



RRB ALP 2024 CBT 2

Assistant Loco Pilot · CEN 01/2024 · CBT 2 · Refrigeration & AC Mechanic Trade · Question Paper

English

All 4 Shifts (Sets) · Official Answer Key

About this Compilation

This booklet contains all 4 shift papers of the RRB ALP 2024 CBT 2 (Refrigeration & AC Mechanic) examination in English, with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

How to use

- Use the **Index** page to jump directly to any set (clickable).
- Questions appear section by section in the order of the paper, numbered 1 onward.
- Diagram and wide-table questions appear at full width at the end of their section.
- The correct answer is highlighted in green with a tick.

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Set 1

02 May 2025
9:30 AM - 12:00 PM

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Set 2

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Set 4

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Part A

100 Questions • Answer Key

Q1 Part A

Which of the following is a geometrical figure with a three-dimensional geometry that has eight vertices and six rectangular faces?

- A. Cylinder
- B. Cuboid
- C. Parallelogram
- D. Pyramid



Q2 Part A

Which of the following best describes the primary function of a digital signature in electronic communication?

- A. It allows the recipient to edit the document before signing.
- B. It verifies the identity of the sender and ensures the integrity of the message.
- C. It automatically archives all electronic documents for future reference.
- D. It encrypts the entire message content to ensure privacy.



Q3 Part A

A fruit seller initially had some apples. He sold 40% of those and still had 300 apples. How many apples did he initially have?

- A. 450
- B. 750
- C. 600
- D. 500



Q4 Part A

Which of the following statements is/are true about Functional Dimensions (F) in engineering drawing?

Statement 1: Functional Dimensions are essential to the function of the component or space.

Statement 2: Functional Dimensions are typically shown without limits.

Statement 3: Functional Dimensions are only shown for reference purposes.

- A. Only statement 3 is true
- B. Only statement 1 is true
- C. Only statements 2 and 3 are true
- D. Only statements 1 and 2 are true



Q5 Part A

If 'A' stands for ' $\div$ ', 'B' stands for ' $\times$ ', 'C' stands for ' $+$ ' and 'D' stands for ' $-$ ', what will come in place of the question mark (?) in the following equation?

$$38 \text{ C } 32 \text{ A } 4 \text{ D } 5 \text{ B } 7 = ?$$

- A. 10
- B. 11
- C. 8
- D. 9



Q6 Part A

Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

- I. Some desks are tables.
- II. All tables are cabinets.
- III. All cabinets are beds.

Conclusions:

- I. Some beds are tables.
- II. All cabinets are desks.

- A. Neither conclusion I nor conclusion II follows.
- B. Both conclusions I and II follow.
- C. Only conclusion II follows.
- D. Only conclusion I follows.



Q7 Part A

Which of the following is the work done by the gravitational force on the object of mass 50 kg when the object is moved from one point to another point along a horizontal line ($g = 10 \text{ m/s}^2$)?

- A. Zero
- B. 500 J
- C. 50 J
- D. -500 J



Q8 Part A

Two plumbers, X and Y, are paid a total of ₹770 per day by their employer. If X is paid 140% of the sum paid to Y, then how much is Y paid (in ₹, rounded off to two decimal places) per day?

A. 320.83



B. 220.83

C. 270.83

D. 370.83

Q9 Part A

In a certain code language,

'A + B' means 'A is the mother of B',
'A - B' means 'A is the brother of B',
'A × B' means 'A is the wife of B' and
'A & B' means 'A is the father of B'.

How is E related to T if 'E & F + G - H × T'?

A. Wife's mother's father



B. Wife's brother

C. Wife's mother's brother

D. Wife's father

Q10 Part A

Which of the following is NOT a benefit of use of mobile governance using ICT?

A. Increased transparency and accountability in the government

B. Increased efficiency in government processes

C. Reduced costs for the government



D. Improved access to government services for citizens

Q11 Part A

Use of energy-efficient machineries in industrial settings primarily helps ____.

A. reduce industrial energy requirement and improve products' competitiveness.



B. decrease operational efficiency

C. increase energy consumption and thereby product cost

D. extend the lifespan of outdated equipment

Q12 Part A

What is the average human body temperature?

A. 42°C

B. 40°C

C. 37°C



D. 32°C

Q13 Part A

What is the term used to describe organisms that produce their own food in an ecosystem?

A. Herbivores

B. Consumers

C. Producers



D. Decomposers

Q14 Part A

Which of the following actions can help prevent slip and fall injuries?

A. Walking on wet floors carefully

B. Ignoring clutter in walkways

C. Cleaning up spills immediately and using warning signs



D. Wearing loose footwear for comfort

Q15 Part A

Simplify $976 \times 265 + 976 \times 735$.

A. 752800

B. 976000



C. 658200

D. 876000

Q16 Part A

What should be done immediately after a fuel spillage in a workshop?

A. Use water to wash it away

B. Evacuate the area and contain the spill using absorbent materials



C. Leave it unattended and inform the supervisor later

D. Cover it with plastic to prevent evaporation



Q17 Part A

Which of the following statements about geometric figures is/are true?

1. Geometric shapes are enclosed figures made by joining two or more points, lines, or curves.
2. Geometric shapes are always open-ended and made up of only straight lines.

- A. Both statements 1 and 2 are true
- B. Only statement 2 is true
- C. Neither statement 1 nor 2 is true
- D. Only statement 1 is true ✓

Q18 Part A

In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Which numbers should replace X and Y so that the pattern followed by the two numbers on the left side of :: is same as that on the right side of ::?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

X : 85 :: 36 : Y

- A. X = 42, Y = 71
- B. X = 43, Y = 77
- C. X = 42, Y = 73 ✓
- D. X = 44, Y = 73

Q19 Part A

Each of Preeti, Kiran, Grace, Ankit, Deepak, Nitin and Neelam has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week. Preeti has an exam on Thursday. Only one person has an exam between Preeti and Nitin. Grace has exam on the day immediately before Nitin but not on a Monday. Only two people have exams between Grace and Deepak. Neelam's exam is on one of the days before Ankit's but on one of the days after Kiran's. Who among the following has an exam on Monday?

- A. Deepak
- B. Nitin
- C. Kiran ✓
- D. Neelam

Q20 Part A

According to the ISO-A size series, what is the designation of a trimmed sheet with dimensions 297 mm × 420 mm?

- A. A1
- B. A2
- C. A3 ✓
- D. A4

Q21 Part A

Which of the following is the best way to identify workplace hazards?

- A. Ignoring small risks
- B. Waiting for an incident to occur
- C. Conducting regular safety inspections ✓
- D. Relying on employees to report accidents

Q22 Part A

What is the total circuit resistance if it contains resistors 10 Ω, 20 Ω and 60 Ω, connected in parallel?

- A. 60 Ω
- B. 90 Ω
- C. 20 Ω
- D. 6 Ω ✓

Q23 Part A

A cube with a mass of 5.74 g occupies a volume of 1.2 cm³. The density (in g/cm³) expressed with the correct number of significant figures is _____.

- A. 4.8 ✓
- B. 4.7833
- C. 4.78
- D. 4.783

Q24 Part A

The average of 5 results is 51 and that of the first 4 is 50. The 5th result is _____.

- A. 55 ✓
- B. 51
- C. 50
- D. 54



Q25 Part A

How many base units are used to measure the physical quantities, according to SI units system?

A. 5

B. 7

C. 10

D. 4

Q26 Part A

The average of three numbers is 20. If two numbers are 16 and 24, the third number is:

A. 22

B. 19

C. 21

D. 20

Q27 Part A

In a certain code language, 'BARE' is coded as '8264' and 'RIDS' is coded as '3587'. What is the code for 'R' in the given code language?

A. 6

B. 3

C. 5

D. 8

Q28 Part A

Potential energy belongs to which of the following categories of energy?

A. Heat energy

B. Light energy

C. Mechanical energy

D. Chemical energy

Q29 Part A

What should come in place of the question mark (?) in the given series?

185 174 163 152 ? 130

A. 143

B. 144

C. 142

D. 141

Q30 Part A

The weight of an object on Earth is 60 N. What is its weight on the surface of the moon?

A. 10 N

B. 60 N

C. 600 N

D. 6 N

Q31 Part A

Which of the following orders of components is primarily responsible for executing instructions, storing permanent firmware, temporarily storing data during program execution and providing a platform for interconnecting hardware components on a computer motherboard?

A. RAM - ROM - CPU - PCB

B. CPU - ROM - RAM - PCB

C. CPU - RAM - ROM - PCB

D. PCB - ROM - CPU - RAM

Q32 Part A

Which of the following devices is used to measure temperature?

A. Thermometer

B. Hygrometer

C. Odometer

D. Voltmeter

Q33 Part A

Which of the following statements regarding the use of a fire extinguisher is/are correct?

Statement 1: It is safe to attempt to extinguish any fire regardless of the presence of toxic smoke.

Statement 2: The P.A.S.S. technique, which stands for Pull, Aim, Squeeze and Sweep, is recommended for the effective use of a fire extinguisher.

A. Only Statement 2 is correct.

B. Neither Statement 1 nor 2 is correct.

C. Only Statement 1 is correct.

D. Both Statements 1 and 2 are correct.



Q34 Part A

Which of the following is the safest method for disposing of toxic dust?

- A. Sweeping it into open areas
- B. Releasing it into the air for dilution
- C. Using specialised hazardous waste disposal containers ✓
- D. Dumping it in regular trash bins

Q35 Part A

Match the columns.

Engineering Applications Type of Engineering Drawings

A) Plan, front elevation of homes to be built, foundation drawings P) Mechanical Engineering Drawings
B) Circuit diagrams and Electrical installation drawings Q) Electronics Engineering drawings
C) PCB tracks drawings R) Electrical Engineering drawings
D) Riveted joints and Welded joints S) Civil Engineering drawings

- A. A-S ; B-R ; C-Q ; D-P ✓
- B. A-S ; B-R ; C-P ; D-Q
- C. A-P ; B-R ; C-Q ; D-S
- D. A-S ; B-P ; C-Q ; D-R

Q36 Part A

The area of a regular polygon with a side of 8 cm is 112 cm^2 . If the perpendicular distance from the centre to the side of the polygon is 7 cm, then the number of sides of the polygon is:

- A. 6
- B. 5
- C. 7
- D. 4 ✓

Q37 Part A

Amit's income in 2019 was ₹27,000. He gets an increment of 10% every year. What was his income (in ₹) in 2021?

- A. 27,000
- B. 29,700
- C. 32,400
- D. 32,670 ✓

Q38 Part A

6 men or 5 women can complete a job in 7 days. 6 men work for 5 days and leave. The number of women required to complete the remaining work in 5 days is:

- A. 1
- B. 4
- C. 3
- D. 2 ✓

Q39 Part A

Four resistors of 4 ohm each are connected in parallel. Four such parallel combinations are then connected in series. The equivalent resistance is _____.

- A. 1 ohm
- B. 2 ohm
- C. 3 ohm
- D. 4 ohm ✓

Q40 Part A

A copper spoon is dipped in hot water. What happens to its other end?

- A. It becomes hot by conduction. ✓
- B. It becomes cold by convection.
- C. It becomes cold by conduction.
- D. It becomes hot by convection.

Q41 Part A

In the following series, only one letter-cluster is incorrect. Select the INCORRECT letter-cluster.

PCO MEM JGK GIJ DKG AME

- A. AME
- B. JGK
- C. GIJ ✓
- D. DKG

Q42 Part A

Which of the following statements is correct about negative work done?

- A. Work done is negative when the force and displacement are in the same direction.
- B. Work done cannot be negative.
- C. Work done is negative when the force is perpendicular to the displacement.
- D. Work done is negative when the force acts opposite to the direction of displacement. ✓



Q43 Part A

In a certain code language, 'CARD' is coded as '8674' and 'MICE' is coded as '3517'. What is the code for 'C' in the given code language?

A. 7



B. 1

C. 8

D. 6

Q44 Part A

Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

A. GMOT

B. LRTY

C. FLNS

D. NTVB

**Q45 Part A**

A man purchased two varieties of pens at the rates of ₹8 for 9 pens and ₹8 per pen. If he purchased an equal number of pens of each of the two varieties and then sold all his pens at ₹6 per pen, what was his profit percentage?

A. 32%

B. 33%

C. 35%



D. 45%

Q46 Part A

Vijay rides a bicycle 10 m from home to his tuition, then 5 m to a shop. He travels back home the same way, covering the same distance. What is his total path length?

A. 20 m

B. 15 m

C. 30 m



D. Zero

Q47 Part A

What should come in place of the question mark (?) in the given series?

893 891 889 887 ? 883

A. 886

B. 986

C. 885



D. 985

Q48 Part A

Which of the following will verify the credentials and documents of applicants uploaded on National Scholarship Portal?

A. Third party

B. National Scholarship Portal

C. Government

D. University/Institute in which applicant is studying

**Q49 Part A**

In the SI system, which of the following options best describes the base quantities?

A. Length, mass, time



B. Distance, speed, acceleration

C. Force, power, energy

D. Temperature, pressure, volume

Q50 Part A

Which of the following statements is/are true?

Statement 1: Heat conductors allow heat to pass through them easily.

Statement 2: All plastics are good conductors of heat.

A. Neither statement 1 nor 2

B. Both statements 1 and 2

C. Only statement 2

D. Only statement 1

**Q51 Part A**

Which type of thermometer is used for measuring the internal temperature of ice?

A. Digital thermometer

B. Laboratory thermometer



C. Clinical thermometer

D. Infrared thermometer



Q52 Part A

If $x^3 + y^3 = 16$ and $x + y = 4$, what is the value of xy ?

A. 2

B. 3

C. 4



D. 0

Q53 Part A

Which of the following relations is NOT correct?

A. Electric Power = (Voltage)² / Resistance

B. Electric Power = Voltage / Current



C. Electric Power = Voltage × Current

D. Electric Power = (Current)² × Resistance

Q54 Part A

Two resistors of resistance 20 Ω and 30 Ω are connected in series in a circuit. What is the current flow in the circuit if the voltage given is 250 V?

A. 5 A



B. 20 A

C. 8 A

D. 12 A

Q55 Part A

Rinku riding his car covers 136 metres in 17 seconds. What is his speed (in km/hr)?

A. 11.6

B. 17

C. 26

D. 28.8

**Q56 Part A**

Which of the following is true?

A. Both insulators and conductors allow heat to pass through them easily.

B. Wood is a good conductor of heat.

C. In a kitchen, aluminium vessels are used because aluminium is a good conductor of heat.



D. Plastic is a good conductor of heat.

Q57 Part A

What is the value of 10 km/hr in SI units?

A. 2.7 m/s



B. 1000 m/s

C. 10 m/s

D. 0.16 m/s

Q58 Part A

Which of the following is a supplementary protocol that allows non-ASCII data to be sent through e-mail?

A. Multipurpose Internet Mail Extensions (MIME)



B. Mailing Lists

C. DNS

D. HTTPS

Q59 Part A

The rate of doing work is known as _____.

A. kinetic energy

B. potential energy

C. power



D. force

Q60 Part A

Ten people are sitting in two parallel rows with five people each in such a way that there is equal distance between adjacent persons.

In row I, A, B, C, D and E are seated and all of them are facing south.

In row II, R, S, T, U and V are seated and all of them are facing north.

Thus each person faces another person from the other row. A sits at the extreme right end of their row and is facing U. R sits at the centre of their row and is facing C. E sits between C and D and is facing T. S sits at the extreme right end of their row.

Who sits exactly opposite B?

A. U

B. V



C. R

D. T



Q61 Part A

An ammeter has 20 divisions between 0 A and 2 A. The least count of ammeter is _____.

- A. 0.2 A
- B. 1 A
- C. 0.1 A
- D. 2 A

Q62 Part A

Which of the following is NOT a valid representation of electrical power P in a circuit? (The current, potential difference and resistance are written symbolically as I , V and R , respectively.)

- A. $P = IR^2$
- B. $P = V^2/R$
- C. $P = I^2R$
- D. $P = VI$

Q63 Part A

Which of the following ecosystems has very low temperatures and frozen soil?

- A. Grassland
- B. Tropical rainforest
- C. Desert
- D. Tundra

Q64 Part A

A 280 m long train running at a speed of 72 km/hr passes a platform in 30 seconds. Find the length of the platform (in m).

- A. 320
- B. 335
- C. 300
- D. 280

Q65 Part A

Jaspreet deposited a sum of ₹58,550 at 20% rate of interest per annum, compounded annually. The total amount (in ₹) received by Jaspreet after 2 years will be:

- A. 84,312
- B. 83,876
- C. 84,735
- D. 84,700

Q66 Part A

Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- A. GN – PV
- B. AH – JR
- C. JQ – SY
- D. HO – QW

Q67 Part A

Kinetic energy and potential energy together are called which form of energy?

- A. Thermal
- B. Mechanical
- C. Nuclear
- D. Chemical

Q68 Part A

Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) ^ T J # * £ B L R Ω Y # E % S U \$ K Q & (Right)

How many such letters are there, each of which is immediately preceded by a letter and also immediately followed by a symbol?

- A. Three
- B. One
- C. Four
- D. Two



Q69 Part A

Ganpat starts from Point A and walks 18 m towards west. He takes a left turn, walks 32 m, takes a left turn, walks 26 m, turns left, walks 61 m and stops at Point B. Meena starts from Point Z, which is 22 m towards the east of Point A. She walks 42 m towards north, takes a right turn, walks 35 m, turns right and walks 13 m and stops at Point Y. What is the shortest distance between Point B and Point Y? (All turns are 90-degree turns only.)

A. 52 m

B. 57 m

C. 49 m

D. 43 m

Q70 Part A

Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

3 - 9 - 12 - 24; 4 - 16 - 20 - 40

A. 1 - 1 - 2 - 4

B. 9 - 2 - 11 - 24

C. 6 - 12 - 18 - 34

D. 7 - 49 - 56 - 122

Q71 Part A

An ammeter of range 0 to 10 A shows a current of 7.5 A. If its true value is 6.2 A, the relative error is _____.

A. 17.33%

B. 13%

C. 20.96%

D. 4.8%

Q72 Part A

In the following triad, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

TERM-ERTM-TMRE

A. ZERO-EZRO-ZREO

B. WHEN-HWEN-WENH

C. USER-RESU-REUS

D. VICE-ICVE-VECI

Q73 Part A

Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) L R Ω Y A \$ K ^ T J # Q & # E % S U * £ B (Right)

How many such symbols are there, each of which is immediately preceded by a vowel and also immediately followed by a letter?

A. Four

B. One

C. Two

D. Three

Q74 Part A

In hot climate regions, the outer walls of the house are preferred to be white in colour because _____.

A. white colour reflects sunlight to make the interior of the house cool

B. white colour looks good

C. white colour absorbs more sunlight to make the house bright

D. white colour makes the wall more durable

Q75 Part A

The areas of three adjacent faces of a solid cuboid are 216 cm², 114 cm² and 19 cm². What is the volume (in cm³) of the cuboid?

A. 955

B. 532

C. 684

D. 880



Q76 Part A

Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of ::?

: HDI :: MIN : %

A. # = JFK, % = KGL



B. # = JFI, % = KGL

C. # = JFK, % = KHL

D. # = JFK, % = KGM

Q77 Part A

On which of the following factors does the resistivity of a conductor depend?

A. Diameter of the conductor

B. Area of the conductor

C. Mass of the conductor

D. Nature of the conductor

**Q78 Part A**

A dozen pairs of jeans quoted at ₹3,520 are available at a discount of 35%. How many pairs of jeans can be bought for ₹572?

A. 1

B. 3



C. 5

D. 2

Q79 Part A

Convert 1 kilowatt hour (kW h) into joule.

A. $1 \text{ kW h} = 3.6 \times 10^3 \text{ J}$

B. $1 \text{ kW h} = 3.6 \times 10^7 \text{ J}$

C. $1 \text{ kW h} = 3.6 \times 10^5 \text{ J}$

D. $1 \text{ kW h} = 3.6 \times 10^6 \text{ J}$

**Q80 Part A**

Megha bought a bag for ₹1,271 after getting a discount of 18% on its marked price. Find the marked price of the bag.

A. ₹1,550



B. ₹1,650

C. ₹1,350

D. ₹1,450

Q81 Part A

Which of the following noise levels is considered potentially harmful to human health if experienced over extended periods?

A. 30 dB

B. 70 dB

C. 90 dB



D. 50 dB

Q82 Part A

Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some bananas are litchis.

All litchis are kiwis.

Some kiwis are strawberries.

Conclusions:

1. All bananas being kiwis is a possibility.

2. All kiwis are litchis.

A. Neither conclusion 1 nor 2 follows

B. Only conclusion 1 follows



C. Only conclusion 2 follows

D. Both conclusions 1 and 2 follow

Q83 Part A

In a hospital, the ratio between the number of doctors and the number of nurses was 1 : 3. When 12 new doctors joined the hospital and 24 nurses left the hospital, the ratio became 3 : 4. After the resignation of k more nurses from the hospital, the ratio becomes 1 : 1. Find the value of k.

A. 28

B. 26

C. 12



D. 24



Q84 Part A

What is the primary source of energy for most of the ecosystems?

- A. Water
- B. Soil
- C. Wind
- D. Sunlight ✓

Q85 Part A

The sum of the ages of Yash and his father is 90 years. When Yash is as old as his father's present age, he will be five times as old as his son Suraj's present age. Suraj will be 12 years older than Yash's present age, when Yash is as old as his father at present. How old is Suraj at present?

- A. 15 years
- B. 18 years
- C. 12 years ✓
- D. 16 years

Q86 Part A

Eight people are sitting in two parallel rows containing 4 people each in such a way that there is equal distance between adjacent persons. In row 1, A, B, C and D are seated, and all of them are facing south. In row 2, P, Q, R and S are seated, and all of them are facing north. Thus, each person faces another person from the other row. Only two people sit between P and Q. A faces the person sitting to the immediate left of P. R sits to the immediate left of S. D sits to the immediate right of C. Who among the following faces P?

- A. B ✓
- B. C
- C. A
- D. D

Q90 Part A

Which of the following expressions is NOT correct for electric power?

- A. $P = \frac{V^2}{R}$
- B. $P = VI$
- C. $P = \frac{I^2}{R}$ ✓
- D. $4. P = I^2R$

Q87 Part A

What should come in place of the question mark (?) in the given alpha-numeric series?

G5, I10, L15, N20, Q25, S30, ?

- A. W35
- B. V40
- C. U35
- D. V35 ✓

Q88 Part A

If $50 : x :: x : 32$, and $x > 0$, then find the value of x.

- A. 45.8
- B. 40.6
- C. 40 ✓
- D. 38.7

Q89 Part A

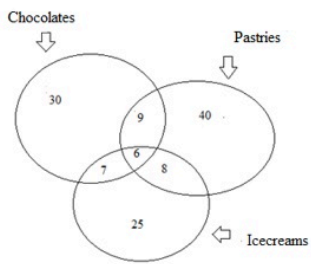
A, B, C, D, E and F live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it is numbered 2 and so on till the topmost floor is numbered 6. D lives on an odd-numbered floor but not 3. The sum of floors on which D and E live is 7. A lives immediately below C. F lives on the top floor. How many people live between E and F?

- A. 2
- B. 3 ✓
- C. 4
- D. 1



Q91 Part A

Study the given diagram carefully and answer the question that follows. The numbers in different sections indicate the number of children preferring different desserts.



How many children prefer both pastries and ice creams but NOT chocolates?

A. 8



B. 7

C. 6

D. 9

Q92 Part A

A piece of rod $\frac{8}{9}$ metre long is broken into two pieces. If one piece is $\frac{1}{3}$ metre long, find the length (in m) of the other piece.

A. $\frac{7}{9}$

B. $\frac{5}{9}$



C. $\frac{2}{9}$

D. $\frac{4}{9}$

Q93 Part A

A cistern has two inlets I_1 and I_2 . I_1 alone can fill it in 8 hours and I_2 in 4 hours. If both the inlets are open, what will be the time required to fill the cistern.

A. 2 hours

B. $4\frac{2}{3}$ hours

C. $2\frac{2}{3}$ hours



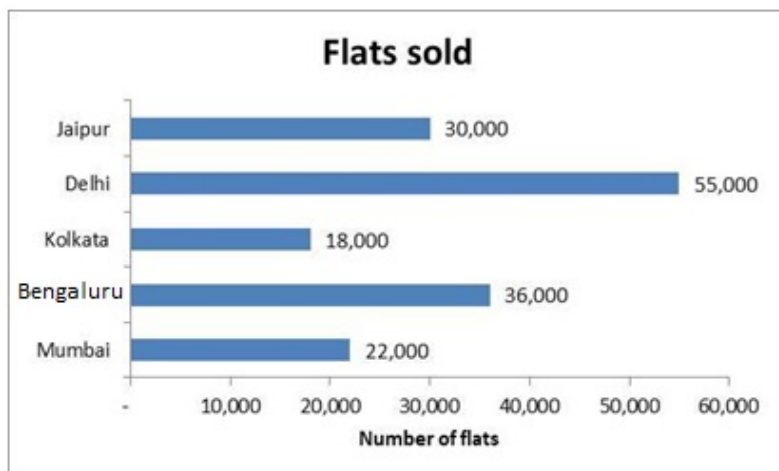
D. $3\frac{2}{3}$ hours



Q94 Part A

Study the given bar-graph and answer the question that follows.

The given bar-graph indicates the number of flats sold by a builder in five different cities in 2020.



The number of flats sold in Delhi is what percentage more than the number of flats sold in Mumbai?

- A. 120%
- B. 75%
- C. 125%
- D. 150%

**Q95** Part A

If $\frac{5}{9}$ of a number is 6 more than $\frac{1}{2}$ of the number, then what is the number?

- A. 102
- B. 104
- C. 108
- D. 106

**Q96** Part A

Find the value of $x^2 + y^2$, given the following.

$$x = 7 + \sqrt{5}, y = 7 - \sqrt{5}$$

- A. 96
- B. 108
- C. 124
- D. 137



Q97 Part A

$$\frac{p^2 - n^2}{pn}$$

A. $\sin A \cdot \cos A$ ✓

B. $\cot A \cdot \cos A$

C. $\frac{\tan A}{\sec A}$

D. $= \cos A \cot A$

Q98 Part A

What does the symbol given below denote in a circuit diagram?



A. Variable resistor ✓

B. Resistor

C. Voltmeter

D. Voltage source

Q99 Part A

From a rectangular cardboard sheet of length 46 m and breadth 8 m, three circular plates of radii 3 m, 2 m and 1 m are cut out. If the area of the remaining part of the cardboard sheet is equal to the area of a square, then find the length of each side of the square (use $\pi = \frac{22}{7}$).

A. 16 m

B. 20 m

C. 18 m ✓

D. 14 m

Q100 Part A

Work done is defined in science as _____.

A. 1. force $\times$ distance

B. $\frac{\text{force}}{\text{distance}}$

C. 3. force $\times$ displacement ✓

D. $\frac{\text{force}}{\text{displacement}}$



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Q101 Part B (Refrigeration & AC Mechanic)

Which of the following parts of a thermostatic expansion valve transmits the diaphragm force to spring to control the flow?

A. Push rod and ball valve ☒

B. Spring retainer

C. Body sealing gasket

D. Superheat spring

Q102 Part B (Refrigeration & AC Mechanic)

What is the primary reason for electrical injuries when a person comes in contact with electrical equipment?

A. Electrical equipment is not properly grounded.

B. Current flows through the body causing harm. ☒

C. Devices are used for too long.

D. Electrical devices are too powerful.

Q103 Part B (Refrigeration & AC Mechanic)

In which of the following types of cooling towers are the eliminators fitted just below the fan and spray nozzles fitted just below the eliminator?

A. Natural draft cooling tower

B. Hyperbolic draft cooling tower

C. Induced draft cooling tower ☒

D. Forced draft cooling tower

Q104 Part B (Refrigeration & AC Mechanic)

Which of the following components of a storage-type water cooler gives initial power for starting winding at the compressor needed and cuts off power supply at running?

A. Fan motor

B. Relay ☒

C. Thermostat

D. Overload protector

Q105 Part B (Refrigeration & AC Mechanic)

Which of the following components of the flake ice machine is a vertically placed drum-shaped stainless-steel container, equipped with the rotating blade?

A. Condenser

B. Evaporator ☒

C. Compressor

D. Tube ice generator

Q106 Part B (Refrigeration & AC Mechanic)

When measuring the resistance of a resistor using an ohmmeter, what does a reading of zero resistance indicate?

A. The resistor is functioning normally.

B. The resistor is open-circuited.

C. The resistor is short-circuited. ☒

D. The ohmmeter is malfunctioning.

Q107 Part B (Refrigeration & AC Mechanic)

Which of the following is INCORRECT regarding the cleaning and care of split AC systems?

A. When removing and replacing the air filters, be sure to touch the heat exchanger ☒

B. Before cleaning the AC, be sure to turn it off and disconnect the power supply cord

C. After washing, allow it to dry thoroughly in a shaded place

D. Be sure the intake grille is installed securely

Q108 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, an electronic expansion valve is a ____.

A. device that meters or regulates the flow of liquid refrigerant to the evaporator ☒

B. device used to measure the moisture content of the air

C. device used to store heat during normal operation of the cycle

D. device used to remove the frost by melting

Q109 Part B (Refrigeration & AC Mechanic)

In refrigeration and air conditioning systems, balance valves are also called the ____.

A. circuit setter ☒

B. circuit breaker

C. coil setter

D. fan coil setter



Q110 Part B (Refrigeration & AC Mechanic)

What is the purpose of an emergency evacuation plan?

- A. To ensure safe and orderly evacuation during emergencies** ✓
- B. To avoid safety drills
- C. To increase productivity
- D. To allow workers to leave early

Q111 Part B (Refrigeration & AC Mechanic)

Which of the following electrical components is used in the refrigeration system to protect the compressor from abnormal operating condition?

- A. Overload protector** ✓
- B. Defrost heater
- C. Fan motor
- D. PTC relay

Q112 Part B (Refrigeration & AC Mechanic)

Which of the following vices consists of a handle and a small collet chuck at one end?

- A. Hand vice
- B. Pin vice** ✓
- C. Pipe vice
- D. Toolmaker's vice

Q113 Part B (Refrigeration & AC Mechanic)

Read the given statements carefully and select the correct option.

Statement 1: In frost-free refrigerator, evaporator fan and condenser fan produces uniform cooling.
Statement 2: In conventional type refrigerator, no fan is provided hence the cooling is not uniform cooling/freezing.

- A. Statement 2 is correct and Statement 1 is incorrect.
- B. Statement 1 is correct and Statement 2 is incorrect.
- C. Both Statement 1 and Statement 2 are incorrect.
- D. Both Statement 1 and Statement 2 are correct.** ✓

Q114 Part B (Refrigeration & AC Mechanic)

In an air-conditioning system, butterfly dampers and multiple vane dampers are ____.

- A. evaporators
- B. duct water-flow controls
- C. duct air-flow controls** ✓
- D. condensers

Q115 Part B (Refrigeration & AC Mechanic)

What is a key advantage of using MOSFETs in electronic circuits compared to other types of transistors?

- A. High frequency response
- B. High input impedance and low power consumption** ✓
- C. Ability to handle higher voltages and currents than BJTs
- D. Ability to amplify both AC and DC signals

Q116 Part B (Refrigeration & AC Mechanic)

Arrange the following steps in the correct order to draw an equilateral triangle with each side of 35 mm.

1. Join CA and CB.
2. Draw a line and mark AB 35 mm as the side of the triangle.
3. With radius AB and center A and B, draw arcs cutting at C.
4. ABC is the required triangle.

- A. 2, 3, 1, 4** ✓
- B. 1, 2, 4, 3
- C. 2, 1, 3, 4
- D. 3, 2, 1, 4

Q117 Part B (Refrigeration & AC Mechanic)

Match the components in Column A with those in Column B.

Column A Column B
Thermometer (A) Measuring solar intensity (P)
Pyrometer (B) Measuring pressure (Q)
Barometer (C) Measuring high temperatures (R)
Pyrometer (D) Measuring ordinary temperatures (S)

- A. A-S, B-R, C-Q, D-P** ✓
- B. A-Q, B-R, C-S, D-P
- C. A-P, B-R, C-Q, D-S
- D. A-S, B-Q, C-R, D-P

Q118 Part B (Refrigeration & AC Mechanic)

Which of the following components of a walk-in cooler is required on freezers to prevent drain line freeze up?

- A. Drain line heater** ✓
- B. Condensate water evaporator
- C. Condenser unit rack
- D. Heat exchanger



Q119 Part B (Refrigeration & AC Mechanic)

Which of the following types of compressors has up to 10 cylinders and is most frequently used in car air-conditioning systems?

- ☒ A. Swash plate compressor
- ☐ B. Scroll type compressor
- ☐ C. Hermetic compressor
- ☐ D. Wobble plate compressor

Q120 Part B (Refrigeration & AC Mechanic)

In a velocity-time graph, the negative slope represents _____.

- ☒ A. retardation
- ☐ B. displacement
- ☐ C. acceleration
- ☐ D. distance

Q121 Part B (Refrigeration & AC Mechanic)

Which of the following statements is/are correct about a commercial refrigeration system?

Statement 1: Condenser water inlet picks up heat from the gas so that it condenses.
Statement 2: Condenser water outlet connects hot water to the cooling tower.

- ☐ A. Only statement 1 is correct.
- ☐ B. Neither statement 1 nor statement 2 is correct.
- ☐ C. Only statement 2 is correct.
- ☒ D. Both statement 1 and statement 2 are correct.

Q122 Part B (Refrigeration & AC Mechanic)

The liquid can get sub-cooled below the saturation temperature in the:

- ☐ A. evaporator
- ☐ B. compressor
- ☐ C. expander
- ☒ D. condenser

Q123 Part B (Refrigeration & AC Mechanic)

In Duct Insulation of Refrigeration and Air-Conditioning, EPDM stands for _____.

- ☐ A. Ethyl Propylene Dual Monomer
- ☐ B. Ethylene Propylene Diene Material
- ☒ C. Ethylene Propylene Diene Monomer
- ☐ D. Ethylene Polymer Diene Monomer

Q124 Part B (Refrigeration & AC Mechanic)

Which of the following hand-operated drilling machines is used for drilling small diameter holes up to 6 mm?

- ☐ A. Electric hand drill
- ☐ B. Ratchet drilling machine
- ☐ C. Breast drilling machine
- ☒ D. Bevel gear type drilling machine

Q125 Part B (Refrigeration & AC Mechanic)

If the current flowing through a conductor is 5 A and the resistance of the conductor is 10 ohms, what will be the voltage across the conductor, according to Ohm's Law?

- ☐ A. 15 V
- ☒ B. 50 V
- ☐ C. 5 V
- ☐ D. 10 V

Q126 Part B (Refrigeration & AC Mechanic)

_____ is the process of adding moisture to the air without affecting its dry bulb temperature.

- ☐ A. Isothermal process
- ☒ B. Humidification
- ☐ C. De-humidification
- ☐ D. Adiabatic process

Q127 Part B (Refrigeration & AC Mechanic)

Which of the following processes of maintaining central AC always follows the detailed instructions provided by equipment manufactures or system designers?

- ☐ A. Log sheets
- ☒ B. Starting procedure
- ☐ C. Post start-up checks
- ☐ D. Pre-start-up checks



Q128 Part B (Refrigeration & AC Mechanic)

The low side component of the vapour compression refrigeration system, where the refrigerant absorbs heat by evaporating, is _____.

- A. compressor
- B. suction line
- C. discharge line
- D. condenser

Q129 Part B (Refrigeration & AC Mechanic)

Which of the following factors is responsible for the maintenance of any desired temperature within an enclosed space even though the temperature of the outside air is above or below the desired room temperature?

- A. Temperature of air
- B. Motion of air
- C. Humidity of air
- D. Purity of air

Q130 Part B (Refrigeration & AC Mechanic)

_____ is the space where heat exchange takes place in direct expansion plants of Central Industrial Air Conditioning systems.

- A. Aerosol Handling Unit
- B. Air Handling Unit
- C. Automotive Handling Unit
- D. Automobile Handling Unit

Q131 Part B (Refrigeration & AC Mechanic)

In industrial air conditioning systems, a pipe line is provided from the condenser to the cooling tower to circulate _____.

- A. gas
- B. chlorine
- C. water
- D. air

Q132 Part B (Refrigeration & AC Mechanic)

The unit for specific gravity is _____.

- A. m/s^2
- B. g/cm^3
- C. kg/m^3
- D. no unit (dimensionless)

Q133 Part B (Refrigeration & AC Mechanic)

_____ exists when a system changes its state due to temperature difference between the system and its surroundings.

- A. Diffusion
- B. Work
- C. Mass flow
- D. Heat

Q134 Part B (Refrigeration & AC Mechanic)

What are 'Thermal insulators' in Refrigeration and Air Conditioning systems?

- A. Materials that retard or offer resistance to the flow of air through it
- B. Materials that retard or offer resistance to the flow of water through it
- C. Materials that retard or offer resistance to the flow of heat through it
- D. Materials that retard or offer resistance to the friction

Q135 Part B (Refrigeration & AC Mechanic)

In which of the following types of refrigeration system, a lighter gas compared to the refrigerant vapour is introduced into the system?

- A. Three fluid absorption system
- B. Ice refrigeration system
- C. Liquid gas refrigeration system
- D. Dry ice refrigeration system

Q136 Part B (Refrigeration & AC Mechanic)

When using a multimeter to measure current, which of the following is correct?

- A. The multimeter is connected directly to the power source.
- B. The multimeter is connected in series with the load.
- C. The multimeter is connected only across resistive components.
- D. The multimeter is connected in parallel with the load.

Q137 Part B (Refrigeration & AC Mechanic)

In horizontal type bottle coolers, _____ air convection is present inside the storage cooling compartment.

- A. neutral
- B. natural
- C. forced
- D. obligatory



Q138 Part B (Refrigeration & AC Mechanic)

The ____ in an air-conditioning system allows heat to flow from the hot refrigerant to the cooler outside air.

A. condenser



B. evaporator

C. turbine

D. compressor

Q139 Part B (Refrigeration & AC Mechanic)

What is the advantage of giving heat treatment to a material?

A. To decrease the melting point of the material

B. To increase the weight of the material

C. To change it from one element to another element

D. To make surgical knives of sharp edges



Q140 Part B (Refrigeration & AC Mechanic)

Which of the following files is used for filing narrow grooves and angles above 10°?

A. Knife-edge file



B. Half round file

C. Square file

D. Triangular file

Q141 Part B (Refrigeration & AC Mechanic)

In the refrigeration system, ____ refrigerants are the heat carriers that directly cool the material by absorbing latent heat.

A. highly flammable

B. secondary

C. primary



D. nitrogen

Q142 Part B (Refrigeration & AC Mechanic)

Which of the following organisations is responsible for enforcing workplace safety regulations in India?

A. World Health Organization (WHO)

B. Food and Drug Administration (FDA)

C. Directorate General of Factory Advice Service and Labour Institutes (DGFASLI)



D. Environmental Protection Agency (EPA)

Q143 Part B (Refrigeration & AC Mechanic)

A circuit consists of three resistors; 15 ohms, 10 ohms, and 20 ohms. The 15-ohm resistor is in series with the parallel combination of the 10-ohm and 20-ohm resistors. If a 24 V battery is applied across the circuit, what is the total current flowing through the circuit?

A. 3.1 A

B. 0.1 A

C. 1.1 A



D. 2.1 A

Q144 Part B (Refrigeration & AC Mechanic)

According to BIS SP 46-2003, which of the following applications is correctly represented by a chain-thin line in engineering drawings?

A. Center lines



B. Hidden edges

C. Dimension lines

D. Visible edges

Q145 Part B (Refrigeration & AC Mechanic)

In the operations of a cold storage plant, _____ is used to protect the plant components against unusual working conditions.

A. Temperature control

B. Safety control



C. Moisture control

D. Fluid control

Q146 Part B (Refrigeration & AC Mechanic)

_____ moves from one point to another through air in air conditioning systems.

A. Air borne sound



B. Structure borne sound

C. Water borne sound

D. Refrigerant borne sound

Q147 Part B (Refrigeration & AC Mechanic)

The _____ device is used for producing cold in a refrigeration system.

A. manifold gauge tool

B. condenser

C. economiser

D. vortex tube



Q148 Part B (Refrigeration & AC Mechanic)

Why is it important for every person to follow safety procedures in the workplace?

- A. To increase overall production efficiency
- B. To minimise risks and avoid accidents ✓
- C. To reduce operational costs significantly
- D. To limit the need for frequent supervision

Q149 Part B (Refrigeration & AC Mechanic)

In a vapor compression system, the condensed liquid refrigerant from the condenser is stored in a vessel known as _____.

- A. receiver ✓
- B. evaporator
- C. condenser
- D. expansion valve

Q150 Part B (Refrigeration & AC Mechanic)

Which of the following motors is used for condensing units and cooling coils of bottle coolers?

- A. Slip ring induction motor
- B. Capacitor-start capacitor-run induction motor
- C. Squirrel cage induction motor
- D. Shaded pole induction motor ✓

Q151 Part B (Refrigeration & AC Mechanic)

For what purpose are pins and clips used in engineering drawings?

- A. To transfer dimensions and dividing lines into a number of equal parts
- B. To draw horizontal lines, parallel lines and to guide/hold the set squares
- C. To fasten the drawing sheet on to the drawing board firmly so that it does not shake ✓
- D. To support the drawing paper/tracing paper for making drawings

Q152 Part B (Refrigeration & AC Mechanic)

In a lead-acid battery, what is the chemical composition of the material used for the positive plate during discharge?

- A. Sulphuric acid (H_2SO_4)
- B. Lead (Pb)
- C. Lead dioxide (PbO_2) ✓
- D. Lead sulfate (PbSO_4)

Q153 Part B (Refrigeration & AC Mechanic)

When selecting a sheet size for an original drawing, what should be the primary consideration?

- A. The standard size of the drawing office.
- B. The clarity and resolution required. ✓
- C. The orientation of the drawing (horizontal or vertical).
- D. The size of the reproduction.

Q154 Part B (Refrigeration & AC Mechanic)

If the diameter of the bare tube coil evaporators is too small, then:

- A. the system efficiency increases
- B. the system efficiency reduces ✓
- C. the pressure drop due to friction becomes too low
- D. the pressure drop due to friction becomes zero

Q155 Part B (Refrigeration & AC Mechanic)

Which of the following advantages of AC motor over DC motor is INCORRECT?

- A. AC motors have higher startup power demands. ✓
- B. AC motors are more durable and have a longer life expectancy than DC motors.
- C. AC motors are more efficient than DC motors.
- D. AC motors have fewer moving parts than DC motors.

Q156 Part B (Refrigeration & AC Mechanic)

Match the refrigerant control expansion valves with their correct functions.

Refrigerant controls	Functions
A. Suction-line regulators	P. Limit the flow of gas to the compressor to prevent surge or excessive loads
B. Check valves	Q. Interrupt the flow on demand from any one of several types of temperature or pressure-sensing devices
C. Solenoid valves	R. Prevent the flow of gas from the condenser
D. Hold back valves	S. Control the flow of refrigerant gas from the evaporator coil

- A. A-P, B-R, C-Q, D-S ✓
- B. A-S, B-P, C-Q, D-R
- C. A-S, B-R, C-Q, D-P
- D. A-S, B-R, C-P, D-Q



Q157 Part B (Refrigeration & AC Mechanic)

Which of the following are the two methods of charging refrigerants into systems?

- A. Charging by specific volume and Charging by diffusivity
- B. Charging by viscosity and Charging by volume
- C. Charging by density and Charging by colour
- D. Charging by weight and Charging by volume ✓

Q158 Part B (Refrigeration & AC Mechanic)

In refrigeration systems, 'FCU' stands for ____.

- A. Fan Coil Unit ✓
- B. Fan Control Unit
- C. Freezer Coil Unit
- D. Freezer Control Unit

Q159 Part B (Refrigeration & AC Mechanic)

Non-functional dimensions are _____.

- A. not essential for the function of the space or component ✓
- B. essential for the function of the space or component
- C. derived from the values of the related features of a drawing
- D. directly derived from the values given on a drawing

Q160 Part B (Refrigeration & AC Mechanic)

What is a refrigeration system?

- A. The equipment employed to maintain a system at a high temperature.
- B. The equipment employed to maintain a system at a low pressure.
- C. The equipment employed to maintain a system at a high pressure.
- D. The equipment employed to maintain a system at a low temperature. ✓

Q161 Part B (Refrigeration & AC Mechanic)

Which of the following parts of a file is the part fitted to the tang for holding the file?

- A. Tip or Point
- B. Handle ✓
- C. Edge
- D. Tang

Q162 Part B (Refrigeration & AC Mechanic)

Which of the following factors should be controlled in order to keep constant temperature throughout the conditioned space?

- A. Motion of air ✓
- B. Humidity of air
- C. Temperature of air
- D. Purity of air

Q163 Part B (Refrigeration & AC Mechanic)

Which of the following types of pliers is used to shape loops in wires and to form curves in light metal strips?

- A. Flat nose pliers
- B. Round nose pliers ✓
- C. Slip-joint pliers
- D. End cutting pliers

Q164 Part B (Refrigeration & AC Mechanic)

Gaskets, seals and spacers are made using:

- A. centre punch
- B. hollow punch ✓
- C. pin punch
- D. prick punch

Q165 Part B (Refrigeration & AC Mechanic)

Which of the following components of an automotive AC system store refrigerant, filter particles, absorb moisture and separate vaporous R134a from liquid R134a?

- A. Compressor
- B. Condenser
- C. Accumulator ✓
- D. Evaporator

Q166 Part B (Refrigeration & AC Mechanic)

_____ is a type of refrigerated cabinet that displays merchandise as well as cools it.

- A. Visible heater
- B. Undercounter cooler
- C. Visible cooler ✓
- D. Hidden cooler



Q167 Part B (Refrigeration & AC Mechanic)

In an automotive air conditioning system compressor, the pistons are operated by a _____, which moves them backwards and forwards in the cylinders.

- A. crank shaft
- B. gear plate
- C. connecting rod
- D. wobble plate



Q168 Part B (Refrigeration & AC Mechanic)

What is the function of a condenser in air-conditioning systems?

- A. Prevents chocking of cooling air
- B. Blows the cool air to the duct
- C. Rejects heat from refrigerant vapour and turns it to liquid
- D. Picks up heat from return air



Q169 Part B (Refrigeration & AC Mechanic)

Which of the following parts of the softy machine admits and shuts the flow of an ice cream?

- A. Shaft bearing
- B. Churner shaft with conveyor
- C. Sight glass
- D. Ice cream outlet valve



Q170 Part B (Refrigeration & AC Mechanic)

A drawing instrument box is used to carry all _____ instruments.

- A. drawing
- B. screening
- C. drilling
- D. casting



Q171 Part B (Refrigeration & AC Mechanic)

A circular hole of radius 3 cm is cut from a rectangular sheet of dimensions 12 cm × 10 cm. Find the remaining area.

(Take $\pi = 3.14$)

- A. 100 cm²
- B. 91.74 cm²
- C. 95.86 cm²
- D. 75.74 cm²



Q172 Part B (Refrigeration & AC Mechanic)

What should you do to ensure your personal safety at work?

- A. Wear personal protective equipment.
- B. Work in a hurry without checking equipment.
- C. Ignore warning signs and instructions.
- D. Take risks to finish tasks quickly.



Q173 Part B (Refrigeration & AC Mechanic)

Which of the following is an important safety measure during a power failure?

- A. Using candles for lighting
- B. Continuing to use equipment without verifying power status
- C. Ensuring all machines and electrical equipment are turned off
- D. Ignoring alarm systems



Q174 Part B (Refrigeration & AC Mechanic)

$$\left(\frac{3}{8}\right) + \left(\frac{5}{12}\right)$$

A. $\frac{17}{24}$

B. $\frac{19}{24}$ 

C. $\frac{8}{20}$

D. $\frac{7}{12}$

Q175 Part B (Refrigeration & AC Mechanic)

$$\cos\theta$$

A. $\frac{3}{5}$

B. $\frac{4}{5}$ 

C. $\frac{5}{4}$

D. $\frac{3}{4}$



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Part A

100 Questions • Answer Key

Q1 Part A

A, B, C, D, E, F and G are sitting around a circular table facing the centre. Only two people sit between G and C when counted from the left of C. F sits third to the left of E. B sits to the immediate right of E. B sits second to the left of G. D is an immediate neighbour of F. How many people sit between A and C when counted from the right of C?

A. 1

B. 4

C. 2



D. 3

Q2 Part A

Which of the following terms describes the process of the gradual increase in the average temperature of the Earth's atmosphere, due to the greenhouse effect caused by increased levels of carbon dioxide, CFCs and other pollutants?

A. Global warming



B. Ozone depletion

C. Deforestation

D. Acid rain

Q3 Part A

What is the normal range of temperature for a healthy human body in Kelvin?

A. (283.15-323.15) K

B. (308.15-315.15) K



C. (301.15-323.15) K

D. (293.15-323.15) K

Q4 Part A

The measures of two supplementary angles are in the ratio 3 : 7. Find the measure of the greater of the two angles.

A. 126° B. 54° C. 180° D. 144°

Q5 Part A

Which of the following statements is correct?

A. There is no method to convert temperature from one temperature scale to another.

B. The normal human body temperature is 45°C .

C. Laboratory thermometer is used to measure human body temperature.

D. The normal human body temperature is 98.6°F .

Q6 Part A

SI unit of luminous intensity is ____.

A. candela



B. mole

C. metre

D. watt

Q7 Part A

Mechanical energy is the sum of ____.

A. electrical energy and light energy

B. chemical energy and electrical energy

C. potential energy and kinetic energy



D. heat energy and chemical energy

Q8 Part A

The body of the cooking vessel is of metal and handles are of plastic because ____.

A. metal is a good conductor of heat and plastic is an insulator



B. both metal and plastic are insulators

C. metal is an insulator and plastic is a good conductor of heat

D. both metal and plastic are good conductors of heat

Q9 Part A

Find the least number which when divided by 5, 6 and 7 leaves remainders 4, 5 and 6.

A. 207

B. 208

C. 209



D. 210



Q10 Part A

Find the four-digit dividend of 21, 42, 147 and 105 that will give the remainder 14, 35, 140 and 98, respectively.

A. 8813



B. 8019

C. 8034

D. 8816

Q11 Part A

How many folds is/are required to fold an A2 size drawing sheet (420 mm × 594 mm), according to BIS SP: 46-2003?

A. 2 folds

B. 1 fold

C. 4 folds

D. 3 folds

**Q12 Part A**

Generally, what is the process of heat transfer in liquids?

A. Both conduction and radiation

B. Convection



C. Conduction only

D. Radiation only

Q13 Part A

A rheostat in the electrical circuit is used to _____.

A. measure the voltage only

B. measure the current and voltage both

C. change the resistance in the circuit



D. measure the current only

Q14 Part A

If a force of 6 N is applied on a body, which is displaced through 2 m in the direction of the force, the work done is found to be _____.

A. 3 J

B. 4 J

C. 10 J

D. 12 J

**Q15 Part A**

If a ball is thrown upwards, the work done by the gravitational force on the ball is _____.

A. zero

B. negative



C. positive

D. independent of the displacement of the ball

Q16 Part A

An $8\ \Omega$ resistor generates 200 J of heat every second. What is the potential difference across the resistor?

A. 10 V

B. 20 V

C. 30 V

D. 40 V

**Q17 Part A**

A fruit seller had some apples. He sold 40% of the apples and now has 840 apples. How many apples did he originally have?

A. 1260

B. 2100

C. 1800

D. 1400

**Q18 Part A**

Kaushik starts from Point A and walks 32 m towards the east. He takes a right turn, walks 16 m and then takes a right turn, walks 14 m, reaches Point B and stops. Chitra starts from Point Z which is 60 m towards the east of Point A. She walks 18 m towards north, takes a right turn, walks 19 m, turns right and walks 65 m, turns right and walks 61 m and stops at Point Y. What is the shortest distance between Point B and Point Y? (All turns are 90 degree turns only.)

A. 33 m

B. 31 m



C. 29 m

D. 25 m



Q19 Part A

The list price of an article is ₹5,100 and a discount of 32% is offered on the list price. What additional discount per cent on the already discounted price must be offered to a customer to bring the net selling price to ₹1,734?

A. 46%

B. 49%

C. 55%

D. 50%

**Q20 Part A**

The value of $32 - 4 [4 + 5 (4 - 4 (6 - 2) + 4) - 18] \div 6$ is:

A. 58

B. 68



C. 60

D. 56

Q21 Part A

Which of the following materials serves as a heat insulator?

A. Silver

B. Copper

C. Plastic



D. Aluminium

Q22 Part A

Which of the following is commonly used to treat drinking water?

A. Acid neutralisation

B. Chlorination



C. Oil filtration

D. Incineration

Q23 Part A

Which of the following options represents the equation for work done?

A. Work done = force – displacement

B. Work done = force / displacement

C. Work done = force × displacement



D. Work done = force + displacement

Q24 Part A

How does the thermal pollution of water affect the water quality?

A. Increases pH of water

B. Oxygen level in water gets reduced



C. Sediments get settled soon

D. Alters the colour of water

Q25 Part A

In a certain code language,
'A × B' means 'A is the son of B',
'A – B' means 'A is the brother of B',
'A + B' means 'A is the wife of B' and
'A % B' means 'A is the father of B'.

How is M related to T if 'M × N – P % S + T'?

A. Wife's mother's brother

B. Wife's mother's brother's son

C. Wife's father's brother's son



D. Wife's father's brother

Q26 Part A

Which of the following letter-number clusters will replace the question mark (?) in the given series?

6S, 24T, 12V, 48Y, 24C, ?

A. 96H



B. 96I

C. 96G

D. 60H

Q27 Part A

The resistance of a particular material wire with length L and cross-sectional area A is $2\ \Omega$. What would be the resistance of another wire of the same material having length 2L and area of cross-section A/2?

A. $1\ \Omega$

B. $2\ \Omega$

C. $8\ \Omega$



D. $4\ \Omega$



Q28 Part A

A person saves 10% of his monthly income. If his monthly income increases by 30%, then he saves 20% more than the previous savings. The percentage increase in his expenditure, correct to two places after decimal, is _____.

- A. 37.33%
- B. 24.89%
- C. 40.44%
- D. 31.11%

**Q29 Part A**

What is the recommended action before replacing a fuse?

- A. Wear a safety belt.
- B. Use rubber gloves.
- C. Switch off circuit.
- D. Stand on a stool.

**Q30 Part A**

The sum of the ages of a grandfather, his son, and his grandson is 128 years. The grandfather is twice as old as his son, and the son is five times as old as the grandson. Determine the age (in years) of the grandson.

- A. 6
- B. 8
- C. 7
- D. 9

**Q31 Part A**

Which of the following statements is correct?

- A. On increasing the length of the conductor, resistance is decreased.
- B. On increasing the length of the conductor, resistance is increased.
- C. On increasing the thickness of the conductor, resistance is increased.
- D. On increasing the length of the conductor, resistance remains unchanged.

**Q32 Part A**

If the arithmetic mean of A and B is 70 and the arithmetic mean of B and C is 110, what is the value of C – A?

- A. 90
- B. 60
- C. 70
- D. 80

**Q33 Part A**

Which of the following processes is primarily responsible for heat loss from a hot utensil?

- A. Radiation
- B. Conduction
- C. Absorption
- D. Convection

**Q34 Part A**

A man purchased two varieties of apples at the rate of ₹4 for 5 apples and ₹4 per apple, respectively. If he purchased an equal number of apples of each variety and then sold all the apples at ₹3 per apple, what will be his profit percentage?

- A. 0.24%
- B. 0.25%
- C. 0.23%
- D. 0.2%

**Q35 Part A**

In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Which numbers should replace X and Y so that the pattern followed by the two numbers on the left side of :: is same as that on the right side of ::?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

X : 179 :: 22 : Y

- A. X = 15, Y = 223
- B. X = 16, Y = 222
- C. X = 18, Y = 219
- D. X = 16, Y = 219



Q36 Part A

Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

68 – 136 – 121 – 363; 29 – 58 – 43 – 129

A. 35 – 70 – 55 – 165



B. 73 – 146 – 114 – 228

C. 13 – 26 – 46 – 138

D. 42 – 84 – 74 – 222

Q37 Part A

In a certain code language, 'GIFT' is coded as '8264' and 'FEAR' is coded as '3527'. What is the code for 'F' in the given code language?

A. 2



B. 6

C. 5

D. 3

Q38 Part A

In the following series, only one letter-cluster is incorrect. Select the INCORRECT letter-cluster.

INK KPJ MRI OTH QWG SXF

A. QWG



B. SXF

C. MRI

D. OTH

Q39 Part A

Calculate the kinetic energy of a body of mass 10 kg moving with a uniform velocity of 5 m s^{-1} .

A. 120 J

B. 50 J

C. 125 J



D. 25 J

Q40 Part A

Neha swims in a pool that is 50 metres long. She covers 100 metres in 1 minute by swimming from one end of the pool to the other and back along the same straight path. Find her average velocity (in m/s).

A. 0 m/s



B. 2.5 m/s

C. 3.2 m/s

D. 1.7 m/s

Q41 Part A

Which chemical process involves replacing the R group of an alcohol with the R' group of an ester to produce biodiesel from vegetable oils?

A. Transesterification



B. Fermentation

C. Distillation

D. Polymerisation

Q42 Part A

In this question, two statements I and II have been given. These statements may be independent causes or effects of independent causes or a common cause. One of the statements may be the effect of the other statement. Read both the statements carefully and select the correct answer.

I. The local river's water levels have reached an all-time low this summer, disrupting water supply to the nearby towns.

II. Several power plants in the region have reported reduced electricity production due to insufficient water for cooling processes.

A. Both I and II are effects of independent causes.

B. II is the cause and I is its possible effect.

C. Both I and II are independent causes.

D. I is the cause and II is its possible effect.



Q43 Part A

Which of the following statement(s) is/are true regarding electrical safety practices?

1. It is safe to plug multi-outlet bars into other multi-outlet bars as long as the total load does not exceed the rated capacity of the outlets.
2. Electrical equipment should not be used near wet surfaces or when your hands are wet, and power cords should be protected by avoiding placement under rugs or mats.

- A. Only Statement 1 is true.
- B. Only Statement 2 is true. ✓
- C. Both Statements 1 and 2 are true.
- D. Neither Statement 1 nor 2 is true.

Q44 Part A

What is the most effective way to avoid mechanical hazards when operating large and dangerous machines?

- A. Employee physical fitness training only
- B. Machine redesign to eliminate hazards
- C. Proper training and experience ✓
- D. Regular machine maintenance only

Q45 Part A

Which of the following factors affect(s) the resistance of a wire?

- A. The length, cross-sectional area and material of the wire ✓
- B. Only material of the wire
- C. Only length and cross-sectional area of the wire
- D. Only length of the wire

Q46 Part A

What is the primary purpose of information kiosks set up by the government?

- A. To offer citizens easy access to information and services such as bill payments, registrations and public information ✓
- B. To enable government employees to monitor social media activities of citizens
- C. To allow citizens to participate in online gaming competitions
- D. To provide free food and beverages to citizens

Q47 Part A

For a given potential difference (V), current (I) and resistance (R) across a conductor, Ohm's law is represented as:

- A. $V = I + R$
- B. $V = I - R$
- C. $I = VR$
- D. $V = IR$ ✓

Q48 Part A

Which of the following features is NOT available in Google Docs?

- A. Insert images
- B. Comment on text
- C. Create tables
- D. Track changes ✓

Q49 Part A

A train goes from A to B at a speed of 40 km/hr and returns from B to A by the same route at 10 km/hr. The average speed (in km/hr) of the train during the two-way journey is:

- A. 16 ✓
- B. 19
- C. 14
- D. 15

Q50 Part A

A, B, C, D, E, F and G are sitting around a circular table facing the centre. G is sitting second to the left of E. B is sitting third to the right of A. C is the immediate neighbour of both E and B. D is sitting to the immediate left of G. How many people are sitting between E and F when counted from the right of E?

- A. Two ✓
- B. One
- C. Three
- D. Four



Q51 Part A

Samir takes 6 days to complete a piece of work, while Tanvir can complete it in 8 days. If Amir also joins them, together, the trio can complete the entire work in 3 days. If a total sum of ₹2,400 is to be paid for the job, how much will Amir receive for his contribution?

A. ₹300



B. ₹430

C. ₹250

D. ₹340

Q52 Part A

Which of the following is an example of preventive maintenance?

A. Using equipment until failure occurs

B. Conducting regular lubrication and inspections



C. Waiting for a machine to break down before repairing it

D. Ignoring minor faults to save costs

Q53 Part A

In a rare coin collection, there was one gold coin for every five non-gold coins. Then, 18 more gold coins were added to the collection, after which the ratio of gold coins to non-gold coins became 5 : 7. How many coins in all are now there in the collection?

A. 75

B. 45

C. 55

D. 60

**Q54 Part A**

An auto A covers a distance in 2 hours at the speed of 42 km/hr. Another auto B covers twice the distance covered by A in 5 hours. What is the speed of auto B (in km/hr)?

A. 31.2

B. 36.3

C. 34.2

D. 33.6

**Q55 Part A**

The resistance of a uniform metallic conductor depends on its:

A. melting point only

B. length, area of cross-section, and nature of its material



C. area of cross-section only

D. length only

Q56 Part A

What will come in place of the question mark (?) in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?

$$9 \div 5 + 70 \times 7 - 11 = ?$$

A. 45

B. 44

C. 46



D. 47

Q57 Part A

Which of the following units are used to measure only fundamental physical quantities?

A. Neither base nor derived units

B. Base units



C. Derived units

D. Both base and derived units

Q58 Part A

Identify the correct pair of Personal Protective Equipment (PPE) categories based on the nature of the hazard.

A. Non-respiratory: Safety goggles, Respiratory: Safety gloves

B. Non-respiratory: Nose mask, Respiratory: Safety boots

C. Non-respiratory: Ear plugs, Respiratory: Safety shoes

D. Non-respiratory: Safety helmet, Respiratory: Nose mask



Q59 Part A

A, B, C and D are four partners in a business. A's investment is two-thirds of D's investment. B and C invest equal amounts, and C's investment is half of D's investment. If they earn ₹137.6 lakh at the end of one year, then find the total share (in ₹ lakh) of A and B put together.

A. 60.2



B. 59.2

C. 63.2

D. 62.2

Q60 Part A

A bulb is connected across a battery of 10 V for 20 seconds. If a current of 2 A flows through it, calculate the heat energy generated by the bulb.

A. 200 J

B. 120 J

C. 100 J

D. 400 J

**Q61 Part A**

Which of the following is NOT a heat insulator?

A. Silver



B. Plastic

C. Wool

D. Rubber

Q62 Part A

Select the option that is true regarding the following two statements labelled Assertion (A) and Reason (R).

Assertion (A): It is safe to work under a suspended load if you are in a hurry.

Reason (R): Never exceed the safe working load (SWL) of the equipment you are using.

A. Assertion (A) is false, but Reason (R) is true.



B. Assertion (A) is true, but Reason (R) is false.

C. Both (A) and (R) are true, and (R) is the correct explanation of (A).

D. Both (A) and (R) are true, but (R) is not the correct explanation of (A).

Q63 Part A

What should come in place of the question mark (?) in the given series?

197 112 189 129 181 146 173 163 ?

A. 165



B. 156

C. 144

D. 153

Q64 Part A

What is the typical range of wind speed (in m/s) required for the efficient operation of most commercial wind turbines?

A. 12 - 25 m/s

B. 0 - 2 m/s

C. 3 - 5 m/s

D. 5 - 15 m/s

**Q65 Part A**

A car starts from New Delhi and travels to Agra. The distance between the two cities is 300 km. The car travels back to New Delhi. What is the total distance travelled and the displacement of the car? (Assume the car reaches the same point and the route followed is exactly same for both travels.)

A. Distance travelled is 600 km and displacement is 0 km



B. Distance travelled is 300 km and displacement is 0 km

C. Distance travelled is 0 km and displacement is 0 km

D. Distance travelled is 0 km and displacement is 600 km

Q66 Part A

If $46.4 : x :: x : 2.9$, and $x > 0$, then find the value of x .

A. 15.6

B. 13.4

C. 11.6



D. 14.3



Q67 Part A

A, B, C, D, E and F live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it is numbered 2 and so on till the topmost floor, which is numbered 6. F lives on an even-numbered floor but not on floor 6. The sum of the floors on which D and F live is 9. The sum of the floors on which F and B live is 5. E lives immediately below C. How many people live between D and E?

A. 1

B. 2

C. 4

D. 3

Q68 Part A

Which of the following fundamental quantities are used to express any mechanical quantity?

A. Length, time and energy

B. Length, mass and time

C. Length, mass and speed

D. Mass, time and force

Q69 Part A

Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

Some cats are rats.

All bats are tables.

All rats are bats.

Conclusions:

(I): Some cats are bats.

(II): All bats are rats.

A. Only conclusion (I) follows.

B. Both conclusions (I) and (II) follow.

C. Only conclusion (II) follows.

D. Neither conclusion (I) nor (II) follows.

Q70 Part A

A class of 30 students appeared in a test. The average score of 12 students is 68, and that of the rest is 70. What is the average score of the class?

A. 68.2

B. 70.2

C. 67.2

D. 69.2

Q71 Part A

Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) ^ T J # L R Ω Y # E % S U \$ K Q & * £ B (Right)

How many such symbols are there each of which is immediately preceded by a letter and also immediately followed by another symbol?

A. One

B. Two

C. Three

D. Four

Q72 Part A

In a project involving the design of a pipeline for a building, which technical drawings would need to be referenced together?

A. Electrical and Electronics

B. Mechanical and Electrical

C. Civil and Electronics

D. Mechanical and Civil

Q73 Part A

Which ICT (Information and Communication Technology) service is commonly used for activities like railway reservation in e-Governance?

A. Web portals

B. Online payment gateways

C. Email services

D. Social media platforms

Q74 Part A

In the following triad, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

GRAND-GRNAD-DNARG

A. MINOR-MOINR-RNOIM

B. INDEX-DEXIN-XDEIN

C. NIGHT-NGHIT-THGIN

D. FRUIT-FRIUT-TIURF



Q75 Part A

Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

A. NQIL

B. RUNP

C. BEWZ

D. WZRU

Q76 Part A

What is the first step in providing first aid for a minor burn?

A. Apply butter to the burn

B. Run cool water over the burn

C. Cover the burn with a thick cloth

D. Pop any blisters that form

Q77 Part A

Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) ^ T J # L R Ω Y # % S U \$ E K Q & * £ B (Right)

How many such symbols are there, each of which is immediately preceded by a symbol and also immediately followed by a letter?

A. One

B. Two

C. Three

D. Four

Q78 Part A

A product, whose MRP is ₹1,590, is sold for ₹835 by a wholesale shop owner. What is the percentage of discount given by him (nearest to its integer)?

A. 49%

B. 46%

C. 47%

D. 45%

Q79 Part A

How many fundamental units are there in the SI system?

A. 5

B. 14

C. 7

D. 10

Q80 Part A

What should come in place of the question mark (?) in the given series?

67 106 88 127 109 148 ?

A. 117

B. 108

C. 130

D. 126

Q81 Part A

Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

A. DJ – BT

B. MS – KB

C. TZ – RI

D. WC – UL

Q82 Part A

There is a rectangular sheet whose dimensions are 15.2 cm $\pm$ 0.1 cm in length and 9.1 cm $\pm$ 0.1 cm in width. What is the error in the estimation of the area of the rectangular sheet?

A. 5 cm²

B. 13 cm²

C. 0.3 cm²

D. 2 cm²



Q83 Part A

Which of the following statements are true regarding general safety in the workshop?

Statement 1: Use any available tool for the job, even if it is not the correct one.

Statement 2: Keep the tools in their proper place after use.

Statement 3: Clean the machine while it is still running.

Statement 4: Replace worn-out or damaged tools immediately.

A. Statements 1 and 2 are true.

B. Statements 1 and 3 are true.

C. Statements 3 and 4 are true.

D. Statements 2 and 4 are true. ✓

Q84 Part A

What is an appropriate way to handle a misunderstanding in an online conversation?

A. Ignoring the conversation

B. Blocking the person immediately

C. Addressing the misunderstanding politely and privately ✓

D. Publicly shaming the other person

Q85 Part A

Determine the energy of an object with a mass of 5 kg at a height of 8 metres above the ground. Assume the value of 'g' as 9.8 m s^{-2} .

A. 392 J ✓

B. 300 J

C. 784 J

D. 400 J

Q86 Part A

Each of I, J, K, L, U, V and W has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week. Only two people have the exam before V. Only one person has the exam after L. Only three people have the exam between V and I. Only one person has the exam between J and K. W has the exam immediately before J. Who among the following has the exam on Friday?

A. W

B. U ✓

C. V

D. I

Q87 Part A

The dimension of surface tension is _____.

A. ML^0T

B. ML^2T^{-2}

C. MLT^{-2}

D. ML^0T^{-2} ✓

Q88 Part A

The areas of three adjacent faces of a solid cuboid are 190 cm^2 , 285 cm^2 and 150 cm^2 . What is the volume (in cm^3) of the cuboid?

A. 2716

B. 3076

C. 2896

D. 2850 ✓

Q89 Part A

Which of the following correctly identifies the main components of a standard email structure?

A. Subject Line, Recipient Address, Message Body and Signature ✓

B. Username, Password, Message Body and Signature

C. Header, Body, Footer and Encryption Key

D. Recipient Address, CC, BCC and Attachment

Q90 Part A

In a certain code language, 'while you wait' is coded as 'ns bg sp' and 'why wait now' is coded as 'kc rw bg'. How is 'wait' coded in the given language?

A. kc

B. ns

C. bg ✓

D. sp

Q91 Part A

5 men or 9 women can do a job in 9 days. 5 men work for 7 days and leave. The number of women required to complete the remaining work in 9 days is:

A. 2 ✓

B. 1

C. 4

D. 5



Q92 Part A

Reeta invests a certain sum of money at a certain rate of simple interest per annum, and the interest she gets is equal to one-fourth of the sum invested. If the time period (in years) of investment is equal to the percentage rate of interest per annum, for how many years did Reeta invest the sum of money?

A. 7

B. 5 ☒

C. 6

D. 4

Q93 Part A

The resistivity of a conductor depends on the _____.

A. material ☒

B. potential difference across conductor

C. cross-sectional area

D. length of conductor

Q94 Part A

Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of ::?

: EAG :: IEK : %

A. # = FBH, % = HDI

B. # = FBH, % = HEJ

C. # = FBH, % = HDJ ☒

D. # = FBG, % = HDJ

Q95 Part A

Given below are two statements numbered I and II. These statements may be independent causes or effects of independent causes or a common cause. One of the statements may be the effect of the other statement. Read both the statements carefully and select the correct answer.

Statements:

- I. Traffic police has issued a traffic advisory regarding the diversion of traffic for the next two days due to closure of Raj Bhavan Road.
- II. The Municipal Corporation is planning to repair the pot holes in Raj Bhavan Road tomorrow.

A. II is the cause and I is its possible effect. ☒

B. I is the cause and II is its possible effect.

C. Both I and II are independent causes.

D. Both I and II are effects of independent causes.

Q96 Part A

In ΔPQR , $\angle Q = 90^\circ$. If $\tan R = \frac{1}{2}$, then what is the value of $\frac{\sec P(3\cos R - \sin P)}{4\operatorname{cosec} R(4\sin R - \cos P)}$?

A. $-\frac{1}{3}$ B. $\frac{1}{3}$ ☒C. $-\frac{8}{7}$ D. $\frac{8}{7}$ 

Q97 Part A

Simplify the following expression.

$$(x - y - z)^2 - (x + y + z)^2$$

- A. $-4y(x + z)$
- B. $-4x(y + z)$
- C. $-4(xy + yz + zx)$
- D. $-4z(x + y)$



Q98 Part A

Study the table given below and answer the following question.

	Number of mangoes sold on		
	Monday	Tuesday	Wednesday
Shop X	58	19	25
Shop Y	42	34	30

If one mango was sold for ₹80 by shop Y on Tuesday, what was the amount received by shop Y on Tuesday?

- A. ₹2,620
- B. ₹2,780
- C. ₹2,560
- D. ₹2,720



Q99 Part A

By how much is 60% of 45 greater than $\frac{4}{5}$ of 25?

- A. 7
- B. 5
- C. 1
- D. 4



Q100 Part A

A cylindrical tank of diameter 14 m contains water up to the depth of 6 m. What is the total area of wetted surface? (Use $\pi = \frac{22}{7}$)

- A. 414 m^2
- B. 412 m^2
- C. 416 m^2
- D. 418 m^2



Q101 Part B (Refrigeration & AC Mechanic)

Which of the following statements is correct about a protractor?

Statements:

1. A protractor can be used to measure angles from both sides.
2. A protractor is typically made of a rigid metal material.

- A. Neither statement is true
- B. Only statement 2 is true
- C. Only statement 1 is true ✓
- D. Both statements are true

Q102 Part B (Refrigeration & AC Mechanic)

In a car air-conditioning system, the ____ separates the liquid and gas refrigerant and removes moisture.

- A. condenser
- B. receiver-drier ✓
- C. compressor
- D. blower

Q103 Part B (Refrigeration & AC Mechanic)

The capacity of a cooling tower can be expressed as:

- A. flow rate * specific heat * temperature difference ✓
- B. specific heat * temperature difference
- C. flow rate * temperature difference
- D. flow rate * temperature

Q104 Part B (Refrigeration & AC Mechanic)

Which of the following types of AC motors is a three-phase induction motor?

- A. Split phase induction motor
- B. Shaded pole induction motor
- C. Capacitor start induction motor
- D. Slip ring induction motor ✓

Q105 Part B (Refrigeration & AC Mechanic)

What is waste?

- A. Natural resources for living organisms
- B. Valuable substances for agriculture
- C. Useful materials for industries
- D. Unwanted or unusable materials ✓

Q106 Part B (Refrigeration & AC Mechanic)

Which of the following punch marks is used for the correct location and seating of the divider point?

- A. Centre punch marks of 30°
- B. Centre punch marks of 60°
- C. Prick punch marks of 120°
- D. Prick punch marks of 30° ✓

Q107 Part B (Refrigeration & AC Mechanic)

If a machine has an efficiency of 80%, it means:

- A. the machine produces more output than input
- B. the machine has a velocity ratio and mechanical advantage both equal to 80
- C. the machine does not have any loss in input energy
- D. the machine loses 20% of the input ✓

Q108 Part B (Refrigeration & AC Mechanic)

Which of the following benefits of forced draft cooling in frost-free refrigerators is INCORRECT?

- A. Even cooling
- B. No frost buildup
- C. Slower cooling ✓
- D. Faster cooling

Q109 Part B (Refrigeration & AC Mechanic)

Which of the following features of automatic control in air conditioning is INCORRECT?

- A. It can be integrated with security access control systems, fire alarm systems and more.
- B. It cannot adjust pressures to reduce demand when spaces are unoccupied. ✓
- C. It maintains a comfortable temperature.
- D. It can regulate heating and cooling to provide comfort conditions while limiting energy usage.

Q110 Part B (Refrigeration & AC Mechanic)

When did India implement the Hazardous Wastes (Management and Handling) Rules to regulate the disposal and handling of hazardous waste?

- A. 1987
- B. 2000
- C. 1989 ✓
- D. 1982



Q111 Part B (Refrigeration & AC Mechanic)

Match the columns and select the correct option from the following.

Thermodynamic Law/Concept	Brief Description
(A) First law of Thermodynamics	(P) Hypothetical envelope enclosing the system
(B) Second law of Thermodynamics	(Q) Deals with thermal equilibrium
(C) Zeroth law of Thermodynamics	(R) Principle of increase of entropy
(D) Boundary	(S) Deals with concept of internal energy

A. A-P, B-R, C-Q, D-S

B. A-S, B-R, C-Q, D-P

C. A-S, B-R, C-P, D-Q

D. A-R, B-S, C-Q, D-P

Q112 Part B (Refrigeration & AC Mechanic)

Which of the following types of wooden mallets are used for general purpose work such as flattening and bending?

A. Bossing mallets

B. Side-faked mallets

C. Standard wooden mallets

D. End-faked mallets

Q113 Part B (Refrigeration & AC Mechanic)

Which of the following is NOT classified as a type of cold storage system of refrigerator?

A. Frozen storage

B. De-frozen storage

C. Long-term cold storage

D. Temporary storage

Q114 Part B (Refrigeration & AC Mechanic)

In direct expansion type bottle coolers, ____ is the cooling coil around the storage tank.

A. copper tube

B. ice cube

C. wind

D. water

Q115 Part B (Refrigeration & AC Mechanic)

Identify the type that is NOT classified under deep freezers in the refrigerator system.

A. Chest type deep freezers

B. Upright freezers

C. High temperature deep freezers

D. Display deep freezers

Q116 Part B (Refrigeration & AC Mechanic)

Which of the following parts of the softy machine holds the churner in position and dries the refrigerant?

A. Master tank

B. Sight glass

C. Filter dryer

D. Shaft bearing

Q117 Part B (Refrigeration & AC Mechanic)

Which of the following punches is used to make deeper witness marks on scribed lines and make it easier for the drill to start correctly?

A. Solid punch

B. Centre punch

C. Pin punch

D. Prick punch

Q118 Part B (Refrigeration & AC Mechanic)

What is the chemical effect that occurs in a battery during the charging process of a Lead Acid battery?

A. Lead reacts with sulphur to form lead sulphate

B. Water dissociation into hydrogen and oxygen

C. Lead sulphate decomposes into lead and sulphuric acid

D. Sulphuric acid dissociates into hydrogen and sulphate ions

Q119 Part B (Refrigeration & AC Mechanic)

The drying material used in refrigerators is called _____.

A. condenser

B. humidifier

C. desiccant

D. stabiliser



Q120 Part B (Refrigeration & AC Mechanic)

What is the function of air washers in an air conditioning system?

- A. Cleans and humidifies the refrigerant
- B. Cleans and humidifies the condensers
- C. Cleans and humidifies the evaporators
- D. Cleans and humidifies the air ✓

Q121 Part B (Refrigeration & AC Mechanic)

In a Heating, Ventilation, and Air Conditioning (HVAC) control system, AHUs stands for ____.

- A. American Handling Units
- B. Atom Handling Units
- C. Automobile Handling Units
- D. Air Handling Units ✓

Q122 Part B (Refrigeration & AC Mechanic)

If the coefficient of linear expansion of a material is $2 \times 10^{-5} \text{ } ^\circ\text{C}^{-1}$, what does it mean?

- A. The material expands by 2×10^{-5} times its original area per degree Celsius
- B. The material expands by 2×10^{-5} times its original volume per degree Celsius
- C. The material expands by 2×10^{-5} times its original length per degree Celsius ✓
- D. The material always increases by 2×10^{-5} kg when temperature is increased by 1°C

Q123 Part B (Refrigeration & AC Mechanic)

Which of the following expansion valves is a modified thermostatic expansion valve with an electrical heater incorporated in its feeler bulb?

- A. High-side float valve
- B. Level master control ✓
- C. Electronic expansion valve
- D. Low side float valve

Q124 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, the defrost cycle will not start until the _____ switch turns the compressor on and off.

- A. velocity control
- B. pressure control
- C. temperature control ✓
- D. volume control

Q125 Part B (Refrigeration & AC Mechanic)

In the cycles of a car air-conditioning system, the _____ component cools the refrigerant gas.

- A. expansion valve
- B. condenser ✓
- C. compressor
- D. receiver-drier

Q126 Part B (Refrigeration & AC Mechanic)

The overall heat of steam is the sum of ____ + internal latent heat + external work of evaporation.

- A. dryness fraction
- B. hidden heat
- C. sensible heat ✓
- D. latent heat

Q127 Part B (Refrigeration & AC Mechanic)

Which of the following statements is/are correct?

Statement I - The annealing process uses heat to reduce the hardness and increase the ductility and toughness of various steels, cast iron, and alloys.

Statement II - Quenching is a rapid cooling process that alters specific properties of materials by manipulating the cooling rate.

- A. Statement (I) is correct but Statement (II) is incorrect.
- B. Statement (I) and (II) both are correct. ✓
- C. Statement (I) is incorrect but Statement (II) is correct.
- D. Statement (I) and (II) both are incorrect.



Q128 Part B (Refrigeration & AC Mechanic)

Which of the following statements correctly describes the placement and purpose of orientation marks on a drawing sheet?

1. Orientation marks are placed at two opposite corners of the drawing sheet to indicate the correct orientation on the drawing board.
2. Orientation marks consist of arrow heads placed across the frame, with one at the shorter side and one at the longer side, coinciding with the centering marks.
3. One of the orientation marks always points towards the draughtsman, indicating the direction in which the drawing sheet should be placed.
4. Orientation marks are used to mark the midpoint of each side of the drawing sheet for accurate centering.

A. 1, 2, and 3 only

B. 1 and 4 only

C. 2 and 3 only



D. 1, 2, and 4 only

Q129 Part B (Refrigeration & AC Mechanic)

Ton of refrigeration can be expressed as:

A. BTU per hour heat gain/6000

B. BTU per hour heat gain/10000

C. BTU per hour heat gain/12000



D. BTU per hour heat gain/1000

Q130 Part B (Refrigeration & AC Mechanic)

Which of the following is a component of the high side of a vapour compression cycle?

A. Accumulator

B. Compressor



C. Suction line

D. Evaporator

Q131 Part B (Refrigeration & AC Mechanic)

In engineering drawing, what is defined as the path of a moving point with no thickness?

A. Angle

B. Curve

C. Point

D. Line

**Q132 Part B (Refrigeration & AC Mechanic)**

Which of the following is an example of a p-type semiconductor?

A. Silicon doped with phosphorus

B. Silicon doped with arsenic

C. Silicon doped with boron



D. Germanium doped with phosphorus

Q133 Part B (Refrigeration & AC Mechanic)

The instrument used to measure high temperature is a _____.

A. manometer

B. barometer

C. pyrometer



D. vacuum pressure gauge

Q134 Part B (Refrigeration & AC Mechanic)

Electromagnetic clutches in car air conditioning systems operates electrically but transmits _____ type of torque.

A. potential

B. chemical

C. mechanical



D. kinetic

Q135 Part B (Refrigeration & AC Mechanic)

Identify the two main types of thermistors used in an air-conditioning system.

A. Positive thermal coefficient (PTC) and negative time coefficient (NTC)

B. Programmable temperature coefficient (PTC) and negligible temperature coefficient (NTC)

C. Positive temperature coefficient (PTC) and negative temperature coefficient (NTC)



D. Positive temperature calibration (PTC) and negative temperature calibration (NTC)

Q136 Part B (Refrigeration & AC Mechanic)

Pencils are rated in engineering drawings based on the _____.

A. hardness or softness of the lead



B. colour of the lead

C. durability of the lead

D. shape of the lead



Q137 Part B (Refrigeration & AC Mechanic)

Why is it important to follow proper disposal procedures for industrial waste?

- A. To allow waste to decompose anywhere
- B. To reduce the number of trash bins needed
- C. To save time and effort in sorting waste
- D. To comply with environmental regulations and reduce pollution**

Q138 Part B (Refrigeration & AC Mechanic)

Which of the followings effects of suction pressure in V.C system is INCORRECT?

- A. Evaporator pressure drops due to frictional resistance
- B. Increases the refrigerating effect**
- C. Decreases the refrigerating effect
- D. Increases the compressor work

Q139 Part B (Refrigeration & AC Mechanic)

What does an optical pyrometer measure?

- A. The relative density of liquids
- B. The temperature of the surface**
- C. The volume of liquids
- D. The pressure of gases

Q140 Part B (Refrigeration & AC Mechanic)

Match the electrical equipment of central Air Conditioning plant system with their correct functioning.

Equipment Name	Functioning
Electronic expansion valve (A)	(P) Fan is operated at step rotation speed by using the inverter
Solenoid valve (B)	(Q) Used to switch outdoor heat exchanger to evaporator
Four-way valve (C)	(R) Used to return oil from the oil separator to the compressor
Inverter fan (D)	(S) Control the refrigerant amount to cool the diode bridge

- A. A-S, B-R, C-P, D-Q
- B. A-S, B-P, C-Q, D-R
- C. A-P, B-R, C-Q, D-S
- D. A-S, B-R, C-Q, D-P**

Q141 Part B (Refrigeration & AC Mechanic)

Match the correct length and breadth of the Trimmed sizes of sheets.

Designation	Trimmed size
A. A0	P. 297 × 420
B. A1	Q. 420 × 594
C. A2	R. 594 × 841
D. A3	S. 841 × 1189

- A. A - R, B - S, C - Q, D - P
- B. A - P, B - R, C - Q, D - S
- C. A - S, B - R, C - P, D - Q
- D. A - S, B - R, C - Q, D - P**

Q142 Part B (Refrigeration & AC Mechanic)

Which of the following is a key advantage of using Thyristors in power control applications?

- A. High frequency switching**
- B. High efficiency and low power loss
- C. Small size and low cost
- D. Low voltage handling capabilities

Q143 Part B (Refrigeration & AC Mechanic)

Which of the following uses of wire gauge is INCORRECT?

- A. It measures the diameter of a wire.
- B. It does not help determine how much current a wire can carry.**
- C. Using the wrong wire gauge can damage appliances and electronic devices.
- D. It is used in electrical installations, welding and other applications.

Q144 Part B (Refrigeration & AC Mechanic)

Which of the following parts of a hammer-head is used for shaping and forming work like riveting and bending?

- A. Face
- B. Eyehole
- C. Pein**
- D. Cheek



Q145 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, ____ are shut-off valves used to control the flow of the refrigerant.

- A. thermistors
- B. cocks
- C. ducts
- D. strainers



Q146 Part B (Refrigeration & AC Mechanic)

What is the blade length of the T1 'T' square, as per IS:1360-1989?

- A. 500 mm
- B. 1500 mm
- C. 700 mm
- D. 1000 mm



Q147 Part B (Refrigeration & AC Mechanic)

Which of the following components of a reciprocating compressor is welded at the top of the bottom dome or at the top dome of the compressor?

- A. Piston pin
- B. Process tube
- C. Discharge tube
- D. Suction tube



Q148 Part B (Refrigeration & AC Mechanic)

A device operates at 240 V and consumes 480 W of power. What is the current flowing through the device?

- A. 2 A
- B. 1 A
- C. 1.5 A
- D. 2.5 A



Q149 Part B (Refrigeration & AC Mechanic)

Which of the following is INCORRECT about the compartment maintenance of walk-in coolers?

- A. Use a soft cleaning cloth with a mild detergent to wipe away dirt and stains.
- B. Use a soft dry cloth to dry up finishes.
- C. Use abrasive and corrosive type of cleaners.
- D. Use a clean damp cloth to remove any chemical residue.



Q150 Part B (Refrigeration & AC Mechanic)

Which of the following components of thermostatic expansion valve covers all external parts and prevents refrigerant leakage to atmosphere?

- A. Diaphragm
- B. Sensing bulb
- C. Equalizer tube connection
- D. Valve body



Q151 Part B (Refrigeration & AC Mechanic)

What force (effort) will be required to push a load, initially at rest, of mass 500 g, so that at a distance of 20 m, its final velocity is 20 m/sec [Assume that there is no friction and 'g' = 10 m/s²].

- A. 5 J
- B. 10 N
- C. 5 N
- D. 10 J



Q152 Part B (Refrigeration & AC Mechanic)

When drawing a curved line of a specific length in an engineering drawing, which tool is most appropriate for ensuring accuracy?

- A. Protractor
- B. Straightedge
- C. French Curve
- D. Compass



Q153 Part B (Refrigeration & AC Mechanic)

A refrigeration is obtained when one ton of ice at 32°F is melted into water at 32° F in ____.

- A. 6 hours
- B. 1 hour
- C. 24 hours
- D. 12 hours



Q154 Part B (Refrigeration & AC Mechanic)

Which of the following types of wooden mallets are used for hollowing panel beatings?

- A. Standard wooden mallets
- B. End-faked mallets
- C. Side-faked mallets
- D. Bossing mallets** ✓

Q155 Part B (Refrigeration & AC Mechanic)

Match the Parts Identified with their Functions in cold storage systems in refrigerator systems.

Parts Identified	Functions
A. Cold room	P. Indicates the room temperature (cold room)
B. Main cold room door	Q. Controls the flow of liquid refrigerant
C. Expansion valve	R. Keeps the room air tight
D. Dial thermometer	S. Product storing area

- A. A-S, B-R, C-P, D-Q
- B. A-R, B-S, C-Q, D-P
- C. A-S, B-R, C-Q, D-P** ✓
- D. A-P, B-R, C-Q, D-S

Q156 Part B (Refrigeration & AC Mechanic)

What is the primary principle behind the generation of electrical energy in a piezoelectric device?

- A. Conversion of thermal energy into electrical energy
- B. Conversion of chemical energy into electrical energy
- C. Conversion of light energy into electrical energy
- D. Conversion of mechanical stress into electrical energy** ✓

Q157 Part B (Refrigeration & AC Mechanic)

A thermostat is a ____ standard control serving as an 'ON' and 'OFF' switch for the compressor in a refrigeration system.

- A. humidity
- B. density
- C. pressure
- D. temperature** ✓

Q158 Part B (Refrigeration & AC Mechanic)

Which of the following parts of a chilling tank contains direct expansion coils, equally distributed throughout the tank?

- A. Insulation of ice tank
- B. Ice tank** ✓
- C. Ice block
- D. Cooling coil

Q159 Part B (Refrigeration & AC Mechanic)

Match the columns and select the correct option from the following.

Types of System	Characteristics of System
(A) Open system	(P) A system which consists of a single phase
(B) Isolated system	(Q) System is one which is thermally insulated from its surroundings
(C) Adiabatic system	(R) System which exchanges neither energy nor matter with environment
(D) Homogeneous system	(S) System is one in which matter flows into or out of the system

- A. A-S, B-R, C-Q, D-P** ✓
- B. A-S, B-R, C-P, D-Q
- C. A-P, B-R, C-Q, D-S
- D. A-Q, B-R, C-S, D-P

Q160 Part B (Refrigeration & AC Mechanic)

The element of the humidity control changes as the humidity changes in an air conditioning system. This element is called _____.

- A. hydrosopic element
- B. freezing element
- C. hygroscopic element** ✓
- D. sonic element



Q161 Part B (Refrigeration & AC Mechanic)

In engineering drawing (lettering and numbering), a single stroke means that the _____.

- A.** thickness of the line of the letter or number is obtained in one stroke of the pencil ☒
- B. thickness of the line of the letter or number is obtained in three strokes of the pencil
- C. thickness of the line of the letter or number is obtained in no strokes of the pencil
- D. thickness of the line of the letter or number is obtained in two strokes of the pencil

Q162 Part B (Refrigeration & AC Mechanic)

Match the correct function of parts of a refrigerator.

Refrigerator Part	Function
(A) Deep freezer	(P) meters out the required amount of refrigerant
(B) Compressor	(Q) reservoir for excess liquid refrigeration
(C) Receiver	(R) provides the pumping action to the refrigerant
(D) Capillary tube	(S) keeps food frozen for extended periods of time

- A. A-P, B-R, C-Q, D-S
- B. A-S, B-R, C-P, D-Q
- C. A-Q, B-R, C-S, D-P
- D. A-S, B-R, C-Q, D-P** ☒

Q163 Part B (Refrigeration & AC Mechanic)

In the condenser, the vapour refrigerant at high pressure and at high temperature is condensed to the liquid refrigerant at _____ and _____.

- A. high pressure; low temperature** ☒
- B. high temperature; low pressure
- C. low pressure; low volume
- D. high temperature; high volume

Q164 Part B (Refrigeration & AC Mechanic)

A compressor is controlled by a _____ control switch during refrigeration cycle and defrost.

- A. temperature** ☒
- B. pressure
- C. density
- D. volume

Q165 Part B (Refrigeration & AC Mechanic)

Which of the following is a fundamental unit?

- A. newton
- B. metre** ☒
- C. pascal
- D. watt

Q166 Part B (Refrigeration & AC Mechanic)

Which of the following care and maintenance methods of air compressor in refrigeration system is INCORRECT?

- A. Ensure that the belt guards are not fitted properly.** ☒
- B. Ensure that the drive belts are in good condition.
- C. The recommended grade of oil should be used.
- D. The level of the oil should be maintained at specified marks shown on the dip stick.

Q167 Part B (Refrigeration & AC Mechanic)

The process where moisture is removed from the air, keeping its dry bulb temperature constant, is called the _____.

- A. radiation process
- B. sensible heating process
- C. humidification process
- D. dehumidification process** ☒

Q168 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, cocks refer to _____.

- A. devices that separate the liquid and gas refrigerant, and remove moisture
- B. devices installed in the piping to filter out solid particles
- C. manual shut-off valves used to control the flow of the refrigerant** ☒
- D. devices that increase the pressure and temperature of the refrigerant gas

Q169 Part B (Refrigeration & AC Mechanic)

In _____ type of drier, the shell charged with moisture absorbing chemical is permanently sealed.

- A. Reusable
- B. Sealed** ☒
- C. Unsealed
- D. Refillable



Q170 Part B (Refrigeration & AC Mechanic)

_____ of air conditioning are the diagrams for HVAC components and control systems.

- A. Blueprints
- B. HVAC drawings
- C. Schematics drawings ☒
- D. Orthogonal drawings

Q171 Part B (Refrigeration & AC Mechanic)

_____ is the process of preserving food stuffs on a large scale by refrigeration.

- A. Godown storage
- B. Hot storage
- C. Cold storage ☒
- D. Clinical storage

Q172 Part B (Refrigeration & AC Mechanic)

In Refrigeration and Air-Conditioning systems, a shell and tube type evaporator is also known as _____.

- A. fouling factor
- B. sensible heat
- C. chiller ☒
- D. latent heat

Q175 Part B (Refrigeration & AC Mechanic)

Identify the type of brazed joint shown below.



- A. Joggle Lap
- B. Simple Lap ☒
- C. Strapped Lap
- D. Butted Flange

Q173 Part B (Refrigeration & AC Mechanic)

Which of the following components is provided in the freezer to control the temperature of the unit?

- A. Compressor
- B. Thermostat ☒
- C. Capillary tube
- D. Condenser fan motor

Q174 Part B (Refrigeration & AC Mechanic)

Which of the following is the key difference between a fuse and a circuit breaker?

- A. A fuse can be reset after tripping, while a circuit breaker must be replaced.
- B. A fuse is used for high-voltage circuits, while a circuit breaker is used for low-voltage circuits.
- C. A fuse is a mechanical device, while a circuit breaker is an electronic device.
- D. A fuse is a one-time-use device, while a circuit breaker can be reset and reused. ☒



Part A

100 Questions • Answer Key

Q1 Part A

The median of the data 2, 6, 4, 8, 1, 2, 5, 8, 9, 10, 12, 9, 7, 8, 3, 1, 0, 9, 2, 5 is ____.

- A. 5
- B. 5.5
- C. 6.5
- D. 6



Q2 Part A

Which of the following is NOT one of the 5S principles?

- A. Supervise
- B. Standardise
- C. Sustain
- D. Sort



Q3 Part A

Two trains of lengths 155 m and 160 m are running at speeds of 74 km/hr and 52 km/hr, respectively, on parallel tracks in opposite directions. In how many seconds will they pass each other?

- A. 7 seconds
- B. 18 seconds
- C. 14 seconds
- D. 9 seconds



Q4 Part A

Which of the following benefits can be obtained by conducting an energy audit in a commercial building?

- A. Identification of opportunities for energy savings
- B. Increasing the cost of energy bills
- C. Reduced market value of building
- D. Reduction in price of energy per its unit usage



Q5 Part A

What is the main advantage of using solar energy over fossil fuels?

- A. Solar energy extraction requires high operational cost when compared to fossil fuels.
- B. Greenhouse gas emission is higher when solar energy is used.
- C. Solar energy is abundantly available and renewable in nature.
- D. Solar energy requires mining and extraction, whereas fossil fuels are free of cost.



Q6 Part A

Which of the following groups represents conductors of heat?

- A. Wood, paper, silver
- B. Paper, copper, plastic
- C. Aluminium, silver, copper
- D. Aluminium, plastic, wood



Q7 Part A

In a certain code language, 'WILD' is coded as '8164' and 'DOGS' is coded as '3517'. What is the code for 'D' in the given code language?

- A. 1
- B. 4
- C. 3
- D. 5



Q8 Part A

Ampere is the SI unit of ____.

- A. mass
- B. electric charge
- C. electric current
- D. electric power



Q9 Part A

What is the main function of the Transport Layer in the internet architecture?

- A. Routing of packets
- B. Data encapsulation
- C. IP addressing
- D. Reliable data transfer and error correction ✓

Q10 Part A

E, F, G, H, P, Q, and R, are sitting around a circular table facing the centre. F sits fourth to the right of E. Only R sits between F and H. H is NOT an immediate neighbour of E. Only P sits between E and G. How many people sit between G and Q when counted from the right of G?

- A. Three
- B. One
- C. Two ✓
- D. Four

Q11 Part A

Pihu starts her car at 9 a.m. to reach her office, which is 20 km away. She covers the first 10 km in 30 minutes and reaches her office at 10 a.m. Pihu's motion is _____.

- A. uniform motion ✓
- B. non-uniform motion
- C. retarded motion
- D. accelerated motion

Q12 Part A

Simran rides a distance of 60 m in one minute and then returns along the same straight path. The average velocity of her ride is _____.

- A. 1 m/s
- B. 60 m/s
- C. 2 m/s
- D. 0 m/s ✓

Q13 Part A

Which of the following is a poor conductor of heat?

- A. Wool ✓
- B. Copper
- C. Steel spoon
- D. Aluminium rod

Q14 Part A

Jaspreet deposited a sum of ₹12,800 at 5% rate of interest per annum, compounded annually. The total amount (in ₹) received by Jaspreet after 2 years will be:

- A. 14,512
- B. 14,112 ✓
- C. 14,442
- D. 13,997

Q15 Part A

A boy goes to school at a speed of 5 km/hr. He returns at a speed of 14 km/hr. He takes a total of 8 hours for both going to school and returning. The distance (in km) between his home and school is:

- A. 28.6
- B. 29.5 ✓
- C. 31
- D. 27

Q16 Part A

What should come in place of the question mark (?) in the given series?

UT27, RQ25, NM23, ?

- A. IH21 ✓
- B. IG21
- C. IH29
- D. JH19

Q17 Part A

Rakesh starts a business with a capital of ₹2,50,000. He incurs a loss of 5% during the first year. However, he makes a profit of 4% on his remaining investment during the second year. Finally, he makes a profit of 20% on his new capital during the third year. Find his total profit at the end of three years.

- A. ₹46,500
- B. ₹46,600
- C. ₹46,400 ✓
- D. ₹46,700



Q18 Part A

What should come in place of the question mark (?) in the given series?

87 118 149 ? 211 242

A. 199

B. 171

C. 188

D. 180

**Q19 Part A**

In Engineering Drawing, which of the following is the correct definition of the term 'dimension'.

A. A numerical value expressed in an appropriate unit of measurement



B. A continuous thick or wide line along which the prints are trimmed

C. The thickness of the line of a letter

D. A line that is drawn to make a section evident

Q20 Part A

A fruit seller had some apples. He sells 40% of the apples and now has 900 apples. How many apples did he originally have?

A. 1350

B. 1800

C. 2250

D. 1500

**Q21 Part A**

The mode of 4, 6, 4, 6, 5, 7, 5, 7, 4, 6, 7, 6 is:

A. 5

B. 6



C. 4

D. 7

Q22 Part A

A is thrice as good a workman as B and together they can finish a piece of work in 12 days. In how many days can A alone finish the work?

A. 18 days

B. 16 days



C. 12 days

D. 14 days

Q23 Part A

How many base units are given in the SI system?

A. 9

B. 3

C. 11

D. 7

**Q24 Part A**

Mangal starts from Point A and walks 14 m towards north. He takes a right turn, walks 9 m and then takes a right turn, walks 37 m, reaches Point B and stops. Jayanti starts from Point Z which is 15 m towards the east of Point B. She walks 11 m towards east, takes a left turn, walks 42 m, turns left and walks 63 m, turns left and walks 19 m and stops at Point Y. What is the shortest distance between Point A and Point Y? (All turns are 90 degree turns only.)

A. 25 m

B. 31 m

C. 26 m

D. 28 m

**Q25 Part A**

What should come in place of the question mark (?) in the given alpha-numeric series?

2M, 5O, 10R, 13T, 18W, 21Y, ?

A. 26A

B. 26B



C. 26C

D. 24B

Q26 Part A

Each of I, J, K, L, U, V and W has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. J has the exam on Friday. Only two people have the exam between V and J. Only four people have the exam between L and V. U has the exam immediately after W. K does not have the exam on Monday. How many people have the exam before K and after I?

A. Three

B. One

C. Two

D. Four



Q27 Part A

Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

4 – 8 – 18 – 9
6 – 12 – 22 – 11

- A. 11 – 13 – 22 – 63
- B. 8 – 16 – 26 – 13
- C. 9 – 18 – 28 – 20
- D. 3 – 15 – 12 – 20

Q28 Part A

Calculate the energy possessed by an object of mass 10 kg when it is raised to a height of 5 m from the ground. Given: $g = 9.8 \text{ m s}^{-2}$.

- A. 450 J
- B. 400 J
- C. 500 J
- D. 490 J

Q29 Part A

What is the scientific notation for 55,60,000 km?

- A. $55.6 \times 10^4 \text{ km}$
- B. $5.56 \times 10^4 \text{ km}$
- C. $5.56 \times 10^6 \text{ km}$
- D. $556 \times 10^6 \text{ km}$

Q30 Part A

If $11.6 : x :: x : 2.9$, and $x > 0$, then find the value of x .

- A. 10.9
- B. 7.7
- C. 5.8
- D. 3.1

Q31 Part A

What will come in place of the question mark (?) in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?

$$32 + 28 \div 3 \times 4 - 15 = ?$$

- A. 29
- B. 26
- C. 20
- D. 32

Q32 Part A

How do we find absolute error?

- A. Absolute error = Actual value + observed value
- B. Absolute error = Actual value/observed value
- C. Absolute error = Actual value – observed value
- D. Absolute error = Actual value × observed value

Q33 Part A

What is the amount of work done in moving a charge of 6 C from a point with a potential of 120 V to a point with a potential of 140 V?

- A. 3.33 J
- B. 120 J
- C. 720 J
- D. 840 J

Q34 Part A

In Engineering Drawing, principal lines are drawn to represent _____.

- A. wide lines along which the prints are trimmed
- B. interior or hidden edges
- C. axes of cylindrical, conical or spherical objects
- D. visible edges and surface boundaries of objects

Q35 Part A

Which term describes the maximum amount of solar energy that a photovoltaic (PV) system can convert into electricity under standard test conditions?

- A. Effective capacity
- B. Peak load
- C. Nameplate capacity
- D. Rated capacity



Q36 Part A

The list price of an article is ₹5,000 and a discount of 70% is offered on the list price. What additional discount per cent on the already discounted price must be offered to a customer to bring the net selling price to ₹1,275?

A. 18%

B. 15% ✓

C. 16%

D. 10%

Q37 Part A

Find the value of 96.86572×10^7 .

A. 96,86,57,200 ✓

B. 9,68,65,720

C. 0.9686572

D. 96,86,572

Q38 Part A

Which of the following represents an item with kinetic energy?

A. A stone in motion ✓

B. A book resting on a table

C. A compressed spring

D. An extended rubber band

Q39 Part A

How does turning off unused electrical devices contribute to energy conservation?

A. ✓

B.

C.

D.

Q40 Part A

Seema is twice as old as Alka. If nine years is subtracted from Alka's age and six years is added to Seema's age, then Seema will be four times Alka's age. How old was Alka three years ago?

A. 20 years

B. 16 years

C. 18 years ✓

D. 21 years

Q41 Part A

The floor of a rectangular hall has a perimeter of 220 m. If the cost of painting the four walls at the rate of ₹10 per m² is ₹11,000, then find the volume of the hall.

A.

B.

C. ✓

D.

Q42 Part A

Which of the following is an application of the 5S concept in a workshop?

A. Removing safety protocols to improve efficiency

B. Increasing the number of safety supervisors

C. Using extra tools without proper storage

D. Keeping tools and materials organised for easy access ✓

Q43 Part A

Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

24 – 48 – 108 – 36; 18 – 36 – 96 – 32

A. 82 – 139 – 234 – 78

B. 48 – 96 – 156 – 52 ✓

C. 53 – 106 – 166 – 55

D. 132 – 264 – 444 – 138



Q44 Part A

Match the following, according to lettering and numbering (uppercase lettering) as per BIS SP: 46-2003.

Width (W) Capital letters

- (A) 5 (I) W
(B) 6 (II) A, M, Q, V, X, Y
(C) 7 (III) B, D, G, H, K, N, O, P, R, S, T, U and Z
(D) 9 (IV) C, E, F, L

A. A-(IV), B-(III), C-(II), D-(I) ✓

B. A-(I), B-(III), C-(II), D-(IV)

C. A-(IV), B-(II), C-(III), D-(I)

D. A-(IV), B-(III), C-(I), D-(II)

Q45 Part A

The areas of three adjacent faces of a solid cuboid are 162 cm^2 , 144 cm^2 and 50 cm^2 . What is the volume (in cm^3) of the cuboid?

A. 1365

B. 805

C. 833

D. 1080 ✓

Q46 Part A

Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group??

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster pair)

A. SL – NP

B. MF – HJ

C. WP – RS ✓

D. DW – YA

Q47 Part A

Akshay gets 2% increase in his sale amount in the first year and 25% in the second year. With that his present sale is ₹1,42,800. What was his sale (in ₹) two years ago?

A. 1,12,000 ✓

B. 1,14,240

C. 1,40,000

D. 92,000

Q48 Part A

In winters, people wear jacket because ____.

A. jacket allows the heat to flow from our body to surroundings

B. fabric of jacket is an insulator of heat so it traps body heat ✓

C. it looks good

D. fabric of jacket is a conductor of heat so it traps body heat

Q49 Part A

Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

Some ships are boats.

All boats are submarines.

Some submarines are yachts

Conclusions:

(I) Some yachts are boats.

(II) Some yachts are ships.

A. Neither conclusion (I) nor (II) follows. ✓

B. Only conclusion (II) follows.

C. Only conclusion (I) follows.

D. Both conclusions (I) and (II) follow.

Q50 Part A

Which of the following correctly describes the direction of electric current?

A. Opposite to the direction of electron flow ✓

B. From low potential to high potential

C. Same as the direction of electron flow

D. Opposite to the direction of positive charge flow

Q51 Part A

Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster pair.)

A. DL – HB

B. WE – AU

C. SA – WQ

D. MU – QL ✓



Q52 Part A

In a certain code language, 'BORE' is coded as '8624' and 'TABS' is coded as '3217'. What is the code for 'B' in the given code language?

A. 1

B. 7

C. 8

D. 2

**Q53 Part A**

Which of the following is an effective way to prevent electrical accidents in the workplace?

A. Using water to cool overheated electrical equipment

B. Using insulated tools and wearing rubber gloves



C. Working on live wires with bare hands

D. Ignoring minor electrical faults

Q54 Part A

The resistances of 30 ohm, 20 ohm and 60 ohm are connected in parallel. The equivalent resistance of the combination is _____.

A. 12 ohm

B. 10 ohm



C. 0.1 ohm

D. 110 ohm

Q55 Part A

If the sum of lengths of two adjacent sides of a parallelogram is 12 cm, then the perimeter of the parallelogram is:

A. 36 cm

B. 34 cm

C. 20 cm

D. 24 cm

**Q56 Part A**

Which of the following correctly describes the role of DNS (Domain Name System) in internet architecture?

A. DNS routes data packets to their destination across the internet.

B. DNS translates IP addresses into domain names to make them easier to remember.

C. DNS translates domain names into IP addresses to allow browsers to locate web servers.



D. DNS secures the data transmitted over the internet by encrypting it.

Q57 Part A

Which technology operates through an electrochemical process that transforms the energy stored in hydrogen gas (H_2) and oxygen into electrical power without combustion?

A. Wind power

B. Solar thermal power

C. Hydrogen fuel cells



D. Hydroelectric power

Q58 Part A

Which of the following options is correct when two objects at the same temperature are kept in contact with each other?

A. Heat is transferred from object 1 to object 2.

B. Both objects transfer heat to each other.

C. Heat is transferred from object 2 to object 1.

D. No heat is transferred.

**Q59 Part A**

Which key combination is commonly used for copying text in many text editing applications in Windows?

A. Ctrl+C



B. Tab

C. Ctrl+V

D. Ctrl+S

Q60 Part A

The taxi charges in a city consist of a fixed charge together with the charge per kilometre for the distance covered. For a distance of 35 km, the charge paid is ₹375 and for a distance of 48 km, the charge paid is ₹427. Find the fixed charges and the charge per km (in ₹), respectively.

A. 227 and 5

B. 235 and 4



C. 275 and 3

D. 220 and 6

Q61 Part A

Which of the following is the temperature range in a clinical thermometer?

A. 10°C to 45°C

B. 31°C to 44°C

C. 30°C to 43°C

D. 35°C to 42°C



Q62 Part A

In a certain code language,
'A × B' means 'A is the son of B',
'A – B' means 'A is the brother of B',
'A + B' means 'A is the wife of B' and
'A % B' means 'A is the father of B'.

How is M related to T if 'M × N % P + S – T'?

- A. Brother's wife's father's brother
- B. Brother's wife's father's father
- C. Brother's wife's brother
- D. Brother's wife's father

Q63 Part A

Select the triad that follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

JK – LM – NO
TU – VW – XY

- A. DE – FB – DF
- B. DE – FG – KL
- C. WE – DF – HI
- D. DE – FG – HI

Q64 Part A

Which of the following is an example of uniform motion?

- A. A vehicle moving through a crowded area
- B. A sprinter running a 100-metre race with varying speed
- C. A ball rolling down a slope
- D. A train moving at a constant speed on a straight track

Q65 Part A

Two containers, one painted black and the other painted white, have been kept in sunlight for one hour in the afternoon. Choose the correct observation.

- A. Both containers become equally hot.
- B. The black container becomes hotter than the white container.
- C. There is no effect on either container.
- D. The white container becomes hotter than the black container.

Q66 Part A

Find the value of $x^2 + y^2$, given that, $x = 7 + \sqrt{1}$, $y = 7 - \sqrt{1}$.

- A. 98
- B. 69
- C. 100
- D. 56

Q67 Part A

What is the first step when encountering a system failure in a workplace?

- A. Report the issue and follow the emergency protocol
- B. Immediately restart all systems without inspection
- C. Ignore the failure and continue working
- D. Disconnect all power sources permanently

Q68 Part A

If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '–', then what will come in place of the question mark (?) in the following equation?

35 A 7 C 9 B 3 D 16 = ?

- A. 16
- B. 10
- C. 18
- D. 21

Q69 Part A

The energy possessed by an object by virtue of its motion is known as _____.

- A. heat energy
- B. kinetic energy
- C. light energy
- D. potential energy



Q70 Part A

Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

11 – 121 – 221 – 171; 27 – 729 – 829 – 779

- A. 13 – 169 – 244 – 188
- B. 16 – 196 – 296 – 246
- C. 23 – 529 – 629 – 589
- D. 25 – 625 – 725 – 675

**Q71 Part A**

Refer to the following letter, number and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) K A T & 4 @ Y # 6 K & 2 R % 7 D 3 5 E * S (Right)

How many such symbols are there which are immediately preceded by a number and also immediately followed by a letter?

- A. Three
- B. Two
- C. One
- D. Four

**Q72 Part A**

The heat developed in a 5 ohm resistor in 2 minutes when a 2A current passes through it is _____.

- A. 1000 J
- B. 500 J
- C. 2400 J
- D. 40 J

**Q73 Part A**

How many significant figures are there in 4.700 m?

- A. 3
- B. 4
- C. 2
- D. 1

**Q74 Part A**

A person saves 50% of his income. If his expenditure is ₹640, then his income (in ₹) is:

- A. 600
- B. 1,320
- C. 1,280
- D. 560

**Q75 Part A**

An object of mass m is made to fall freely from a height h . As the object continues to fall, what will happen to its energy?

- A. The potential energy and kinetic energy will both increase.
- B. The potential energy would decrease while the kinetic energy would increase.
- C. The kinetic energy and potential energy will not change.
- D. The potential energy would increase while the kinetic energy would decrease.

**Q76 Part A**

How fast should a cat of mass 15 kg run in order to have a kinetic energy of 120 J?

- A. 0.16 m/s
- B. 40 m/s
- C. 4 m/s
- D. 16 m/s

**Q77 Part A**

If an electric heater draws a current of 5 A when the potential difference across its terminals is 75 V, what current will it draw when the potential difference is increased to 150 V?

- A. 30 A
- B. 20 A
- C. 10 A
- D. 15 A



Q78 Part A

Aditya is using two thin blankets instead of one thick blanket in winter to keep himself warm because _____.

- A. the friction between the two blankets produces heat
- B. the air trapped between the blankets is a poor conductor of heat ☒
- C. two blankets are cheaper than one thick blanket
- D. the blankets are at a higher temperature than the surroundings

Q79 Part A

Match the following.

- (A) Continuous thick lines (P) Projection lines
- (B) Hidden lines (Q) Principal lines
- (C) Outlines (R) Dotted lines
- (D) Extension lines (S) Object lines

- A. A-S, B-R, C-P, D-Q
- B. A-P, B-R, C-Q, D-S
- C. A-S, B-R, C-Q, D-P ☒
- D. A-R, B-S, C-Q, D-P

Q80 Part A

Which of the following is NOT a fundamental quantity in the SI system?

- A. Force ☒
- B. Time
- C. Luminous intensity
- D. Amount of substance

Q81 Part A

What should come in place of the question mark (?) in the given series?

17 29 41 59 77 101 125 ?

- A. 161
- B. 149
- C. 175
- D. 155 ☒

Q82 Part A

An electric lamp with a resistance of 35 ohms and a conductor with a resistance of 5 ohms are connected to an 8 V battery in series. Calculate the current flowing through the circuit.

- A. 2 A
- B. 1.82 A
- C. 0.2 A ☒
- D. 40 A

Q83 Part A

In a business, Tushar invests in ₹10,000 and Salil invests in ₹20,000. Tushar received 10% of the profit for managing the business and the rest of the profit is divided in the ratio of their capitals. Find Tushar's share of the profit (in ₹) in a profit of ₹14,400.

- A. 5,510
- B. 5,610
- C. 5,910
- D. 5,760 ☒

Q84 Part A

A can complete a piece of work in 18 days. B can complete it in 14 days. With the assistance of C, they completed the work in 7 days. C alone can complete it in _____ days.

- A. 36
- B. 63 ☒
- C. 42
- D. 64

Q85 Part A

Eight people are sitting in two parallel rows containing 4 people each in such a way that there is equal distance between adjacent persons. In row 1 – A, B, C and D are seated and all of them are facing south. In row 2 – P, Q, R and S are seated and all of them are facing north. Thus each person faces another person from the other row. Only three people sit to the right of R. D faces the person who is the immediate neighbour of S and P. C faces the person who sits second to the left of S. R does not face A. Who amongst the following faces B?

- A. R ☒
- B. S
- C. P
- D. Q



Q86 Part A

In a certain code language, 'LOVE' is coded as '8364' and 'EARS' is coded as '3517'. What is the code for 'E' in the given code language?

A. 7

B. 4

C. 5

D. 3

**Q87 Part A**

In a clearance sale of electronic items, an item whose marked price was ₹12,225 is now sold for ₹10,758, d% is the discount percentage on the item. The value of d is:

A. 12%



B. 11%

C. 14%

D. 13%

Q88 Part A

Which of the following features allows the user to quickly find emails received from a specific sender?

A. Draft

B. Sort



C. Filter

D. Archive

Q89 Part A

Which of the following is an INCORRECT formula for power?

A. VI

B. I^2Rt



C. I^2R

D. V^2/R

Q90 Part A

In this question, a statement is given followed by two courses of action, numbered I and II. You must assume everything in the statement to be true, and on the basis of the information given in the statement, decide which of the given courses of action logically follow(s) for pursuing.

Statement:

A major fire broke out this afternoon in a mall in Jaipur, causing several casualties amongst the people present inside.

Courses of Action:

- I. The police must check to see if the fire safety regulations were followed by the mall.
- II. Traffic police must divert traffic away from the fire site, to enable evacuation of people.

A. Only II follows.

B. Neither I nor II follows.

C. Both I and II follow.



D. Only I follows.

Q91 Part A

What is the immediate action to take when a fire breaks out in a workplace?

A. Raise the alarm and evacuate the area



B. Try to put it out using water without knowing the fire type

C. Gather near the fire to observe the situation

D. Ignore the fire and continue working

Q92 Part A

A line in an engineering drawing is the _____.

A. closed curve where all points are the same distance from a fixed centre point

B. three-dimensional object with length, breadth, and height

C. dimensionless location in space or on a drawing sheet that has no width, height, or depth

D. one-dimensional figure, which has length but no width



Q93 Part A

Alloys are preferred over pure metals in electrical heating devices:

- A. because the resistivity of an alloy is lower than that of its constituent metals.
- B. because the resistivity of an alloy is generally higher than its constituent metals. ☒
- C. because the elasticity of an alloy is higher than that of its constituent metals.
- D. because alloys oxidise (burn) readily at high temperatures.

Q94 Part A

Which of the following steps is essential when configuring a web browser to enhance both security and privacy for a user?

- A. Enabling pop-ups for all websites to improve user experience
- B. Setting the homepage to a frequently visited website for quick access
- C. Configuring the browser to block third-party cookies and enabling HTTPS-only mode ☒
- D. Disabling the browser's cache to improve website loading times

Q97 Part A

$$\frac{121\tan^2\theta - 3}{169\cot^2\theta + 1}$$

- A. $-\frac{83}{21}$
- B. $-\frac{83}{61}$
- C. $\frac{83}{61}$ ☒
- D. $\frac{83}{21}$

Q95 Part A

The HCF of two numbers is 62, and the other two factors of the LCM of these factors are 7 and 9. Which of the options given below can be a possible value of the smaller of the two numbers?

- A. 433
- B. 434 ☒
- C. 431
- D. 432

Q96 Part A

Select the pair that follows the same pattern as the one followed by the two sets of pairs given below. Both pairs follow the same pattern.

BSR : GQW
LOB : QMG

- A. QGT : TDW
- B. RWH : WUM ☒
- C. HVD : LTH
- D. KRW : NPZ



Q98 Part A

$$\frac{a^2 + b^2 + ab}{a^3 - b^3}$$

A. $\frac{1}{2}$



B. $\frac{2}{3}$

C. $\frac{3}{5}$

D. $\frac{2}{5}$

Q99 Part A

The resistance of a metallic wire is R. If the radius of the metallic wire is reduced to half of its initial value while keeping all other parameters the same, the new resistance becomes ____.

A. 1. 4R



B. $\frac{R}{2}$

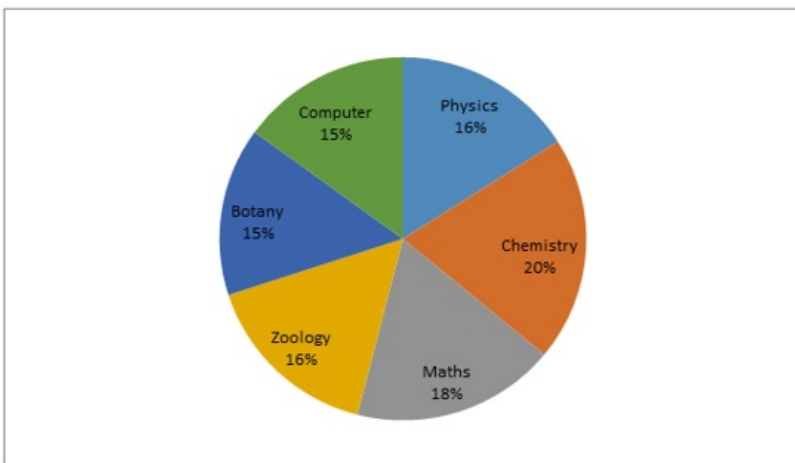
C. $\frac{R}{4}$

D. 4. 2R

Q100 Part A

Study the given pie chart and answer the question that follows.

The given pie chart indicates the percentage-wise breakup of students in different subjects. The total number of students in the college is 5000.



What is the ratio of the students studying Zoology to the students studying Botany?

A. 15 : 14

B. 16 : 15



C. 15 : 16

D. 14 : 15



Q101 Part B (Refrigeration & AC Mechanic)

Which of the following screwdrivers has cross-shaped tips that are unlikely to slip from the cruciform slots in Philips recessed head screws?

- A. Stumpy screwdriver
- B. Offset screwdriver
- C. Cross-recess screwdriver ✓
- D. Ratchet screwdriver

Q102 Part B (Refrigeration & AC Mechanic)

What is the primary reason for conducting a vehicle road test?

- A. To test how fast the vehicle can go
- B. To avoid the need for inspections
- C. To increase fuel efficiency
- D. To ensure the vehicle is functioning safely and correctly ✓

Q103 Part B (Refrigeration & AC Mechanic)

Which of the following statements is/are true about Non-Functional Dimensions (NF) in engineering drawing?

Statement 1: Non-functional Dimensions are shown without limits, as they do not affect the functionality of the component or space.

Statement 2: Non-Functional Dimensions are typically used for reference purposes only, and do not impact the assembly or performance of the component or space.

- A. Only statement 2 is true ✓
- B. Only statement 1 is true
- C. Both statements are true
- D. Neither statement is true

Q104 Part B (Refrigeration & AC Mechanic)

Identify the correct throttling device used in the operation of cold storage plant of refrigerator.

- A. Orifice meter
- B. Manometer
- C. Pressure gauge
- D. Expansion valve ✓

Q105 Part B (Refrigeration & AC Mechanic)

Which of the following condensers of an ice cube machine cools the refrigerant vapour by using heat exchanger between the condenser pipes and the evaporated water?

- A. Air cooling condenser
- B. Water cooling condenser
- C. Surface condenser
- D. Evaporative condenser ✓

Q106 Part B (Refrigeration & AC Mechanic)

In the Automotive Air conditioning system, a/an _____ is used to transmit the power from the engine crankshaft to the compressor by means of a drive belt.

- A. clutch ✓
- B. bearing
- C. air filter
- D. evaporator

Q107 Part B (Refrigeration & AC Mechanic)

A 100-mm centre-punch could have a 10-mm diameter body and a 6-mm diameter point ground to an angle of _____.

- A. 120°
- B. 90° ✓
- C. 60°
- D. 30°

Q108 Part B (Refrigeration & AC Mechanic)

What is the primary reason for the heating effect in a conductor when an electric current passes through it?

- A. The electric field in the conductor causes heat generation.
- B. The movement of electrons causes heat generation. ✓
- C. The conductor absorbs heat from the surrounding environment.
- D. The movement of protons causes heat generation.



Q109 Part B (Refrigeration & AC Mechanic)

Which of the following compressors is mainly used in large industrial systems running at high speeds through the use of step-up gears?

- A. Centrifugal compressor
- B. Screw compressor ✓
- C. Scroll compressor
- D. Reciprocating compressor

Q110 Part B (Refrigeration & AC Mechanic)

In a refrigerator, the cold vapour continues to absorb heat and gets superheated in the last portion of the ____.

- A. expansion valve
- B. condenser
- C. evaporator ✓
- D. compressor

Q111 Part B (Refrigeration & AC Mechanic)

_____ recommend(s) 20 mm wide margins for sheet sizes AO and A1 in engineering drawings.

- A. Borders and frames: SP: 46 (2003) ✓
- B. Geographic coordinate systems
- C. Custom grids
- D. Grid reference system

Q112 Part B (Refrigeration & AC Mechanic)

Match the components in Column A with those in Column B.

Column A Column B

Thermometer pyrometer (A) Thermometric property resistance (P)

Mercury-in-glass (B) Electromotive force (Q)

Thermocouple (C) Length (R)

Electric resistance (D) Intensity of radiation (S)

- A. A-S, B-R, C-Q, D-P ✓
- B. A-P, B-R, C-Q, D-S
- C. A-S, B-R, C-P, D-Q
- D. A-R, B-S, C-Q, D-P

Q113 Part B (Refrigeration & AC Mechanic)

A Carnot refrigeration cycle absorbs heat at 270 K and rejects it at 300 K. What will be the coefficient of performance of this refrigeration cycle?

- A. 2
- B. 4
- C. 9 ✓
- D. 6

Q114 Part B (Refrigeration & AC Mechanic)

Which of the following is a key electrical safety tip in a workshop?

- A. Operate machines with wet hands
- B. Ignore frayed wires if the device is still working
- C. Use water to clean electrical panels
- D. Ensure electrical equipment is properly grounded ✓

Q115 Part B (Refrigeration & AC Mechanic)

Cold storages are provided with _____ to preserve the food beverages.

- A. air-tight insulated rooms ✓
- B. water sealed insulated rooms
- C. rock wool made insulated rooms
- D. fire bricks insulated rooms

Q116 Part B (Refrigeration & AC Mechanic)

Refrigeration means the removal of _____ from a system.

- A. liquid
- B. pressure
- C. volume
- D. heat ✓

Q117 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, a 'cold storage' is a _____ refrigeration application.

- A. high temperature
- B. low temperature ✓
- C. high melting temperature
- D. high boiling temperature



Q118 Part B (Refrigeration & AC Mechanic)

In a commercial refrigeration system, relative humidity (R.H.) is defined as the ____.

- A. ratio of the actual amount of water present in one cubic foot to the amount of moisture needed to saturate the water at that same temperature
- B. ratio of the actual amount of oxygen present in one cubic foot to the amount of moisture needed to saturate the air at that same temperature
- C. ratio of the actual amount of moisture present in one cubic foot to the amount of moisture needed to saturate the air at that same temperature ✓
- D. ratio of the actual amount of refrigerant present in one cubic foot to the amount of moisture needed to saturate the refrigerant at that same temperature

Q119 Part B (Refrigeration & AC Mechanic)

Humidification process is represented by a/an _____ line on the psychrometric chart.

- A. intersecting
- B. vertical ✓
- C. diagonal
- D. curved

Q120 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, which of the following functions is NOT performed by valves?

- A. Regulating pressure
- B. Regulating temperature ✓
- C. Throttling flow
- D. Preventing backflow

Q121 Part B (Refrigeration & AC Mechanic)

The accuracy of measurement by a try square is about:

- A. 0.02 mm per 10 mm length
- B. 0.001 mm per 10 mm length
- C. 0.004 mm per 10 mm length
- D. 0.002 mm per 10 mm length ✓

Q122 Part B (Refrigeration & AC Mechanic)

Which of the following is a major risk associated with fuel spillage?

- A. Fire hazards and environmental contamination ✓
- B. Better lubrication for workshop floors
- C. Increased productivity
- D. Reduced need for ventilation

Q123 Part B (Refrigeration & AC Mechanic)

Which option shows the correct answer when 27°C is converted to the kelvin scale?

- A. - 300 K
- B. 246 K
- C. 300 K ✓
- D. - 246 K

Q124 Part B (Refrigeration & AC Mechanic)

Match the List-I (Chillers) to the List-II (Compression processes) in Air conditioning.

Chiller	Compression Process
(A) Reciprocating	(P) Spiral Rotors
(B) Centrifugal	(Q) Helical Rotors
(C) Screw	(R) Rotating Impeller
(D) Scroll	(S) Uses Piston

- A. A-S, B-R, C-Q, D-P ✓
- B. A-S, B-R, C-P, D-Q
- C. A-R, B-S, C-Q, D-P
- D. A-S, B-Q, C-R, D-P

Q125 Part B (Refrigeration & AC Mechanic)

What is the primary purpose of shielding in electrical cables?

- A. To increase the voltage capacity of the cable
- B. To increase the current-carrying capacity of the cable
- C. To protect the cable from external electromagnetic interference ✓
- D. To prevent heat loss from the cable

Q126 Part B (Refrigeration & AC Mechanic)

In which of the following parts of the vapour compression system does the liquid vapour refrigerant absorb its latent heat of vaporisation from the medium that is to be cooled?

- A. Compressor
- B. Condenser
- C. Expansion valve
- D. Evaporator ✓



Q127 Part B (Refrigeration & AC Mechanic)

Which of the following actions is a part of the emergency response team's responsibilities during an active emergency?

- A. Preparing reports on emergency incidents
- B. Rescuing persons in immediate danger ✓
- C. Conducting routine safety checks
- D. Scheduling regular evacuation drills

Q128 Part B (Refrigeration & AC Mechanic)

A 'halide torch' is used to detect the leak of ____ vapour.

- A. water
- B. acrolein
- C. freon ✓
- D. formaldehyde

Q129 Part B (Refrigeration & AC Mechanic)

Which of the following parts is NOT seen in cold storage plants of a refrigeration system?

- A. Condenser
- B. Evaporator
- C. Boiler ✓
- D. Compressor

Q130 Part B (Refrigeration & AC Mechanic)

In which of the following valves is the inlet located at the outlet of the condenser coil and outlet is located to the inlet of the evaporator coil?

- A. Low side float valve
- B. High side float valve ✓
- C. Electronic expansion valve
- D. Level master control

Q131 Part B (Refrigeration & AC Mechanic)

In a circuit with a NTC type thermistor and a fixed resistor connected in series connected to a DC power supply, what will happen to the output voltage if there is a rise in temperature?

- A. The output voltage will increase. ✓
- B. The output voltage will remain constant.
- C. The output voltage will fluctuate depending on the resistor value.
- D. The output voltage will decrease.

Q132 Part B (Refrigeration & AC Mechanic)

In which of the following types of bottle coolers is pre cool storage space created and circulation of cooling of bottles even?

- A. Vertical type bottle coolers ✓
- B. Visible coolers
- C. Commercial type bottle coolers
- D. Horizontal type bottle coolers

Q133 Part B (Refrigeration & AC Mechanic)

When a cold store is used to store different types of foods, then that cold storage is called ____.

- A. frozen storage
- B. mixed storage ✓
- C. uniform storage
- D. common storage

Q134 Part B (Refrigeration & AC Mechanic)

What is the solution of the causes of valves being bent in train ACs?

- A. Install a new condenser.
- B. Replace the compressor from the AC system.
- C. Evacuate the incondensable gases and moisture from the AC system. ✓
- D. Recover the refrigerant from the AC system.

Q135 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, the heat rejection factor for a condenser is defined as the ratio of ____.

- A. $\frac{\text{heat rejected at the condenser}}{\text{the refrigerating effect}}$ ✓
- B. $\frac{\text{increase in load on the condenser}}{\text{to the increase in compression ratio}}$
- C. $\frac{\text{increase in work done by the condense}}{\text{to the refrigerating effect}}$
- D. $\frac{\text{refrigerating effect}}{\text{to the heat rejected at the condenser}}$

Q136 Part B (Refrigeration & AC Mechanic)

Which of the followings refrigeration systems use non-poisonous liquid (Nitrogen) to cool the space?

- A. Liquid gas refrigeration system ✓
- B. Ice refrigeration system
- C. Dry ice refrigeration system
- D. Water vapour system



Q137 Part B (Refrigeration & AC Mechanic)

Which of the following electrical components of refrigerator is used to activate the defrost heater periodically?

- A. Overload protector
- B. Fan motor
- C. PTC relay
- D. Defrost timer**

**Q138 Part B (Refrigeration & AC Mechanic)**

Which of the following is INCORRECT about the refrigeration unit maintenance of walk-in coolers?

- A. Need not check that the voltage is within system design limits or not**
- B. Check to see whether wire mounting nuts are secure
- C. Heat exchanger inspection and maintenance
- D. Check the contactor for proper operation and for worn contact points

**Q139 Part B (Refrigeration & AC Mechanic)**

The ____ in a car AC cools the cabin by absorbing heat from the car's interior.

- A. accumulator
- B. compressor
- C. evaporator**
- D. condenser

**Q140 Part B (Refrigeration & AC Mechanic)**

In the electrical equipment of refrigeration and air conditioning systems, 'PWM' stands for ____.

- A. Pulse Wide Modelling
- B. Program Width Modulation
- C. Pulse Width Modulation**
- D. Pulse Wide Monitoring

**Q141 Part B (Refrigeration & AC Mechanic)**

Match the Mechanical Components (List-I) of central Air-Conditioning system to its Functions (List-II).

Mechanical Components (List-I)	Functions (List-II)
(A) Ducts	(P) Cool the condensing water
(B) Drier strainer	(Q) Collect liquid refrigerant coming from the condenser
(C) Liquid receiver	(R) Prevent moisture and dust particles
(D) Cooling tower	(S) Carry air from one place to another place

- A. A-S, B-P, C-Q, D-R
- B. A-P, B-R, C-Q, D-S
- C. A-S, B-Q, C-R, D-P
- D. A-S, B-R, C-Q, D-P**

**Q142 Part B (Refrigeration & AC Mechanic)**

Match the columns and select the correct option from the following.

Term	Brief Description
(A) Refrigeration	(P) (Actual C.O. P / theoretical C.O. P)
(B) Refrigerated system	(Q) Equipment employed to maintain the system at a low temperature
(C) Refrigerating system	(R) System which is kept at lower temperature
(D) Relative C.O.P	(S) Cooling or removal of heat from a system

- A. A-S, B-R, C-P, D-Q
- B. A-R, B-S, C-Q, D-P
- C. A-P, B-R, C-Q, D-S
- D. A-S, B-R, C-Q, D-P**

**Q143 Part B (Refrigeration & AC Mechanic)**

High side float valve is a refrigeration control device whose inlet is located at the:

- A. outlet of the condenser coil and outlet is located at the inlet of the evaporator coil**
- B. outlet of the receiver coil and outlet is located at the inlet of the economiser coil
- C. inlet of the condenser coil and outlet is located at the outlet of the evaporator coil
- D. outlet of the compressor coil and outlet is located at the inlet of the condenser coil



Q144 Part B (Refrigeration & AC Mechanic)

Which of the following compressors is a positive displacement machine that compress with two inter fitting, spiral shaped scroll members?

A. Scroll type compressor



B. Screw compressor

C. Centrifugal compressor

D. Axial compressor

Q145 Part B (Refrigeration & AC Mechanic)

In Industrial Air Conditioning, the control is defined as:

A. a device used in commercial HVAC machineries to cool secondary refrigerants

B. starting, stopping or regulation of heating, ventilating, and air conditioning system



C. a microprocessor that continuously monitors data from a network of sensors

D. a device used to generate steam and supply to Air Conditioning system

Q146 Part B (Refrigeration & AC Mechanic)

What is the function of a drier/strainer in a refrigerator?

A. Removes the heat carried by the refrigerant

B. Provides the necessary pumping action to the refrigerant

C. Purifies the refrigerant and eliminates moisture



D. Metres out the required amount of refrigerant to pick the heat from the evaporator

Q147 Part B (Refrigeration & AC Mechanic)

In a logic circuit, three SPST (Single Pole Single Throw) switches are used to implement a logic gate. The switches are connected in series. What is the output of the circuit if all switches are closed?

A. Undefined

B. 1



C. The output will depend on the type of gate used

D. 0

Q148 Part B (Refrigeration & AC Mechanic)

A fire damper in an air-conditioning system is a ____.

A. safety device installed within the ductwork that automatically closes valves when detecting high pressure water flow

B. safety device installed within the ductwork that automatically closes when detecting high heat or smoke from a fire



C. safety device installed within the ductwork that automatically opens when detecting high heat or smoke from a fire

D. safety device installed within the ductwork that automatically opens when detecting high air flow

Q149 Part B (Refrigeration & AC Mechanic)

For which of the following calipers, a screw and nut are provided for opening and closing the caliper legs?

A. Spring joint calipers



B. Firm joint calipers

C. Simple calipers

D. Leg and point calipers

Q150 Part B (Refrigeration & AC Mechanic)

An angle greater than 180 degrees is referred to as

A. a right angle

B. an acute angle

C. an obtuse angle

D. a reflex angle



Q151 Part B (Refrigeration & AC Mechanic)

Which of the following design section is used in inverters to give a steady output voltage of 230 or 110 V AC, irrespective of the load?

A. Pulse width modulation



B. DC converter

C. Power factor correction

D. IGBT transistors



Q152 Part B (Refrigeration & AC Mechanic)

Which of the following equipment of an air conditioning system directs the conditioned air from the circulating fan to the space to be air conditioned at proper point?

- A. Return outlets
- B. Supply outlets
- C. Supply duct** ✓
- D. Circulation fan

Q153 Part B (Refrigeration & AC Mechanic)

What is the primary goal of the 5S concept?

- A. To replace traditional safety measures
- B. To increase the number of safety regulations
- C. To improve workplace organisation and efficiency** ✓
- D. To eliminate the need for maintenance

Q154 Part B (Refrigeration & AC Mechanic)

Which of the following care and maintenance of a marking table is INCORRECT?

- A. The marking table should be protected from damage.
- B. The marking table should be protected from rust.
- C. After use, the marking table should be cleaned with a soft cloth.
- D. The surface of the marking table should not be given a thin layer of oil.** ✓

Q155 Part B (Refrigeration & AC Mechanic)

A rectangular floor measuring 10 m × 8 m is to be tiled. If each tile covers 0.25 m², how many tiles are needed?

- A. 200
- B. 300
- C. 320** ✓
- D. 250

Q156 Part B (Refrigeration & AC Mechanic)

Which of the following is INCORRECT about line standard?

- A. More accurate due to line thickness** ✓
- B. Subject to parallax error
- C. Quick measurements over a wide range
- D. Used to measure the distance between two engraved lines

Q157 Part B (Refrigeration & AC Mechanic)

Match the correct meanings/definitions with the respective thermal properties of insulating materials in refrigeration and air conditioning systems.

Thermal properties	Definition
(A) Thermal conductivity	(P) Characterised by flash point, smoke index, fire point
(B) Heat capacity	(Q) Measure of the rate of progression of temperature rise in an insulating material
(C) Thermal diffusivity	(R) Measure of the heat absorbed for a certain temperature rise
(D) Combustibility	(S) Ability of a material to retard the flow of heat

- A. A-P, B-R, C-Q, D-S
- B. A-S, B-Q, C-R, D-P
- C. A-S, B-R, C-P, D-Q
- D. A-S, B-R, C-Q, D-P** ✓

Q158 Part B (Refrigeration & AC Mechanic)

Which of the following is a primary difference between a primary and a secondary electrochemical cell?

- A. A secondary cell produces more energy than a primary cell.
- B. A primary cell can be recharged, while a secondary cell cannot be recharged.
- C. A primary cell cannot be recharged, while a secondary cell can be recharged.** ✓
- D. There is no difference between primary and secondary cells.

Q159 Part B (Refrigeration & AC Mechanic)

Why do cars have treaded tyres?

- A. To increase friction and grip on the road** ✓
- B. To reduce weight
- C. To decrease friction
- D. To increase speed

Q160 Part B (Refrigeration & AC Mechanic)

Which of the following applications of a vapour compression system use the refrigerated cabinets to store the perishable food products at the required temperature levels between -10°C to 30°C?

- A. Visible cooler
- B. Deep freezer** ✓
- C. Water cooler
- D. Bottle cooler



Q161 Part B (Refrigeration & AC Mechanic)

Which of the following ducts carries the used air from the air-conditioned room and supplies it to the AHU?

- A. Fresh air duct
- B. Extended plenum duct
- C. Supply duct
- D. Return duct



Q162 Part B (Refrigeration & AC Mechanic)

The automatic device that controls the temperature of the refrigeration unit is _____.

- A. barometer
- B. thermostat
- C. regulator
- D. manometer



Q163 Part B (Refrigeration & AC Mechanic)

What is the primary purpose of preventive maintenance?

- A. To increase the workload of employees
- B. To reduce unexpected equipment failures
- C. To delay repairs until breakdowns occur
- D. To eliminate the need for regular inspections



Q164 Part B (Refrigeration & AC Mechanic)

Which of the following commercial compressors consists of two meshing helically grooved rotors with very close tolerance within a housing?

- A. Twin screw compressor
- B. Scroll compressor
- C. Reciprocating compressor
- D. Centrifugal compressor



Q165 Part B (Refrigeration & AC Mechanic)

In Refrigeration and Air Conditioning systems, the 'refrigeration process' refers to _____ cycle.

- A. closed
- B. cooling
- C. heating
- D. open



Q166 Part B (Refrigeration & AC Mechanic)

A statement and conclusion for pictorial drawing are given below. Determine the logical relationship between them.

Statement: Pictorial drawings are three-dimensional and provide a visual representation of an object.

Conclusion: Therefore, pictorial drawings are useful for describing the shape of a piece part or component.

- A. The conclusion does not logically follow from the statement.
- B. The conclusion is partially supported by the statement.
- C. The conclusion is unrelated to the statement.
- D. The conclusion logically follows from the statement.



Q167 Part B (Refrigeration & AC Mechanic)

Match the following designations of sheets with their respective trimmed sizes in length and breadth.

Designation Trimmed Size

- A) A0 P) 297 × 420
- B) A1 Q) 420 × 594
- C) A2 R) 594 × 841
- D) A3 S) 841 × 1189

- A. A-S ; B-R ; C-Q ; D-P
- B. A-Q ; B-R ; C-S ; D-P
- C. A-S ; B-P ; C-Q ; D-R
- D. A-P ; B-R ; C-Q ; D-S



Q168 Part B (Refrigeration & AC Mechanic)

Sine bars are used when a high degree of accuracy less than _____ is needed for measuring angles.

- A. 1 degree
- B. 30 degrees
- C. 1 minute
- D. 30 minutes



Q169 Part B (Refrigeration & AC Mechanic)

The compressor is controlled by a _____ switch during both the defrost and refrigeration cycle.

- A. velocity control
- B. volume control
- C. pressure control
- D. temperature control



Q170 Part B (Refrigeration & AC Mechanic)

What is the term used to describe programs that distinguish between uppercase and lowercase letters, treating "yes" and "YES" as different inputs?

- A. Case-insensitive
- B. Numerical
- C. Case-sensitive
- D. Alphabetical

Q171 Part B (Refrigeration & AC Mechanic)

In HVAC systems, a ____ is a self-contained cooling device that has all required parts, such as condenser, compressor, and evaporator in a single enclosure.

- A. screw chiller
- B. packaged chiller
- C. flooded type chiller
- D. scroll chiller

Q172 Part B (Refrigeration & AC Mechanic)

The SI unit of 'ultimate stress' is _____.

- A. pascal (Pa)
- B. newton (N)
- C. newton per meter (N/m)
- D. joule per square meter (J/m^2)

Q173 Part B (Refrigeration & AC Mechanic)

Which of the following conversions are correct?

- A. $1 \text{ L} = 1000 \text{ dm}^3$ and $1 \text{ mL} = 1000 \text{ cm}^3$
- B. $1000 \text{ L} = 1 \text{ dm}^3$ and $1000 \text{ mL} = 1 \text{ cm}^3$
- C. $1 \text{ L} = 1 \text{ dm}^3$ and $1 \text{ mL} = 1 \text{ cm}^3$
- D. $1000 \text{ L} = 1 \text{ dm}^3$ and $1 \text{ mL} = 1000 \text{ cm}^3$

Q174 Part B (Refrigeration & AC Mechanic)

What will be the COP of a refrigeration system if the work input is 80 kJ/kg and refrigeration effect produced is 160 kJ/kg of refrigerant flowing?

- A. 4
- B. 1
- C. 2
- D. 3

Q175 Part B (Refrigeration & AC Mechanic)

Natural rubber is soft at high temperatures and brittle at low temperatures; hence raw rubber is heated with sulphur and other additives at a temperature range between 373 – 415 K to make it strong. This process is called ____ of rubber.

- A. vulcanisation
- B. molding
- C. latex
- D. extrusion



Part A

100 Questions • Answer Key

Q1 Part A

Which of the following is NOT correct?

- A. The motion of satellite around Earth in a circular orbit is uniform circular motion.
- B. The distance-time graph of an object moving with uniform speed is not a straight line. ✓
- C. A person jogging in the park is not an example of uniform circular motion.
- D. An object moving with a constant velocity represents uniform motion.

Q2 Part A

What is the ratio of the areas of two successive format sheet sizes created by either halving along the length or doubling along the width?

- A. 2 : 1
- B. 4 : 1
- C. 1 : 2 ✓
- D. 1 : 4

Q3 Part A

What should come in place of the question mark (?) in the given alpha-numeric series?

Q16, O14, M12, K10, I8, ?

- A. H6
- B. G6 ✓
- C. G4
- D. J6

Q4 Part A

Which of the following processes causes accumulation of heavy metals such as lead and mercury in soil?

- A. Improper disposal of industrial wastes ✓
- B. Natural soil formation
- C. Ozone layer depletion
- D. Water evaporation

Q5 Part A

Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of ::?

: KHM :: OLQ : %

- A. # = LIN, % = NLP
- B. # = LIM, % = NKP
- C. # = LIN, % = NKP ✓
- D. # = LIN, % = NKO

Q6 Part A

Which of the following is the primary reason for adopting scientifically designed methods for safely disposing of toxic waste from automobiles?

- A. To improve vehicle lifespan by minimising mechanical wear
- B. To reduce fuel consumption and improve overall efficiency
- C. To protect human health from harmful fumes and dust in the air ✓
- D. To increase vehicle performance by optimising engine efficiency

Q7 Part A

Which of the following is NOT an SI unit?

- A. Mole
- B. Hour ✓
- C. Metre
- D. Kilogram

Q8 Part A

A porter lifts a 10 kg luggage from the ground and places it on his head, 2.5 m above the ground. Calculate the work done by him on the luggage. (Take $g = 10 \text{ ms}^{-2}$.)

- A. 200 J
- B. 250 N
- C. 250 J ✓
- D. 100 J



Q9 Part A

Select the pair which follows the same pattern as that followed by the two sets of pairs given below. Both pairs follow the same pattern.

ARF : YTH

WVJ : UXL

A. MEL : HZN

B. KXF : HZH

C. SZN : QBP



D. QEB : NBD

Q10 Part A

If an electric load draws a current of 2 A for 1 second, then calculate the number of electrons (with charge 1.6×10^{-19} C) passing through the load.

A. 1.25×10^{19}



B. 1.25×10^{20}

C. 0.25×10^{20}

D. 0.25×10^{19}

Q11 Part A

Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster pair)

A. KF – HM



B. DY – AG

C. QL – NT

D. BW – YE

Q12 Part A

Two trains are running in opposite directions at the same speed. The length of each train is 175 m. If they cross each other in 7 s, the speed of each train is:

A. 80 km/hr

B. 85 km/hr

C. 90 km/hr



D. 75 km/hr

Q13 Part A

Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

A. JNEL

B. UYPW

C. CGXF



D. QULS

Q14 Part A

If $21.6 : x :: x : 29.4$, and $x > 0$, then find the value of x.

A. 23.9

B. 25.4

C. 25.2



D. 23.3

Q15 Part A

The weights (in kg) of 20 students of a class have been recorded as 35, 42, 56, 44, 55, 44, 36, 44, 49, 48, 55, 35, 44, 47, 49, 48, 56, 44, 37 and 35. The modal weight (in kg) of the class is:

A. 45

B. 47

C. 37

D. 44

**Q16 Part A**

If 24 joules of work is done in moving a charge of 2 coulombs across two points, then what will be the correct voltage across these two points?

A. 12 V



B. 24 V

C. 2 V

D. 48 V

Q17 Part A

How is a voltmeter connected in a circuit to measure potential difference?

A. Neither in series nor in parallel

B. Directly to the power source only

C. In series with the circuit

D. In parallel across the points where potential difference is to be measured



Q18 Part A

Which of the following features is unique to Telegram compared to WhatsApp and Facebook Messenger?

A. Ability to create channels for broadcasting messages to large audiences ✓

B. Integration with Facebook for seamless sharing

C. Voice and video calling capabilities

D. End-to-end encryption for all messages

Q19 Part A

What is the SI unit for solid angle?

A. Metre

B. Candela

C. Steradian ✓

D. Radian

Q20 Part A

An electric heater of resistance $50\ \Omega$ uses a current of 3 A. Determine the heat generated in 20 seconds.

A. 5000 J

B. 9000 J ✓

C. 1000 J

D. 60 J

Q21 Part A

Calculate the resistance of the bulb filament if it draws 200 mA current from 220 V source.

A. $44\ \Omega$

B. $220\ \Omega$

C. $1100\ \Omega$ ✓

D. $0\ \Omega$

Q22 Part A

Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

AD8, FI16, KN24, ?

A. PS35

B. PS32 ✓

C. OS32

D. OR35

Q23 Part A

A mass m is moving with a velocity v and its kinetic energy is K . What will be the new kinetic energy if the velocity is doubled?

A. $4K$ ✓

B. $2K$

C. $K/2$

D. K

Q24 Part A

Which element is used in thermometers?

A. Lead

B. Mercury ✓

C. Gallium

D. Bromine

Q25 Part A

Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

A. EKJR ✓

B. VBZI

C. GMKT

D. IOMV

Q26 Part A

Given below are two sets of numbers. Both the sets are formed using the same mathematical equations or follow a common pattern. Which of the given options follows the same set of mathematical equations or patterns as the sets given in the question?

$4 - 9 - 25 - 64 - 169$; $16 - 49 - 121 - 324 - 841$

A. $16 - 36 - 64 - 100 - 144$

B. $64 - 225 - 529 - 1444 - 3721$ ✓

C. $64 - 100 - 144 - 196 - 256$

D. $4 - 16 - 36 - 64 - 100$



Q27 Part A

In a certain code language, 'BOAT' is coded as '8654' and 'AIDS' is coded as '3517'. What is the code for 'A' in the given code language?

A. 5



B. 3

C. 6

D. 8

Q28 Part A

If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '-', then what will come in place of the question mark (?) in the following equation?

$$47 \text{ D } 25 \text{ A } 5 \text{ C } 2 \text{ B } 9 = ?$$

A. 60



B. 58

C. 56

D. 62

Q29 Part A

What is the primary purpose of netiquette in online communication?

A. To increase the number of followers on social media

B. To improve typing speed

C. To enhance internet connection speed

D. To ensure polite and respectful interactions

**Q30 Part A**

What should come in place of the question mark (?) in the given series?

WU5, SQ7, NL11, ?

A. HE15

B. HF13



C. HF17

D. GE17

Q31 Part A

What is the first step to take in case of a power failure in a workshop?

A. Check if emergency lighting and backup power are functional



B. Continue working as usual

C. Panic and leave the premises immediately

D. Ignore the situation and wait for power to return

Q32 Part A

Which term is used to describe the closeness of the measured value to the standard or true value?

A. Precision

B. Approximate

C. Accuracy



D. Mean

Q33 Part A

Which of the following is a main greenhouse gas that is responsible for global warming?

A. Carbon Dioxide



B. Nitrogen

C. Oxygen

D. Helium

Q34 Part A

The speed of a bus is 6 metres/second. The distance (in kilometres) travelled by the bus in 8 hours and 20 minutes is:

A. 180



B. 184

C. 175

D. 185

Q35 Part A

The thickness of a thread is measured by a student using a microscope of magnification 100. After making 30 observations, he finds the average width of the thread is 5.7 mm. What is the estimated thickness of the thread?

A. 0.057 mm



B. 171 mm

C. 0.57 mm

D. 0.09 mm



Q36 Part A

T-Square is used to _____ in engineering drawings.

- A. transfer dimensions and dividing lines into a number of equal parts
- B. draw horizontal lines, parallel lines and to guide/hold the setsquares ☒
- C. draw curved lines on drawing sheets
- D. support the drawing paper/tracing paper for making drawings

Q37 Part A

A person saves 50% of his income. If his expenditure is ₹440, then his income (in ₹) is:

- A. 560
- B. 600
- C. 880 ☒
- D. 920

Q38 Part A

Read the given statement and conclusions carefully. Assuming that the information given in the statement is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statement.

Statement:

Over the past year, there has been a noticeable increase in respiratory diseases in City W. According to a public health study, this increase is related to an increase in the number of cars on the road, which has raised air pollution levels.

Conclusions:

- I. Increased vehicular traffic contributes to higher levels of air pollution.
- II. Improving public transportation would reduce respiratory illnesses in City W.

- A. Only conclusion II follows.
- B. Neither conclusion I nor II follows.
- C. Both conclusions I and II follow. ☒
- D. Only conclusion I follows.

Q39 Part A

A force of 6 N is exerted on an object, resulting in its displacement of 2 m in the direction of the force. If the force is constant during the displacement, what is the work done in this case?

- A. 25 J
- B. 12 J ☒
- C. 10 J
- D. 3 J

Q40 Part A

Three partners, A, B and C, shared the profit in a business in the proportion of 11 : 13 : 16. They invested their capitals for 7 months, 5 months and 12 months, respectively. What was the ratio of their capitals?

- A. 96 : 135 : 101
- B. 3 : 5 : 8
- C. 21 : 35 : 44
- D. 165 : 273 : 140 ☒

Q41 Part A

Given below are two sets of numbers. Both the sets are formed using the same mathematical equations or follow a common pattern. Which of the given options follows the same set of mathematical equations or patterns as the sets given in the question?

1333 – 1730 – 2199 – 2746 – 3377
218 – 345 – 514 – 731 – 1002

- A. 3 – 10 – 29 – 66 – 127 ☒
- B. 3 – 6 – 11 – 18 – 27
- C. 38 – 51 – 66 – 83 – 102
- D. 123 – 146 – 171 – 198 – 227

Q42 Part A

A, B, C, D, E and F live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it is numbered 2 and so on till the topmost floor is numbered 6. E lives on an even-numbered floor but not 4. The sum of floors on which E and B live is 9. Only three people live between A and C. The sum of floors on which F and C live is 3. What is the sum of floors on which B and F live?

- A. 6
- B. 5 ☒
- C. 7
- D. 4



Q43 Part A

The potential energy of an object is equivalent to the _____.

A. energy transferred



B. change in velocity

C. energy lost

D. change in speed

Q44 Part A

Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

988 – 494 – 444 – 534; 894 – 447 – 397 – 487

A. 682 – 341 – 291 – 381



B. 226 – 113 – 144 – 268

C. 586 – 293 – 244 – 328

D. 138 – 69 – 14 – 98

Q45 Part A

Find the minimum value of $2x^2 - 5x - 3$ and also find x .

A. 6.125 and $x = 1.2$

B. -6.125 and $x = 0.25$

C. 6.125 and $x = 1.25$

D. -6.125 and $x = 1.25$

**Q46 Part A**

Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

- I. All books are pencils.
- II. All pencils are cardboards.
- III. All cardboards are notebooks.

Conclusions:

- I. Some notebooks are pencils.
- II. Some cardboards are books.
- III. Some notebooks are books.

A. All conclusions I, II and III follow.



B. Only conclusions I and II follow.

C. Only conclusions II and III follow.

D. Only conclusions I and III follow.

Q47 Part A

What is necessary for a circuit to have electric current flowing through it?

A. Only bulb

B. Only wire

C. A closed conducting path with a voltage source



D. Only switch

Q48 Part A

Which of the following terms is used to describe the pollutants that originate from identifiable sources, such as factories or vehicles?

A. Random Pollution

B. Point Source Pollution



C. Radicle Pollution

D. Non-point Source Pollution

Q49 Part A

Which of the following keyboard shortcuts on a Windows 10 home screen opens the item's properties?

A. Insert + Alt

B. F2 + Alt

C. Tab + Del

D. Alt + Enter



Q50 Part A

ABC Association meeting is to be held on the 2nd Sunday of next month. The cost of the registration is ₹50 per person. Lunch will be provided to the participants at an additional cost of ₹24. If the number of participants who paid for lunch was 100 more than the members who did not, and if the total receipts for registrations and lunch is ₹69,400, how many people registered and how many lunches are to be prepared, respectively?

- A. 1100 and 500
- B. 500 and 600
- C. 1100 and 1100
- D. 1100 and 600

**Q51 Part A**

If the length, the breadth, and the height of a cuboid are 5 m, 2 m, and 50 cm, respectively, then find its volume.

- A. 50 m³
- B. 500 m³
- C. 5 m³
- D. 20 m³

**Q52 Part A**

Which of the following statements is correct?

- A. All metals are poor conductors of heat.
- B. Plastic and wood allow heat to pass through them easily.
- C. Copper and aluminium are good conductors of heat.
- D. Dry air is a good conductor of heat.

**Q53 Part A**

A can do a work in 14 hours. B can do the same work in 21 hours. A started working alone. After how many hours should B join A so that the whole work is completed in 10 hours?

- A. 3.5
- B. 4
- C. 3
- D. 4.5

**Q54 Part A**

A man rides a bicycle from Point A to Point B in 10 minutes and comes back to Point B along the same path in 10 minutes. If the distance between Points A and B is 1 km, calculate his average velocity?

- A. 0 m/s
- B. 0.1 m/s
- C. 3.3 m/s
- D. 1.6 m/s

**Q55 Part A**

Among three partners A, B and C in a business. The capital of B is equal to half the difference between thrice the capital of C and twice the capital of A. If at the end of the year, they received a profit of ₹25,415, what is the share of C (in ₹)?

- A. 9,166
- B. 8,666
- C. 11,666
- D. 10,166

**Q56 Part A**

Which of the following is NOT a good heat conductor?

- A. Aluminum
- B. Copper
- C. Fur
- D. Iron

**Q57 Part A**

Which of the following tools is commonly used to support the 'Standardize' step in the 5S methodology?

- A. Job cycle charts
- B. Labels and signs
- C. Floor markings
- D. Cleaning supplies

**Q58 Part A**

Which of the following options is NOT a necessary characteristic of a kite?

- A. The pairs of opposite angles are bisected by the corresponding diagonals.
- B. At least one diagonal is bisected by the other diagonal.
- C. At least one pair of opposite angles is congruent.
- D. The diagonals are perpendicular to each other.



Q59 Part A

Which is the least number that must be subtracted from 5563 to make it exactly divisible by 18?

- A. 3
- B. 7
- C. 5
- D. 1

**Q60 Part A**

What is the value of 100 g in SI units?

- A. 100 kg
- B. 10 kg
- C. 0.1 kg
- D. 1 kg

**Q61 Part A**

In a certain code language, 'GOES' is coded as '8624' and 'SNYC' is coded as '3817'. What is the code for 'S' in the given code language?

- A. 8
- B. 2
- C. 4
- D. 3

**Q62 Part A**

Why is regular maintenance of HVAC systems considered a medium ECO?

- A. It prevents overheating of the system.
- B. It decreases the system's energy consumption.
- C. It speeds up system breakdowns.
- D. It increases the cost of energy.

**Q63 Part A**

Which of the following actions involves scientific work?

- A. Climbing up the stairs
- B. Spending time conversing with friends
- C. Watching a film
- D. Holding a large load on one's head while standing motionless

**Q64 Part A**

What is the dimensional equation of mass density (ρ) ?

- A. $[M L^{-3} T^0]$
- B. $[M L^{-2} T^0]$
- C. $[M^0 L^3 T^0]$
- D. $[M L^{-3} T^{-2}]$

**Q65 Part A**

The speed of a train is 144 km/hr. The distance covered by the train in 12 seconds is:

- A. 78 m
- B. 480 m
- C. 518 m
- D. 103 m

**Q66 Part A**

The two sides CB and BA of triangle ABC are produced to CE and BD, respectively, in such a way that $\angle DAC = 110^\circ$ and $\angle ABE = 130^\circ$. Which of the following options is true?

- A. $BC < AC < AB$
- B. $AB < AC < BC$
- C. $AC < AB < BC$
- D. $BC < AB < AC$

**Q67 Part A**

Eight people are sitting in two parallel rows containing 4 people each in such a way that there is equal distance between adjacent persons. In row 1 – A, B, C and D are seated and all of them are facing south. In row 2 – P, Q, R and S are seated and all of them are facing north. Thus each person faces another person from the other row. No one sits to the left of B. R faces the person who sits second to the right of D. C faces the person who is the immediate neighbour of Q and R, B does not face S. Who amongst the following faces P?

- A. D
- B. B
- C. A
- D. C



Q68 Part A

Which of the following is the correct statement of Ohm's Law?

- A. The potential difference across the ends of a conductor is inversely proportional to the current flowing through it.
- B. The potential difference across the ends of a conductor is directly proportional to the current flowing through it. ✓
- C. If the potential difference across the two ends of a conductor is 1 V and the current through it is 1A, then the resistance of the conductor is 2Ω .
- D. Current through a resistor is directly proportional to its resistance.

Q69 Part A

Which of the following is an ethical concern related to Information Technology?

- A. Increased accessibility to educational resources
- B. Enhancement of communication channels
- C. Privacy violations and data breaches ✓
- D. Reduction in administrative costs

Q70 Part A

What should come in place of the question mark (?) in the given series?

179 171 163 ? 147 139

- A. 153
- B. 151
- C. 157
- D. 155 ✓

Q71 Part A

When reporting a fire in an emergency, what is the most critical information to provide to emergency services?

- A. The likely cause of the fire and the building owner's name
- B. The weather conditions at the time of the fire
- C. How the fire started and if someone is injured or missing ✓
- D. The colour of the smoke and the direction it is moving

Q72 Part A

What should come in place of the question mark (?) in the given series?

62 73 87 104 124 ?

- A. 142
- B. 134
- C. 147 ✓
- D. 153

Q73 Part A

Which of the following is generally the temperature range in a laboratory thermometer?

- A. -10°C to 110°C ✓
- B. -100°C to 130°C
- C. -10°C to 150°C
- D. 35°C to 42°C

Q74 Part A

What should come in place of the question mark (?) in the given alpha-numeric series?

Y13, F11, L9, Q7, U5, X3, ?

- A. A1
- B. Z2
- C. Z1 ✓
- D. Y1

Q75 Part A

E, F, G, H, P, Q, and R, are sitting around a circular table facing the centre. F sits third to the left of H. Only two people sit between H and G when counted from the right of H. Q is an immediate neighbor of G. P is NOT an immediate neighbour of H. E is an immediate neighbour of Q. Who sits second to the left of E?

- A. P
- B. H
- C. G
- D. R ✓



Q76 Part A

Which of the following statements is INCORRECT?

- A. In solids, heat transfer is typically carried out through conduction.
- B. Burning of feet on hot sand is an example of heat transfer by conduction.
- C. Conduction is the process of heat transfer from hotter body to colder body.
- D. Conduction is the process of heat transfer that does not require any medium to transfer heat. ✓

Q77 Part A

A refrigerator seller offers a discount of 10% on its listed price of ₹57,500 and still earns a profit of 15%. The cost price of the refrigerator is:

- A. ₹42,000
- B. ₹45,000 ✓
- C. ₹48,000
- D. ₹40,000

Q78 Part A

The marked price of an article was ₹27,500. The shopkeeper gave two successive discounts; the first discount was 20%, and the second was at a rate of 30% of the first discount. What is the selling price (in ₹) of the article?

- A. 20,860
- B. 26,080
- C. 20,086
- D. 20,680 ✓

Q79 Part A

Four chairs and a table set up cost ₹22,000. Determine the table's cost, if it is ₹2,000 more expensive than the chair.

- A. ₹5,000
- B. ₹6,000 ✓
- C. ₹4,000
- D. ₹6,500

Q80 Part A

What is the kinetic energy possessed by an object having mass 25 kg and moving with a uniform velocity of 2 m s^{-1} ?

- A. 50 J ✓
- B. 100 J
- C. 120 J
- D. 80 J

Q81 Part A

In a certain code language, 'WIDE' is coded as '8694' and 'INKS' is coded as '3917'. What is the code for 'I' in the given code language?

- A. 9 ✓
- B. 7
- C. 3
- D. 6

Q82 Part A

How does retrofitting an old building with energy-efficient windows impact energy consumption?

- A. It decreases the building's heating and cooling costs. ✓
- B. It causes a rise in indoor temperatures.
- C. It has no effect on energy consumption.
- D. It increases the need for artificial lighting.

Q83 Part A

A shopkeeper allows a discount of 18% on the marked price of an article and sells it for ₹2,870. Find the marked price of the article.

- A. ₹3,460
- B. ₹3,500 ✓
- C. ₹3,350
- D. ₹3,200

Q84 Part A

Which of the following statements is NOT true?

- A. Clinical and laboratory thermometers are the same. ✓
- B. The range of clinical thermometer is 35 to 42°C.
- C. Laboratory thermometer cannot be used to measure body temperature.
- D. Clinical thermometer should not be used to measure the temperature of boiling water.



Q85 Part A

Why does a combination of two thin blankets keep you warmer in the winter than a single thick blanket?

- A. Two thin blankets absorb more heat from the surroundings than one thick blanket.
- B. Two thin blankets allow more heat to escape, keeping you warmer.
- C. Two thin blankets generate more heat than one thick blanket.
- D. Two blankets create an additional insulating layer of air, reducing heat loss. ✓

Q86 Part A

Which of the following is NOT correct about Joule's law of heating?

- A. Heat produced in a resistor is directly proportional to the resistance for a given current.
- B. Heat produced in a resistor is directly proportional to the time for which the current flows through the resistor.
- C. Heat produced in a resistor is inversely proportional to the square of the current for a given resistance. ✓
- D. Heat produced in a resistor is directly proportional to the square of the current for a given resistance.

Q87 Part A

Under which Section of the Factories Act, of 1948, is the employment of women and children near cotton openers prohibited?

- A. Section 29
- B. Section 25
- C. Section 21
- D. Section 27 ✓

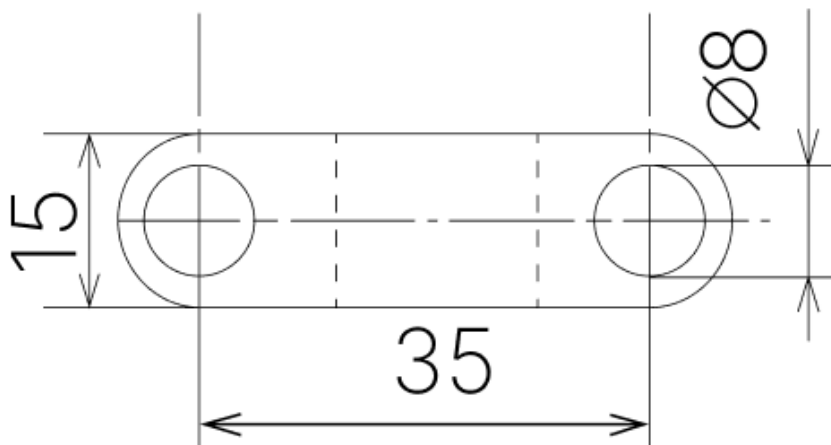
Q88 Part A

In order to resolve disputes arising from cyber crime, such as tampering with computer source documents, hacking the computer system, using password of another person and publishing sensitive personal data of others without their consent, a forum has been established by the Central Government (India) in accordance with the provisions contained under Section 48(1) of the Information Technology Act, 2000. What is the name of that forum?

- A. Internet Crime Complaint Center
- B. National Cybercrime Reporting Station
- C. Cyber Appellate Tribunal ✓
- D. Cybercrime Reporting Tribunal

Q89 Part A

What type of view is represented of the given machine component?



- A. Isometric view
- B. Oblique view
- C. Orthographic view ✓
- D. Perspective view



Q90 Part A

The cost of painting a spherical ball at the rate of ₹2.50 per cm^2 is ₹13,860. What is the diameter of the ball (use $\pi = (\frac{22}{7})$)?

- A. 48 cm
- B. 21 cm
- C. 42 cm
- D. 40 cm

**Q91 Part A**

Study the given table carefully and answer the question that follows.

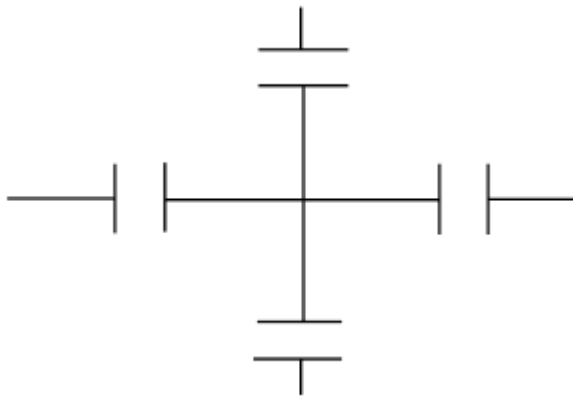
	Number of students who	
	Appeared for the exam	Passed the exam
Class IX	104	89
Class X	63	47

What was the total number of students who failed the exam from classes IX and X?

- A. 28
- B. 33
- C. 21
- D. 31

**Q92 Part A**

Identify the orthographic symbol of a pipe fitting shown in the figure.



- A. Bend
- B. Union
- C. Tee
- D. Cross



Q93 Part A

If $x + y + z = 0$, then find the value of $\frac{x^2}{2yz} + \frac{y^2}{2xz} + \frac{z^2}{2xy}$.

A. $\frac{3}{5}$

B. $\frac{2}{5}$

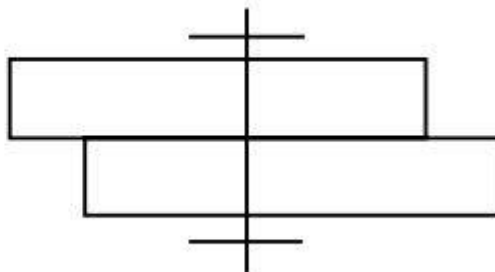
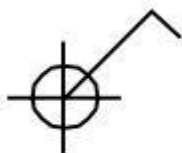
C. $\frac{3}{2}$



D. $\frac{2}{3}$

Q94 Part A

Examine the symbolic representation of the hole and rivet provided below. According to BIS SP 46-2003, what does this symbol represent?



A. Drilled on-site

B. Fitted in the workshop



C. Drilled in the workshop

D. Drilled and fitted on-site

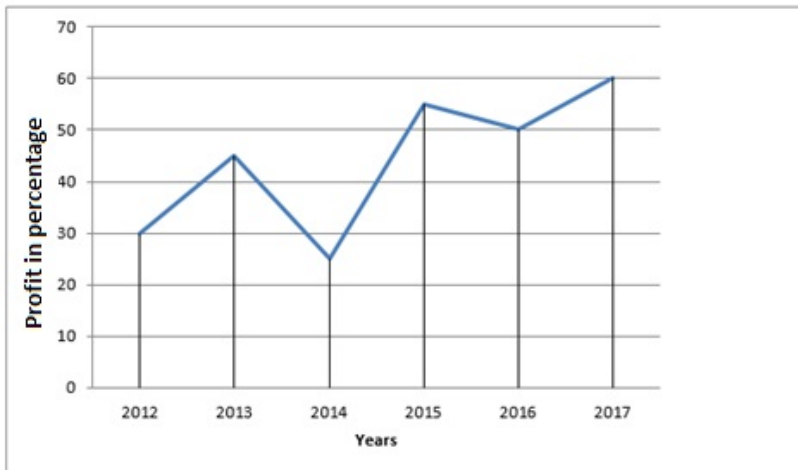


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Q95 Part A

Study the given graph and answer the question that follows.



What is the average profit percentage of the given years?

- A. 43.4%
- B. 45%
- C. 44%
- D. 44.1%

**Q96 Part A**

By how much is 60% of 50 greater than $\frac{4}{5}$ of 35?

- A. 4
- B. 1
- C. 3
- D. 2

**Q97 Part A**

$\frac{r}{10}\%$

- A. $\frac{r^4}{10}$
- B. $10r^4$
- C. $\frac{r^4}{5}$
- D. $\frac{r^4}{20}$



Q98 Part A

Pipes A and B can fill a rectangular tank in 40 minutes and 120 minutes, respectively. Pipe C can empty the completely filled same tank in 240 minutes. If pipes A, B and C are opened at the same time, then how many minutes will it take to fill the tank?

A. $32\frac{2}{7}$

B. $34\frac{3}{7}$

C. $34\frac{2}{7}$ ✓

D. $34\frac{2}{8}$

Q99 Part A

A shopkeeper sells sugar at ₹30 per kg, which he has bought at ₹24 per kg. Being dishonest, he also gives only y gm of sugar instead of 1000 gm that is mentioned on the weight. In this way, the shopkeeper manages to make an overall profit of $66\frac{2}{3}\%$.

What is the value of y ?

A. 720

B. 750 ✓

C. 600

D. 800

Q100 Part A

In an electrical circuit, 'n' number of $1\ \Omega$ resistors are connected in parallel. When one of the resistors is eliminated, the overall resistance of the circuit is _____.

A. $\frac{1}{(n-1)}$ ✓

B. Zero

C. $\frac{1}{n^2}$

D. $\frac{1}{n}$

Part B (Refrigeration & AC Mechanic)

75 Questions • Answer Key

Q101 Part B (Refrigeration & AC Mechanic)

When creating 10 mm single-stroke capital letters in vertical style, what does the 10 mm distance between horizontal parallel lines represent?

A. Letter width

B. Letter height ✓

C. Stroke thickness

D. Interline spacing

Q102 Part B (Refrigeration & AC Mechanic)

Which of the following colours is commonly used for caution signs?

A. Blue

B. Yellow ✓

C. Red

D. Green



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Q103 Part B (Refrigeration & AC Mechanic)

Which of the following is the primary reason why copper is widely used as a conductor in electrical wiring?

- ☒ A. Copper has low resistance and high conductivity.
- ☐ B. Copper has a low melting point.
- ☐ C. Copper is abundant and inexpensive.
- ☐ D. Copper has high resistance to electricity.

Q104 Part B (Refrigeration & AC Mechanic)

Which of the following components of a walk-in cooler is used to mount condensing unit assembly?

- ☐ A. Condensate water evaporator
- ☒ B. Condenser unit rack
- ☐ C. Drain line heater
- ☐ D. Heat exchanger

Q105 Part B (Refrigeration & AC Mechanic)

Which of the following expansion valves functions to maintain a constant pressure in the evaporator?

- ☐ A. Electronic expansion valve
- ☐ B. Level master control
- ☒ C. Automatic expansion valve
- ☐ D. Thermostatic expansion valve

Q106 Part B (Refrigeration & AC Mechanic)

Which of the following care and maintenance of car air-conditioning is INCORRECT?

- ☒ A. Do not replace the evaporator coil to prevent ice formation.
- ☐ B. Vacuum the filter if it is dirty from driving in dusty or polluted areas.
- ☐ C. Replace the cabin air filter regularly to prevent dust and pollen from clogging the system.
- ☐ D. Perform electrical repairs to resolve issues with the electrical components of the AC unit.

Q107 Part B (Refrigeration & AC Mechanic)

A 100-mm prick punch with a 7-mm diameter body could have a 2.5-mm diameter point ground to an angle of _____.

- ☐ A. 90°
- ☒ B. 30°
- ☐ C. 120°
- ☐ D. 45°

Q108 Part B (Refrigeration & AC Mechanic)

In which of the following components of ice cube machine, is the water frozen in tubes, extended vertically within a surrounding casing?

- ☐ A. Compressor
- ☐ B. Condenser
- ☒ C. Tube ice generator
- ☐ D. Capillary tube

Q109 Part B (Refrigeration & AC Mechanic)

The SI Unit of heat is _____.

- ☐ A. kilogram
- ☐ B. Ohm
- ☐ C. Watt
- ☒ D. Joule

Q110 Part B (Refrigeration & AC Mechanic)

Convert 8.5% into a decimal.

- ☐ A. 0.85
- ☐ B. 8.5
- ☒ C. 0.085
- ☐ D. 85

Q111 Part B (Refrigeration & AC Mechanic)

Removal of moisture from the air, without change in its dry bulb temperature (DBT), is called _____.

- ☐ A. latent heat
- ☐ B. humidification
- ☒ C. dehumidification
- ☐ D. sensible heat

Q112 Part B (Refrigeration & AC Mechanic)

A machine working on a Carnot cycle operates between 305 K and 260 K. What will be the COP when it is operated as a refrigerating machine?

- ☐ A. 3.84
- ☒ B. 5.78
- ☐ C. 4.25
- ☐ D. 2.67



Q113 Part B (Refrigeration & AC Mechanic)

HVAC system selection does NOT depend on the _____.

- A. owner's desire
- B. building configuration
- C. number of tubes
- D. climate condition

Q114 Part B (Refrigeration & AC Mechanic)

For a given subcooling in °C, the increase in refrigeration effect is _____.

- A. proportional to the specific heat of the liquid
- B. proportional to the entropy of the liquid
- C. inversely proportional to the specific heat of the liquid
- D. proportional to the irreversibility of the liquid

Q115 Part B (Refrigeration & AC Mechanic)

In a series circuit, three resistors of 10 ohms, 20 ohms, and R ohms are connected in series with a 12 V battery. What is the value of resistance R if current flowing in the circuit is 0.2 A?

- A. 10 ohms
- B. 20 ohms
- C. 30 ohms
- D. 40 ohms

Q116 Part B (Refrigeration & AC Mechanic)

The SI unit of temperature is/are _____.

- A. both kelvin and celsius
- B. celsius
- C. kelvin
- D. fahrenheit

Q117 Part B (Refrigeration & AC Mechanic)

_____ controllers uses compressed air to control Central Industrial Air Conditioning Systems.

- A. Robotic
- B. Automated
- C. Pneumatic
- D. Hydraulic

Q118 Part B (Refrigeration & AC Mechanic)

Refrigeration controls are the refrigeration tools used to control the _____.

- A. flow of refrigerant at various points throughout the refrigeration cycle
- B. pressure of refrigerant at various points throughout the refrigeration cycle
- C. heat of refrigerant at various points throughout the refrigeration cycle
- D. temperature of refrigerant at various points throughout the refrigeration cycle

Q119 Part B (Refrigeration & AC Mechanic)

Which type of line is used to represent hidden edges or surfaces in a technical drawing, as per BIS SP 46-2003?

- A. Continuous thin line
- B. Continuous thick line
- C. Dashed thin line
- D. Chain thin line

Q120 Part B (Refrigeration & AC Mechanic)

Which of the following calipers are used for marking lines, parallel to inside and outside edges and for locating the centre of round bars?

- A. Spring joint calipers
- B. Leg and point calipers
- C. Simple calipers
- D. Firm joint calipers

Q121 Part B (Refrigeration & AC Mechanic)

Who is authorised to conduct road tests on workshop vehicles?

- A. Only trained and certified personnel
- B. Visitors to the workshop
- C. Any employee
- D. The company accountant

Q122 Part B (Refrigeration & AC Mechanic)

Which of the following statements is INCORRECT about end standard?

- A. It measures the distance between two parallel flat surfaces.
- B. Faces are subject to wear.
- C. It is slower but more accurate.
- D. It is used to measure the distance between two engraved lines.



Q123 Part B (Refrigeration & AC Mechanic)

What is the effect of scaling in a water cooled condenser?

- A. Scale coating prevents the heat transfer from the hot gas to the water. ✓
- B. Scale coating acts as a reservoir for excess liquid refrigeration.
- C. Scale coating provides necessary pumping action to the refrigerant.
- D. Scale coating increases the heat transfer from the hot gas to the water.

Q124 Part B (Refrigeration & AC Mechanic)

During which of the following processes of the working of a bus AC system does the cool liquid through the expansion valve become gas and the gaseous refrigerant absorb a lot of heat energy?

- A. Evaporation ✓
- B. Throttling
- C. Condensation
- D. Compression

Q125 Part B (Refrigeration & AC Mechanic)

The latent heat of fusion of ice is ____ kJ/kg.

- A. 536
- B. 436
- C. 336 ✓
- D. 236

Q126 Part B (Refrigeration & AC Mechanic)

What is the function of ducts in Central Industrial Air Conditioning System?

- A. Used to carry air from one place to another place ✓
- B. Located in the liquid line to prevent moisture and dust particles in Air Conditioning System
- C. Reducing the pressure and amount of liquid refrigerant into the evaporator
- D. Collect liquid refrigerant coming from condenser and supply to the expansion valve

Q127 Part B (Refrigeration & AC Mechanic)

What is the typical temperature range of a mercury-based clinical thermometer?

- A. 0°C to 100°C
- B. 35°C to 42°C ✓
- C. 0°C to 50°C
- D. -10°C to 110°C

Q128 Part B (Refrigeration & AC Mechanic)

Isobutane (R-600a) is never used for _____ of existing CFC-12 or HFC-134 a systems.

- A. heating
- B. conversion/retrofitting ✓
- C. cooling
- D. expansion

Q129 Part B (Refrigeration & AC Mechanic)

A voltmeter with a resistance of 10,000 ohms is connected across a circuit that has a voltage of 50 V. What is the current flowing through the voltmeter?

- A. 2 mA
- B. 1 mA
- C. 5 mA ✓
- D. 4 mA

Q130 Part B (Refrigeration & AC Mechanic)

Identify the correct statement(s) regarding the Industrial Air-Conditioning System.

Statement 1: Three-way valves are traditionally used in constant-flow pumping systems.

Statement 2: In three-way valves, unused water is bypassed at the coil.

- A. Only Statement 2 is correct.
- B. Both Statement 1 and Statement 2 are correct. ✓
- C. Both Statement 1 and Statement 2 are incorrect.
- D. Only Statement 1 is correct.

Q131 Part B (Refrigeration & AC Mechanic)

In refrigeration and air conditioning systems, manual valves regulate the flow of _____ throughout the piping system.

- A. air
- B. milk
- C. refrigerant ✓
- D. nitrogen

Q132 Part B (Refrigeration & AC Mechanic)

In air conditioning systems, screw chiller uses _____ compression process.

- A. zigzag rotors
- B. spiral rotors
- C. rotating impeller
- D. helical rotors ✓



Q133 Part B (Refrigeration & AC Mechanic)

Which of the following units of a train AC consists of pressure gauges and pressure cutouts to protect the compressor against high pressure?

A. Gauge board



B. Condenser

C. Evaporator unit

D. Compressor

Q134 Part B (Refrigeration & AC Mechanic)

The pencil type double mouth filter drier, used in the refrigerator is made of _____.

A. titanium

B. silicon

C. brass

D. copper

**Q135 Part B (Refrigeration & AC Mechanic)**

If the length of a resistor is doubled, what happens to its resistance, assuming all other factors remain constant?

A. The resistance is doubled.



B. The resistance remains the same.

C. The resistance is halved.

D. The resistance quadruples.

Q136 Part B (Refrigeration & AC Mechanic)

Find the lateral surface area of a cube with side length 5 cm.

A. 125 cm²

B. 150 cm²

C. 200 cm²

D. 100 cm²

**Q137 Part B (Refrigeration & AC Mechanic)**

Which of the following parts of a vapour compression system allows the liquid refrigerant under high pressure and temperature to pass at a controlled rate after reducing its pressure and temperature?

A. Evaporator

B. Condenser

C. Receiver

D. Expansion valve

**Q138 Part B (Refrigeration & AC Mechanic)**

Which of the following terms in the 5S concept refers to making a habit of maintaining the established procedures?

A. Shine

B. Set

C. Sort

D. Sustain

**Q139 Part B (Refrigeration & AC Mechanic)**

Which of the following metals has the lowest melting point?

A. Mercury



B. Iron

C. Lead

D. Gold

Q140 Part B (Refrigeration & AC Mechanic)

Squirrel cage induction motor is _____ phase induction motor.

A. not a

B. a two

C. a single

D. a three

**Q141 Part B (Refrigeration & AC Mechanic)**

Match the given halocarbon refrigerants with their correct refrigerant numbers.

Chemical names	Refrigerant numbers
A. Methyl chloride	P. R-14
B. Dichlorodifluoromethane	Q. R-13
C. Monochlorotrifluoromethane	R. R-12
D. Carbon tetrafluoride	S. R-40

A. A-S, B-Q, C-R, D-P

B. A-S, B-R, C-Q, D-P



C. A-S, B-R, C-P, D-Q

D. A-R, B-S, C-Q, D-P

Q142 Part B (Refrigeration & AC Mechanic)

The wave set of hacksaw teeth set has a pitch of _____.

A. 2.0 mm

B. 0.5 mm

C. 0.8 mm



D. 1.0 mm



Q143 Part B (Refrigeration & AC Mechanic)

The temperature at which air becomes saturated with water vapour is called:

- A. dry bulb temperature
- B. wet bulb depression
- C. dew point temperature ✓
- D. wet bulb temperature

Q144 Part B (Refrigeration & AC Mechanic)

Which of the following types of chisels is used for separating metals after chain drilling?

- A. Cross-cut chisel
- B. Flat chisel
- C. Web chisel ✓
- D. Diamond point chisel

Q145 Part B (Refrigeration & AC Mechanic)

The _____ part in a frost-free refrigerator provides pumping action to the refrigerant.

- A. compressor ✓
- B. capillary tube
- C. receiver
- D. condenser

Q146 Part B (Refrigeration & AC Mechanic)

What is the minimum age for employment in factories or mines or other hazardous employment, according to Article 24 of the Indian Constitution?

- A. 14 years ✓
- B. 12 years
- C. 16 years
- D. 18 years

Q147 Part B (Refrigeration & AC Mechanic)

Which of the following remote controllers in split AC quickly maximises the cooling effect in any operation mode?

- A. Powerful operation ✓
- B. Swing
- C. Mode selector button
- D. Timer cancel

Q148 Part B (Refrigeration & AC Mechanic)

In the case of ammonia, the power consumption per ton refrigeration with wet compression as compared with that of dry compression is _____.

- A. 20% more
- B. 10% less ✓
- C. 20% less
- D. 10% more

Q149 Part B (Refrigeration & AC Mechanic)

When passing stationary vehicles, keep a watch on _____ who may come out suddenly from the front of the stationary vehicle. While overtaking, it should be done on the _____ side. Always keep a good _____ between your vehicle and others.

- A. cyclists; left; interval
- B. vehicles; right; gap
- C. drivers; left; space
- D. pedestrians; right; distance ✓

Q150 Part B (Refrigeration & AC Mechanic)

What is the SI unit of 'volume'?

- A. Litres
- B. Cubic centimetre
- C. Cubic metre ✓
- D. Millilitres

Q151 Part B (Refrigeration & AC Mechanic)

Which of the following statements about title block is/are true?

Statement 1: The title block is situated in the bottom right-hand corner of the drawing sheet.
Statement 2: The contents of the title block are standardised and cannot be modified to suit individual company needs.

- A. Both statements are false
- B. Statement 1 is false, but statement 2 is true
- C. Statement 1 is true, but statement 2 is false ✓
- D. Both statements are true



Q152 Part B (Refrigeration & AC Mechanic)

Which of the following applications of a vapour compression system is a type of refrigerated cabinet that displays merchandise as well as cools it?

A. Bottle cooler

B. Visible cooler ☒

C. Deep freezer

D. Water cooler

Q153 Part B (Refrigeration & AC Mechanic)

Which of the following properties of lubricant oils is a measure of the resistance that the oil offers to the flow of electric current?

A. Cloud point

B. Viscosity

C. Dielectric strength ☒

D. Chemical stability

Q154 Part B (Refrigeration & AC Mechanic)

What is the function of Air flapper or Louver in refrigeration systems?

A. Increasing the pressure and temperature of the refrigerant gas

B. Controlling the influx of cold air into a refrigerating chamber ☒

C. Lowering the pressure of the refrigerant from high to low

D. Cooling the refrigerant gas, changing it to a liquid

Q155 Part B (Refrigeration & AC Mechanic)

Vertical type bottle coolers employ _____ convection of air inside storage cooling compartment.

A. gravitational

B. forced ☒

C. natural

D. buoyant

Q156 Part B (Refrigeration & AC Mechanic)

Match the following types of lines with their correct descriptions according to their orientation and characteristics.

Description	Type of Line
A. A line that is neither parallel to a horizontal plane nor perpendicular to it.	1. Horizontal line
B. A line that is perpendicular to horizontal lines.	2. Vertical line
C. A line that changes its direction continuously.	3. Inclined line
D. A line that is parallel to a horizontal plane.	4. Curved line

A. A - 1, B - 2, C - 3, D - 4

B. A - 2, B - 3, C - 4, D - 1

C. A - 3, B - 2, C - 4, D - 1 ☒

D. A - 2, B - 1, C - 4, D - 3

Q157 Part B (Refrigeration & AC Mechanic)

Which of the following remote controllers in split AC is used to start or stop the fast cooling?

A. Timer off button

B. Timer on button

C. Power saver button

D. Turbo button ☒

Q158 Part B (Refrigeration & AC Mechanic)

In which of the following unitary air conditioners, are all components in one unit, like a rooftop package unit?

A. Window air conditioners

B. Ducted split systems

C. Ductless systems ☒

D. Central air conditioners



Q159 Part B (Refrigeration & AC Mechanic)

Which of the following parts of VRF or VRV system is used to return oil from the oil separator to the compressor?

A. Solenoid valve



B. Electronic expansion valve

C. High pressure sensor

D. Four-way valve

Q160 Part B (Refrigeration & AC Mechanic)

Which of the following chemicals is NOT added to ordinary water for making brine solution?

A. Sodium chloride

B. Ethylene glycol

C. Propylene glycol

D. Hydrochloric acid



Q161 Part B (Refrigeration & AC Mechanic)

Which of the following regarding ventilation inspection and commissioning is INCORRECT?

A. Proper ventilation is crucial for maintaining good indoor air quality

B. A well-balanced ventilation system cannot help optimise energy usage by preventing unnecessary over-ventilation



C. Testing the functionality of automated controls that regulate the ventilation system, such as sensors and actuators

D. Many building codes and standards require regular ventilation system checks to ensure compliance

Q162 Part B (Refrigeration & AC Mechanic)

The automatic expansion valve is a ____ reducing device in a refrigeration system.

A. temperature

B. density

C. pressure



D. volume

Q163 Part B (Refrigeration & AC Mechanic)

Which of the following types of control is NOT used in air-conditioning system?

A. Electric

B. Electronics

C. Pneumatic

D. Hydraulic



Q164 Part B (Refrigeration & AC Mechanic)

It is always desirable to sub cool the liquid refrigerant before the _____.

A. expansion valve



B. condenser

C. evaporator

D. compressor

Q165 Part B (Refrigeration & AC Mechanic)

Which of the following information is necessary to construct a rectangle?

A. Length of two adjacent sides



B. Length of one side and the area of the rectangle

C. Only the length of one side

D. Only the length of the diagonal

Q166 Part B (Refrigeration & AC Mechanic)

In a logic circuit, two inputs A and B are applied to an AND gate, and the output of the AND gate is connected to the input of a NOT gate. If the inputs A and B are both at logic 0, what will be the output of the entire circuit?

A. Undefined

B. 0

C. 1



D. 2

Q167 Part B (Refrigeration & AC Mechanic)

____ type of controllers have semiconductor sensors in Air conditioning system.

A. Electronic



B. Electric

C. Pneumatic

D. Hydraulic

Q168 Part B (Refrigeration & AC Mechanic)

For your safety at work, which of the following should be ensured?

1. All the required protective clothing and equipment are used.

2. Training and instruction necessary for performing tasks safely have been received.

A. Only statement 1

B. Neither statement 1 nor 2

C. Only statement 2

D. Both statements 1 and 2



Q169 Part B (Refrigeration & AC Mechanic)

In an air-conditioning system, control systems are used to _____.

- A. clean air, either fresh, recirculated or both
- B. regulate automatically the amount of cooling or warming ✓
- C. connect to heat exchange surfaces
- D. direct the air to the room through the outlets

Q170 Part B (Refrigeration & AC Mechanic)

Which of the following electrical components is NOT used by hydrocarbon appliances?

- A. The overload protector is sealed bimetal.
- B. The compressor relay is in solid state.
- C. ON/OFF and door switches should be of non-sealed type. ✓
- D. The thermostat is either located in a sealed electrical box or a solid state.

Q171 Part B (Refrigeration & AC Mechanic)

In a refrigeration system, _____ equipment is used for measuring the dry bulb and wet bulb temperature simultaneously.

- A. orificemeter
- B. psychrometer ✓
- C. barometer
- D. manometer

Q172 Part B (Refrigeration & AC Mechanic)

Which of the following 'V' blocks will have one 'V' groove and two grooves (slots) on either side for clamping in two positions?

- A. Double level single groove 'V' block
- B. Matched pair 'V' block
- C. Single level double groove 'V' block ✓
- D. Single level single groove 'V' block

Q173 Part B (Refrigeration & AC Mechanic)

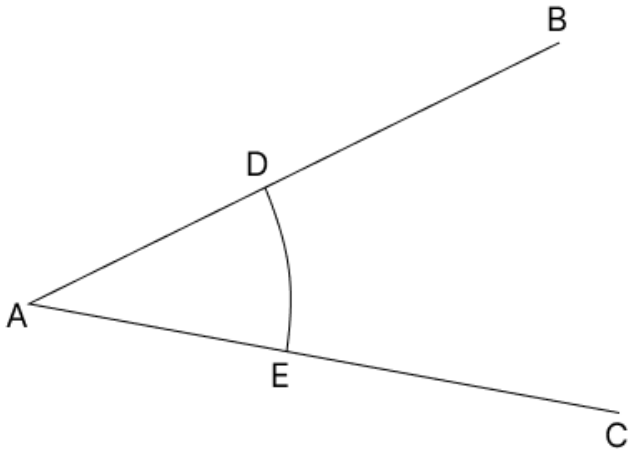
Which of the following statements is NOT correct for using scribes?

- A. Scriber points are very sharp, so they are to be handled very carefully.
- B. While scribing lines, the scriber is used like a pencil.
- C. Do not put the scriber in your pocket.
- D. Place a cork on the point when in use to prevent accidents. ✓



Q174 Part B (Refrigeration & AC Mechanic)

In the process of bisecting angle BAC in the given figure, why do we draw arcs from points D and E?

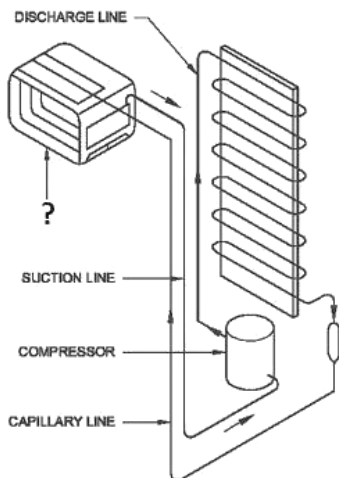


- A. To find midpoint AB
- B. To mark equal lengths
- C. To intersect line AC
- D. To intersect above A



Q175 Part B (Refrigeration & AC Mechanic)

Identify the part labelled with a question mark (?) from the skeleton of conventional household refrigerator.



- A. Heating coil
- B. Cooling coil
- C. Steam engine
- D. Turbine

