



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS  
सी ई एन - ०१/२०२४ - CEN - 01/2024  
सहायक लोको पायलट की भर्ती / Recruitment of Assistant Loco Pilot



# RRB ALP 2024 CBT 2

Assistant Loco Pilot | CEN 01/2024 | CBT 2 | Instrument Mechanic

## ENGLISH ANSWER KEY

### Official Answer Key

All 2 Shifts · 02-05-2025 to 06-05-2025

|           |                                                                     |
|-----------|---------------------------------------------------------------------|
| Questions | 175 (Part A 100 + Part B 75)                                        |
| Marking   | +1 correct / -1/3 wrong                                             |
| Duration  | 2 hours 30 minutes (Part A 90 min + Part B 60 min)                  |
| Sections  | Part A 100 (Maths, Reasoning, Basic Sci & Engg) · Part B 75 (trade) |

Every paper is set from the saved RRB question paper, with the official correct answer marked.

Note: 30 questions are not saved in any language, so not printed.

#### HOW TO USE THIS BOOK

- 1 Open the INDEX on the next page.
- 2 Click any row to jump straight to that date and shift.

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Compiled 28 October 2026

## INDEX · Click any row to open that paper

RRB ALP 2024 CBT 2 (Instrument Mechanic) (English) · 2 shifts

| DAY   | DATE                       | SHIFT   | TIME          | PAGE               |
|-------|----------------------------|---------|---------------|--------------------|
| Day 1 | <a href="#">02-05-2025</a> | Shift 1 | 14:30 - 17:00 | <a href="#">3</a>  |
| Day 2 | <a href="#">06-05-2025</a> | Shift 1 | 09:30 - 12:00 | <a href="#">25</a> |



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|           |                                  |
|-----------|----------------------------------|
| Exam      | RRB ALP 2024 CBT 2 (CEN 01/2024) |
| Paper     | Instrument Mechanic              |
| Test Date | 02 May 2025                      |
| Test Time | 2:30 PM - 5:00 PM                |
| Language  | English                          |

**\* Note**

Correct answer carries 1 mark; each incorrect answer carries a negative mark of 1/3.

1. The option shown in green with a tick is the correct answer as per the official answer key.

2. RRB shuffles question order for every candidate inside each Part; this paper follows the order of one real response sheet.

**Section : Part A**

**Q.1** The resistivity of a conductor depends on the \_\_\_\_\_.

Ans ✓ 1. material

✗ 2. potential difference across conductor

✗ 3. cross-sectional area

✗ 4. length of conductor

**Q.2** Identify the correct pair of Personal Protective Equipment (PPE) categories based on the nature of the hazard.

Ans ✗ 1. Non-respiratory: Safety goggles, Respiratory: Safety gloves

✗ 2. Non-respiratory: Nose mask, Respiratory: Safety boots

✗ 3. Non-respiratory: Ear plugs, Respiratory: Safety shoes

✓ 4. Non-respiratory: Safety helmet, Respiratory: Nose mask

**Q.3** 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

Ans ✗ 1. MINOR-MOINR-RNOIM

✗ 2. INDEX-DEXIN-XDEIN

✗ 3. NIGHT-NGHIT-THGIN

✓ 4. FRUIT-FRIUT-TIURF

**Q.4** Simplify the following expression.

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

Ans ✗ 1.  $-4y(x + z)$

✓ 2.  $-4x(y + z)$

✗ 3.  $-4(xy + yz + zx)$

✗ 4.  $-4z(x + y)$

**Q.5** Find the four-digit dividend of 21, 42, 147 and 105 that will give the remainder 14, 35, 140 and 98, respectively.

Ans ✓ 1. 8813

✗ 2. 8019

✗ 3. 8034

✗ 4. 8816

**Q.6** 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.

Ans ✓ 1. Only conclusion (I) follows.

✗ 2. Both conclusions (I) and (II) follow.

✗ 3. Only conclusion (II) follows.

✗ 4. Neither conclusion (I) nor (II) follows.

**Q.7** How does the thermal pollution of water affect the water quality?

Ans ✗ 1. Increases pH of water

✓ 2. Oxygen level in water gets reduced

✗ 3. Sediments get settled soon

✗ 4. Alters the colour of water

**Q.8** If a ball is thrown upwards, the work done by the gravitational force on the ball is \_\_\_\_\_.

Ans ✗ 1. zero

✓ 2. negative

✗ 3. positive

✗ 4. independent of the displacement of the ball

**Q.9** Which of the following materials serves as a heat insulator?

Ans ✗ 1. Silver

✗ 2. Copper

✓ 3. Plastic

✗ 4. Aluminium

**Q.10** 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?

Ans ✗ 1. kc

✗ 2. ns

✓ 3. bg

✗ 4. sp

**Q.11** A rheostat in the electrical circuit is used to \_\_\_\_\_.

Ans ✗ 1. measure the voltage only

✗ 2. measure the current and voltage both

✓ 3. change the resistance in the circuit

✗ 4. measure the current only

**Q.12** Which of the following is NOT a heat insulator?

Ans ✓ 1. Silver

✗ 2. Plastic

✗ 3. Wool

✗ 4. Rubber

**Q.13** 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?

- Ans ☒ 1. One  
☒ 2. Two  
☐ 3. Three  
☐ 4. Four

**Q.14** 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.)

- Ans ☒ 1. DJ – BT  
☐ 2. MS – KB  
☐ 3. TZ – RI  
☐ 4. WC – UL

**Q.15** Which ICT (Information and Communication Technology) service is commonly used for activities like railway reservation in e-Governance?

- Ans ☒ 1. Web portals  
☐ 2. Online payment gateways  
☐ 3. Email services  
☐ 4. Social media platforms

**Q.16** Which of the following statements is correct?

- Ans ☐ 1. On increasing the length of the conductor, resistance is decreased.  
☒ 2. On increasing the length of the conductor, resistance is increased.  
☐ 3. On increasing the thickness of the conductor, resistance is increased.  
☐ 4. On increasing the length of the conductor, resistance remains unchanged.

**Q.17** Which of the following statements is correct?

- Ans ☐ 1. There is no method to convert temperature from one temperature scale to another.  
☐ 2. The normal human body temperature is 45°C.  
☐ 3. Laboratory thermometer is used to measure human body temperature.  
☒ 4. The normal human body temperature is 98.6°F.

**Q.18** 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 : %

- Ans ☐ 1. # = FBH, % = HDI  
☐ 2. # = FBH, % = HEJ  
☒ 3. # = FBH, % = HDJ  
☐ 4. # = FBG, % = HDJ

**Q.19** 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?

- Ans ☐ 1. 1  
☒ 2. 2  
☐ 3. 4  
☐ 4. 3

Q.20 The value of  $32 - 4 [ 4 + 5 ( 4 - 4 ( 6 - 2 ) + 4 ) - 18 ] \div 6$  is:

- Ans ☒ 1. 58  
☒ 2. 68  
☒ 3. 60  
☒ 4. 56

Q.21 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.)

- Ans ☒ 1. Distance travelled is 600 km and displacement is 0 km  
☒ 2. Distance travelled is 300 km and displacement is 0 km  
☒ 3. Distance travelled is 0 km and displacement is 0 km  
☒ 4. Distance travelled is 0 km and displacement is 600 km

Q.22 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.

- Ans ☒ 1. 60.2  
☒ 2. 59.2  
☒ 3. 63.2  
☒ 4. 62.2

Q.23 Calculate the kinetic energy of a body of mass 10 kg moving with a uniform velocity of  $5 \text{ m s}^{-1}$ .

- Ans ☒ 1. 120 J  
☒ 2. 50 J  
☒ 3. 125 J  
☒ 4. 25 J

Q.24 There is a rectangular sheet whose dimensions are  $15.2 \text{ cm} \pm 0.1 \text{ cm}$  in length and  $9.1 \text{ cm} \pm 0.1 \text{ cm}$  in width. What is the error in the estimation of the area of the rectangular sheet?

- Ans ☒ 1.  $5 \text{ cm}^2$   
☒ 2.  $13 \text{ cm}^2$   
☒ 3.  $0.3 \text{ cm}^2$   
☒ 4.  $2 \text{ cm}^2$

Q.25 What is the normal range of temperature for a healthy human body in Kelvin?

- Ans ☒ 1. (283.15-323.15) K  
☒ 2. (308.15-315.15) K  
☒ 3. (301.15-323.15) K  
☒ 4. (293.15-323.15) K

Q.26 What is the first step in providing first aid for a minor burn?

- Ans ☒ 1. Apply butter to the burn  
☒ 2. Run cool water over the burn  
☒ 3. Cover the burn with a thick cloth  
☒ 4. Pop any blisters that form

Q.27 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  $\pi = \frac{22}{7}$ )

- Ans ☒ 1.  $414 \text{ m}^2$   
☒ 2.  $412 \text{ m}^2$   
☒ 3.  $416 \text{ m}^2$   
☒ 4.  $418 \text{ m}^2$

Q.28 An 8  $\Omega$  resistor generates 200 J of heat every second. What is the potential difference across the resistor?

- Ans ☒ 1. 10 V  
☒ 2. 20 V  
☒ 3. 30 V  
☒ 4. 40 V

Q.29 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?

- Ans ☒ 1. ₹2,620  
☒ 2. ₹2,780  
☒ 3. ₹2,560  
☒ 4. ₹2,720

Q.30 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?

- Ans ☒ 1. 75  
☒ 2. 45  
☒ 3. 55  
☒ 4. 60

Q.31 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

- Ans ☒ 1. X = 15, Y = 223  
☒ 2. X = 16, Y = 222  
☒ 3. X = 18, Y = 219  
☒ 4. X = 16, Y = 219

Q.32 What is the primary purpose of information kiosks set up by the government?

- Ans ☒ 1. To offer citizens easy access to information and services such as bill payments, registrations and public information  
☒ 2. To enable government employees to monitor social media activities of citizens  
☒ 3. To allow citizens to participate in online gaming competitions  
☒ 4. To provide free food and beverages to citizens

Q.33 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.

- Ans ☒ 1. Assertion (A) is false, but Reason (R) is true.  
☒ 2. Assertion (A) is true, but Reason (R) is false.  
☒ 3. Both (A) and (R) are true, and (R) is the correct explanation of (A).  
☒ 4. Both (A) and (R) are true, but (R) is not the correct explanation of (A).

Q.34 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 \_\_\_\_\_.

- Ans
- ☒ 1. 3 J
  - ☒ 2. 4 J
  - ☒ 3. 10 J
  - ☒ 4. 12 J

Q.35 What should come in place of the question mark (?) in the given series?

197 112 189 129 181 146 173 163 ?

- Ans
- ☒ 1. 165
  - ☒ 2. 156
  - ☒ 3. 144
  - ☒ 4. 153

Q.36 Mechanical energy is the sum of \_\_\_\_\_.

- Ans
- ☒ 1. electrical energy and light energy
  - ☒ 2. chemical energy and electrical energy
  - ☒ 3. potential energy and kinetic energy
  - ☒ 4. heat energy and chemical energy

Q.37 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)?

- Ans
- ☒ 1. 31.2
  - ☒ 2. 36.3
  - ☒ 3. 34.2
  - ☒ 4. 33.6

Q.38 In  $\Delta PQR$ ,  $\angle Q = 90^\circ$ . If  $\tan R = \frac{1}{2}$ , then what is the value of  $\frac{\sec P(3\cos R - \sin P)}{4\operatorname{cosec} R(4\sin R - \cos P)}$ ?

- Ans
- ☒ 1.  $-\frac{1}{3}$
  - ☒ 2.  $\frac{1}{3}$
  - ☒ 3.  $-\frac{8}{7}$
  - ☒ 4.  $\frac{8}{7}$

Q.39 Generally, what is the process of heat transfer in liquids?

- Ans
- ☒ 1. Both conduction and radiation
  - ☒ 2. Convection
  - ☒ 3. Conduction only
  - ☒ 4. Radiation only

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

- Ans
- ☒ 1. 1260
  - ☒ 2. 2100
  - ☒ 3. 1800
  - ☒ 4. 1400

**Q.41** 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.

- Ans ☒ 1. 6  
☒ 2. 8  
☒ 3. 7  
☒ 4. 9

**Q.42** 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:

- Ans ☒ 1. 2  
☒ 2. 1  
☒ 3. 4  
☒ 4. 5

**Q.43** 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.

- Ans ☒ 1. II is the cause and I is its possible effect.  
☒ 2. I is the cause and II is its possible effect.  
☒ 3. Both I and II are independent causes.  
☒ 4. Both I and II are effects of independent causes.

**Q.44** What is an appropriate way to handle a misunderstanding in an online conversation?

- Ans ☒ 1. Ignoring the conversation  
☒ 2. Blocking the person immediately  
☒ 3. Addressing the misunderstanding politely and privately  
☒ 4. Publicly shaming the other person

**Q.45** The resistance of a uniform metallic conductor depends on its:

- Ans ☒ 1. melting point only  
☒ 2. length, area of cross-section, and nature of its material  
☒ 3. area of cross-section only  
☒ 4. length only

**Q.46** 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?

- Ans ☒ 1. Global warming  
☒ 2. Ozone depletion  
☒ 3. Deforestation  
☒ 4. Acid rain

**Q.47** 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 \_\_\_\_\_.

- Ans ☒ 1. 37.33%  
☒ 2. 24.89%  
☒ 3. 40.44%  
☒ 4. 31.11%

**Q.48** 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.

Ans ☒ 1. Both I and II are effects of independent causes.  
☒ 2. II is the cause and I is its possible effect.  
☒ 3. Both I and II are independent causes.  
☒ 4. I is the cause and II is its possible effect.

**Q.49** 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.)

Ans ☒ 1. 33 m  
☒ 2. 31 m  
☒ 3. 29 m  
☒ 4. 25 m

**Q.50** If  $46.4 : x :: x : 2.9$ , and  $x > 0$ , then find the value of  $x$ .

Ans ☒ 1. 15.6  
☒ 2. 13.4  
☒ 3. 11.6  
☒ 4. 14.3

**Q.51** For a given potential difference (V), current (I) and resistance (R) across a conductor, Ohm's law is represented as:

Ans ☒ 1.  $V = I + R$   
☒ 2.  $V = I - R$   
☒ 3.  $I = VR$   
☒ 4.  $V = IR$

**Q.52** Which of the following correctly identifies the main components of a standard email structure?

Ans ☒ 1. Subject Line, Recipient Address, Message Body and Signature  
☒ 2. Username, Password, Message Body and Signature  
☒ 3. Header, Body, Footer and Encryption Key  
☒ 4. Recipient Address, CC, BCC and Attachment

**Q.53** 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?

Ans ☒ 1. 0.24%  
☒ 2. 0.25%  
☒ 3. 0.23%  
☒ 4. 0.2%

**Q.54** What is the most effective way to avoid mechanical hazards when operating large and dangerous machines?

Ans ☒ 1. Employee physical fitness training only  
☒ 2. Machine redesign to eliminate hazards  
☒ 3. Proper training and experience  
☒ 4. Regular machine maintenance only

Q.55 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?

- Ans ☒ 1. W  
☒ 2. U  
☒ 3. V  
☒ 4. I

Q.56 The measures of two supplementary angles are in the ratio 3 : 7. Find the measure of the greater of the two angles.

- Ans ☒ 1.  $126^\circ$   
☒ 2.  $54^\circ$   
☒ 3.  $180^\circ$   
☒ 4.  $144^\circ$

Q.57 By how much is 60% of 45 greater than  $\frac{4}{5}$  of 25?

- Ans ☒ 1. 7  
☒ 2. 5  
☒ 3. 1  
☒ 4. 4

Q.58 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'?

- Ans ☒ 1. Wife's mother's brother  
☒ 2. Wife's mother's brother's son  
☒ 3. Wife's father's brother's son  
☒ 4. Wife's father's brother

Q.59 In a project involving the design of a pipeline for a building, which technical drawings would need to be referenced together?

- Ans ☒ 1. Electrical and Electronics  
☒ 2. Mechanical and Electrical  
☒ 3. Civil and Electronics  
☒ 4. Mechanical and Civil

Q.60 Which of the following options represents the equation for work done?

- Ans ☒ 1. Work done = force – displacement  
☒ 2. Work done = force / displacement  
☒ 3. Work done = force × displacement  
☒ 4. Work done = force + displacement

Q.61 Which of the following is commonly used to treat drinking water?

- Ans ☒ 1. Acid neutralisation  
☒ 2. Chlorination  
☒ 3. Oil filtration  
☒ 4. Incineration

**Q.62** 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.

Ans ☒ 1. Only Statement 1 is true.  
☒ 2. Only Statement 2 is true.  
☒ 3. Both Statements 1 and 2 are true.  
☒ 4. Neither Statement 1 nor 2 is true.

**Q.63** 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?

Ans ☒ 1. Two  
☒ 2. One  
☒ 3. Three  
☒ 4. Four

**Q.64** Which of the following factors affect(s) the resistance of a wire?

Ans ☒ 1. The length, cross-sectional area and material of the wire  
☒ 2. Only material of the wire  
☒ 3. Only length and cross-sectional area of the wire  
☒ 4. Only length of the wire

**Q.65** 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?

Ans ☒ 1. 90  
☒ 2. 60  
☒ 3. 70  
☒ 4. 80

**Q.66** The areas of three adjacent faces of a solid cuboid are  $190 \text{ cm}^2$ ,  $285 \text{ cm}^2$  and  $150 \text{ cm}^2$ . What is the volume (in  $\text{cm}^3$ ) of the cuboid?

Ans ☒ 1. 2716  
☒ 2. 3076  
☒ 3. 2896  
☒ 4. 2850

**Q.67** What should come in place of the question mark (?) in the given series?

67 106 88 127 109 148 ?

Ans ☒ 1. 117  
☒ 2. 108  
☒ 3. 130  
☒ 4. 126

**Q.68** 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).

Ans ☒ 1. 0 m/s  
☒ 2. 2.5 m/s  
☒ 3. 3.2 m/s  
☒ 4. 1.7 m/s

Q.69 Which chemical process involves replacing the R group of an alcohol with the R' group of an ester to produce biodiesel from vegetable oils?

- Ans ☒ 1. Transesterification  
☐ 2. Fermentation  
☐ 3. Distillation  
☐ 4. Polymerisation

Q.70 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?

- Ans ☐ 1. 46%  
☐ 2. 49%  
☐ 3. 55%  
☒ 4. 50%

Q.71 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

- Ans ☒ 1. 35 – 70 – 55 – 165  
☐ 2. 73 – 146 – 114 – 228  
☐ 3. 13 – 26 – 46 – 138  
☐ 4. 42 – 84 – 74 – 222

Q.72 What will come in place of the question mark (?) in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?

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

- Ans ☐ 1. 45  
☐ 2. 44  
☒ 3. 46  
☐ 4. 47

Q.73 Which of the following features is NOT available in Google Docs?

- Ans ☐ 1. Insert images  
☐ 2. Comment on text  
☐ 3. Create tables  
☒ 4. Track changes

Q.74 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.

- Ans ☐ 1. 200 J  
☐ 2. 120 J  
☐ 3. 100 J  
☒ 4. 400 J

Q.75 SI unit of luminous intensity is \_\_\_\_.

- Ans ☒ 1. candela  
☐ 2. mole  
☐ 3. metre  
☐ 4. watt

**Q.76** 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?

- Ans ✓ 1. ₹300  
✗ 2. ₹430  
✗ 3. ₹250  
✗ 4. ₹340

**Q.77** What is the recommended action before replacing a fuse?

- Ans ✗ 1. Wear a safety belt.  
✗ 2. Use rubber gloves.  
✓ 3. Switch off circuit.  
✗ 4. Stand on a stool.

**Q.78** 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?

- Ans ✓ 1. One  
✗ 2. Two  
✗ 3. Three  
✗ 4. Four

**Q.79** How many fundamental units are there in the SI system?

- Ans ✗ 1. 5  
✗ 2. 14  
✓ 3. 7  
✗ 4. 10

**Q.80** In the following series, only one letter-cluster is incorrect. Select the INCORRECT letter-cluster.

INK KPJ MRI OTH QWG SXF

- Ans ✓ 1. QWG  
✗ 2. SXF  
✗ 3. MRI  
✗ 4. OTH

**Q.81** Which of the following fundamental quantities are used to express any mechanical quantity?

- Ans ✗ 1. Length, time and energy  
✓ 2. Length, mass and time  
✗ 3. Length, mass and speed  
✗ 4. Mass, time and force

**Q.82** The body of the cooking vessel is of metal and handles are of plastic because \_\_\_\_.

- Ans ✓ 1. metal is a good conductor of heat and plastic is an insulator  
✗ 2. both metal and plastic are insulators  
✗ 3. metal is an insulator and plastic is a good conductor of heat  
✗ 4. both metal and plastic are good conductors of heat

**Q.83** 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  $9.8 \text{ m s}^{-2}$ .

- Ans ✓ 1. 392 J  
✗ 2. 300 J  
✗ 3. 784 J  
✗ 4. 400 J

Q.84 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.

- Ans ☒ 1. Statements 1 and 2 are true.  
☒ 2. Statements 1 and 3 are true.  
☒ 3. Statements 3 and 4 are true.  
☒ 4. Statements 2 and 4 are true.

Q.85 The dimension of surface tension is \_\_\_\_\_.

- Ans ☒ 1.  $ML^0T$   
☒ 2.  $ML^2T^{-2}$   
☒ 3.  $MLT^{-2}$   
☒ 4.  $ML^0T^{-2}$

Q.86 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  $A/2$ ?

- Ans ☒ 1.  $1\ \Omega$   
☒ 2.  $2\ \Omega$   
☒ 3.  $8\ \Omega$   
☒ 4.  $4\ \Omega$

Q.87 Find the least number which when divided by 5, 6 and 7 leaves remainders 4, 5 and 6.

- Ans ☒ 1. 207  
☒ 2. 208  
☒ 3. 209  
☒ 4. 210

Q.88 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)?

- Ans ☒ 1. 49%  
☒ 2. 46%  
☒ 3. 47%  
☒ 4. 45%

Q.89 What is the typical range of wind speed (in m/s) required for the efficient operation of most commercial wind turbines?

- Ans ☒ 1. 12 - 25 m/s  
☒ 2. 0 - 2 m/s  
☒ 3. 3 - 5 m/s  
☒ 4. 5 - 15 m/s

Q.90 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.)

- Ans ☒ 1. NQIL  
☒ 2. RUNP  
☒ 3. BEWZ  
☒ 4. WZRU

- Q.91** How many folds is/are required to fold an A2 size drawing sheet (420 mm × 594 mm), according to BIS SP: 46-2003?
- Ans** ☒ 1. 2 folds  
☒ 2. 1 fold  
☒ 3. 4 folds  
☒ 4. 3 folds
- 
- Q.92** Which of the following letter-number clusters will replace the question mark (?) in the given series?
- 6S, 24T, 12V, 48Y, 24C, ?
- Ans** ☒ 1. 96H  
☒ 2. 96I  
☒ 3. 96G  
☒ 4. 60H
- 
- Q.93** Which of the following units are used to measure only fundamental physical quantities?
- Ans** ☒ 1. Neither base nor derived units  
☒ 2. Base units  
☒ 3. Derived units  
☒ 4. Both base and derived units
- 
- Q.94** 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?
- Ans** ☒ 1. 68.2  
☒ 2. 70.2  
☒ 3. 67.2  
☒ 4. 69.2
- 
- Q.95** 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:
- Ans** ☒ 1. 16  
☒ 2. 19  
☒ 3. 14  
☒ 4. 15
- 
- Q.96** Which of the following processes is primarily responsible for heat loss from a hot utensil?
- Ans** ☒ 1. Radiation  
☒ 2. Conduction  
☒ 3. Absorption  
☒ 4. Convection
- 
- Q.97** 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?
- Ans** ☒ 1. 2  
☒ 2. 6  
☒ 3. 5  
☒ 4. 3
- 
- Q.98** 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?
- Ans** ☒ 1. 1  
☒ 2. 4  
☒ 3. 2  
☒ 4. 3

Q.99 Which of the following is an example of preventive maintenance?

- Ans ☐ 1. Using equipment until failure occurs  
☒ 2. Conducting regular lubrication and inspections  
☐ 3. Waiting for a machine to break down before repairing it  
☐ 4. Ignoring minor faults to save costs

Q.100 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?

- Ans ☐ 1. 7  
☒ 2. 5  
☐ 3. 6  
☐ 4. 4

Section : Part B (Instrument Mechanic)

Q.102 Which of the following is a fundamental unit?

- Ans ☐ 1. newton  
☒ 2. metre  
☐ 3. pascal  
☐ 4. watt

Q.104 Which of the following maintenance practices helps prevent overheating in a DC motor?

- Ans ☒ 1. Regular lubrication of bearings  
☐ 2. Reducing field current  
☐ 3. Disconnecting the load frequently  
☐ 4. Increasing armature resistance

Q.105 Select the correct statement regarding grounding and earthing in electrical system.

- Ans ☐ 1. Grounding is used to protect humans from electric shocks, while earthing is used to reduce power consumption.  
☐ 2. The grounding and earthing are related to single phase system.  
☐ 3. Grounding and earthing are the same process with no distinction.  
☒ 4. Grounding involves connecting the earth to a system's neutral or other conductors, while earthing connects the system's frame or body to the earth.

Q.106 What is the maximum allowable distance of the screw from the end point of a joint during installation of PVC channel?

- Ans ☒ 1. 15 cm  
☐ 2. 10 cm  
☐ 3. 5 cm  
☐ 4. 20 cm

Q.107 A capacitor with a capacitance of  $10\ \mu\text{F}$  is connected in series with a  $1\ \text{M}\Omega$  resistor. How much time will it take for the capacitor to reach 90% of its final charge?

- Ans ☐ 1. 10.5 seconds  
☐ 2. 50.2 seconds  
☐ 3. 35.7 seconds  
☒ 4. 23.03 seconds

Q.109 Which type of DC generator has its field winding connected in parallel with the armature?

- Ans ☐ 1. Series DC generator  
☒ 2. Shunt DC generator  
☐ 3. Separately excited DC generator  
☐ 4. Compound DC generator

Q.111 Which power loss is assessed by open-circuit test on transformer?

- Ans
- ☒ 1. Winding loss
  - ☒ 2. Copper loss
  - ☒ 3. Core loss
  - ☒ 4. Friction loss
- 

Q.112 Which of the following IEEE standards focuses on the grounding of electrical systems and equipment?

- Ans
- ☒ 1. IEEE 80
  - ☒ 2. IEEE 519
  - ☒ 3. IEEE 1547
  - ☒ 4. IEEE 1100
- 

Q.113 Which of the following uses of wire gauge is INCORRECT?

- Ans
- ☒ 1. It measures the diameter of a wire.
  - ☒ 2. It does not help determine how much current a wire can carry.
  - ☒ 3. Using the wrong wire gauge can damage appliances and electronic devices.
  - ☒ 4. It is used in electrical installations, welding and other applications.
- 

Q.114 Which of the following losses remains variable during normal operation of transformer?

- Ans
- ☒ 1. Copper loss
  - ☒ 2. Hysteresis loss
  - ☒ 3. Eddy current loss
  - ☒ 4. Stray loss
- 

Q.115 Which type of material is used to protect the transformer winding from the core?

- Ans
- ☒ 1. Steel
  - ☒ 2. Mica
  - ☒ 3. Water
  - ☒ 4. Iron
- 

Q.116 What does inductance (L) oppose in a circuit?

- Ans
- ☒ 1. Change in voltage
  - ☒ 2. Change in current magnitude
  - ☒ 3. Change in frequency
  - ☒ 4. Change in resistance
- 

Q.117 What is waste?

- Ans
- ☒ 1. Natural resources for living organisms
  - ☒ 2. Valuable substances for agriculture
  - ☒ 3. Useful materials for industries
  - ☒ 4. Unwanted or unusable materials
- 

Q.118 Which of the following punch marks is used for the correct location and seating of the divider point?

- Ans
- ☒ 1. Centre punch marks of 30°
  - ☒ 2. Centre punch marks of 60°
  - ☒ 3. Prick punch marks of 120°
  - ☒ 4. Prick punch marks of 30°
- 

Q.119 A device operates at 240 V and consumes 480 W of power. What is the current flowing through the device?

- Ans
- ☒ 1. 2 A
  - ☒ 2. 1 A
  - ☒ 3. 1.5 A
  - ☒ 4. 2.5 A
-

Q.120 Which of the following processes is used to manufacture thick film resistors?

- Ans ☒ 1. Pasting metal compound and powdered glass on a ceramic base  
☒ 2. Embedding metal wire in ceramic  
☒ 3. Spraying metal powder on a ceramic base  
☒ 4. Coating a metal rod with ceramic

Q.121 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/s<sup>2</sup>].

- Ans ☒ 1. 5 J  
☒ 2. 10 N  
☒ 3. 5 N  
☒ 4. 10 J

Q.123 Pencils are rated in engineering drawings based on the \_\_\_\_\_.

- Ans ☒ 1. hardness or softness of the lead  
☒ 2. colour of the lead  
☒ 3. durability of the lead  
☒ 4. shape of the lead

Q.124 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.

- Ans ☒ 1. Statement (I) is correct but Statement (II) is incorrect.  
☒ 2. Statement (I) and (II) both are correct.  
☒ 3. Statement (I) is incorrect but Statement (II) is correct.  
☒ 4. Statement (I) and (II) both are incorrect.

Q.126 What should be the minimum thickness of the MS clips used for fixing PVC channels under steel joints?

- Ans ☒ 1. 1.2 mm  
☒ 2. 1.7 mm  
☒ 3. 0.5 mm  
☒ 4. 2.2 mm

Q.127 What is the main difference between grounding and earthing in a three-phase system?

- Ans ☒ 1. Grounding provides a return path for current, while earthing provides a safe path for fault current.  
☒ 2. Grounding and earthing are used interchangeably, with no major difference.  
☒ 3. Grounding is used to protect electrical appliances from surge voltages, while earthing is used to prevent system overloads.  
☒ 4. Grounding connects only the body of the electrical equipment to the earth, whereas earthing is associated with the neutral conductor.

Q.128 Which of the following parts of a hammer-head is used for shaping and forming work like riveting and bending?

- Ans ☒ 1. Face  
☒ 2. Eyehole  
☒ 3. Pein  
☒ 4. Cheek

Q.129 In engineering drawing (lettering and numbering), a single stroke means that the \_\_\_\_\_.

- Ans ☒ 1. thickness of the line of the letter or number is obtained in one stroke of the pencil  
☒ 2. thickness of the line of the letter or number is obtained in three strokes of the pencil  
☒ 3. thickness of the line of the letter or number is obtained in no strokes of the pencil  
☒ 4. thickness of the line of the letter or number is obtained in two strokes of the pencil

Q.130 What is the blade length of the T1 'T' square, as per IS:1360-1989?

- Ans
- ☐ 1. 500 mm
  - ☐ 2. 1500 mm
  - ☐ 3. 700 mm
  - ☒ 4. 1000 mm

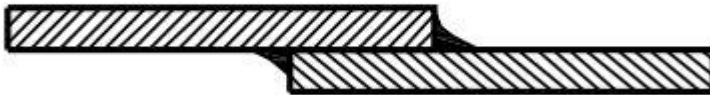
Q.131 Which of the following types of wooden mallets are used for hollowing panel beatings?

- Ans
- ☐ 1. Standard wooden mallets
  - ☐ 2. End-faked mallets
  - ☐ 3. Side-faked mallets
  - ☒ 4. Bossing mallets

Q.133 Which of the following is an example of a p-type semiconductor?

- Ans
- ☐ 1. Silicon doped with phosphorus
  - ☐ 2. Silicon doped with arsenic
  - ☒ 3. Silicon doped with boron
  - ☐ 4. Germanium doped with phosphorus

Q.135 Identify the type of brazed joint shown below.



- Ans
- ☐ 1. Joggle Lap
  - ☒ 2. Simple Lap
  - ☐ 3. Strapped Lap
  - ☐ 4. Butted Flange

Q.136 The EMF per turn of a single phase 10 kVA, 2200/220 V, 50 Hz transformer is 10 V. Calculate the number of primary and secondary turns, respectively.

- Ans
- ☐ 1. 110 and 10
  - ☒ 2. 220 and 22
  - ☐ 3. 10 and 110
  - ☐ 4. 22 and 220

Q.137 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.

- Ans
- ☐ 1. Neither statement is true
  - ☐ 2. Only statement 2 is true
  - ☒ 3. Only statement 1 is true
  - ☐ 4. Both statements are true

Q.138 A resistor has these colour bands: Brown, Black, Red and Gold. What is its resistance value?

- Ans
- ☐ 1.  $10 \Omega \pm 5\%$
  - ☐ 2.  $100 \Omega \pm 5\%$
  - ☐ 3.  $10,000 \Omega (10 \text{ k}\Omega) \pm 5\%$
  - ☒ 4.  $1,000 \Omega (1 \text{ k}\Omega) \pm 5\%$

**Q.139** 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?

- Ans ☒ 1. Solid punch  
☒ 2. Centre punch  
☒ 3. Pin punch  
☒ 4. Prick punch

**Q.140** Which of the following methods is used to reduce earth resistance in an earthing system?

- Ans ☒ 1. Increasing the depth of the ground electrode  
☒ 2. Using larger conductors for grounding  
☒ 3. Reducing the distance between the earth and the neutral  
☒ 4. Using insulated grounding cables

**Q.142** 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.

- Ans ☒ 1. 1, 2, and 3 only  
☒ 2. 1 and 4 only  
☒ 3. 2 and 3 only  
☒ 4. 1, 2, and 4 only

**Q.143** What is the primary principle behind the generation of electrical energy in a piezoelectric device?

- Ans ☒ 1. Conversion of thermal energy into electrical energy  
☒ 2. Conversion of chemical energy into electrical energy  
☒ 3. Conversion of light energy into electrical energy  
☒ 4. Conversion of mechanical stress into electrical energy

**Q.145** What is the recommended action if a DC motor produces excessive sparking at the brushes?

- Ans ☒ 1. Reduce the motor speed  
☒ 2. Increase the supply voltage  
☒ 3. Replace worn-out brushes and clean the commutator  
☒ 4. Add resistance to the armature circuit

**Q.146** Which of the following is the key difference between a fuse and a circuit breaker?

- Ans ☒ 1. A fuse can be reset after tripping, while a circuit breaker must be replaced.  
☒ 2. A fuse is used for high-voltage circuits, while a circuit breaker is used for low-voltage circuits.  
☒ 3. A fuse is a mechanical device, while a circuit breaker is an electronic device.  
☒ 4. A fuse is a one-time-use device, while a circuit breaker can be reset and reused.

**Q.147** If the coefficient of linear expansion of a material is  $2 \times 10^{-5} \text{ } ^\circ\text{C}^{-1}$ , what does it mean?

- Ans ☒ 1. The material expands by  $2 \times 10^{-5}$  times its original area per degree Celsius  
☒ 2. The material expands by  $2 \times 10^{-5}$  times its original volume per degree Celsius  
☒ 3. The material expands by  $2 \times 10^{-5}$  times its original length per degree Celsius  
☒ 4. The material always increases by  $2 \times 10^{-5}$  kg when temperature is increased by  $1^\circ\text{C}$

**Q.149** What will be the eddy current loss if the supply frequency of a transformer becomes double?

- Ans ☒ 1. Four times  
☒ 2. No change  
☒ 3. Double  
☒ 4. Half

Q.150 What is the most likely cause if a DC motor runs in the wrong direction?

- Ans
- ☒ 1. Faulty bearings
  - ☒ 2. Incorrect field or armature wiring connections
  - ☒ 3. High armature resistance
  - ☒ 4. Worn-out brushes

Q.151 What is the chemical effect that occurs in a battery during the charging process of a Lead Acid battery?

- Ans
- ☒ 1. Lead reacts with sulphur to form lead sulphate
  - ☒ 2. Water dissociation into hydrogen and oxygen
  - ☒ 3. Lead sulphate decomposes into lead and sulphuric acid
  - ☒ 4. Sulphuric acid dissociates into hydrogen and sulphate ions

Q.152 Which of the following is a key advantage of using Thyristors in power control applications?

- Ans
- ☒ 1. High frequency switching
  - ☒ 2. High efficiency and low power loss
  - ☒ 3. Small size and low cost
  - ☒ 4. Low voltage handling capabilities

Q.154 If a machine has an efficiency of 80%, it means:

- Ans
- ☒ 1. the machine produces more output than input
  - ☒ 2. the machine has a velocity ratio and mechanical advantage both equal to 80
  - ☒ 3. the machine does not have any loss in input energy
  - ☒ 4. the machine loses 20% of the input

Q.155 In parallel grouping of capacitors, what happens to the total capacitance?

- Ans
- ☒ 1. It remains the same.
  - ☒ 2. It increases.
  - ☒ 3. It becomes zero.
  - ☒ 4. It decreases.

Q.156 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 |

- Ans
- ☒ 1. A - R, B - S, C - Q, D - P
  - ☒ 2. A - P, B - R, C - Q, D - S
  - ☒ 3. A - S, B - R, C - P, D - Q
  - ☒ 4. A - S, B - R, C - Q, D - P

Q.157 What determines the appropriate current rating of a fuse in a circuit?

- Ans
- ☒ 1. The smallest cable rating in the circuit
  - ☒ 2. The number of electrical devices connected
  - ☒ 3. The length of the circuit wires
  - ☒ 4. The voltage supplied to the circuit

Q.158 Which of the following types of wooden mallets are used for general purpose work such as flattening and bending?

- Ans
- ☒ 1. Bossing mallets
  - ☒ 2. Side-faked mallets
  - ☒ 3. Standard wooden mallets
  - ☒ 4. End-faked mallets

**Q.159** When did India implement the Hazardous Wastes (Management and Handling) Rules to regulate the disposal and handling of hazardous waste?

- Ans
- ☐ 1. 1987
  - ☐ 2. 2000
  - ☒ 3. 1989
  - ☐ 4. 1982
- 

**Q.161** Which type of wiring is used only for temporary installations?

- Ans
- ☐ 1. Casing and capping wiring
  - ☐ 2. Conduit wiring
  - ☐ 3. CTS wiring
  - ☒ 4. Cleat wiring
- 

**Q.162** A DC generator delivers a load current of 25 A at 200 V. If the generated EMF is 205 V, what is the armature resistance?

- Ans
- ☒ 1. 0.2  $\Omega$
  - ☐ 2. 0.4  $\Omega$
  - ☐ 3. 0.3  $\Omega$
  - ☐ 4. 0.1  $\Omega$
- 

**Q.163** What is another name for CTS wiring?

- Ans
- ☐ 1. Conduit wiring
  - ☒ 2. Batten wiring
  - ☐ 3. Casing and capping wiring
  - ☐ 4. Cleat wiring
- 

**Q.164** What happens to inductive reactance, when frequency increases?

- Ans
- ☐ 1. It becomes zero.
  - ☒ 2. It increases.
  - ☐ 3. It decreases.
  - ☐ 4. It remains the same.
- 

**Q.165** Which of the following instruments is used to measure the resistance of an earthing electrode?

- Ans
- ☐ 1. Clamp meter
  - ☐ 2. Tachometer
  - ☒ 3. Earth resistance tester
  - ☐ 4. Power analyser
- 

**Q.166** A shunt release in an MCCB is commonly used for:

- Ans
- ☐ 1. overcurrent protection
  - ☐ 2. improving power factor
  - ☒ 3. remote tripping of the MCCB
  - ☐ 4. voltage stabilisation
- 

**Q.167** Why is it important to follow proper disposal procedures for industrial waste?

- Ans
- ☐ 1. To allow waste to decompose anywhere
  - ☐ 2. To reduce the number of trash bins needed
  - ☐ 3. To save time and effort in sorting waste
  - ☒ 4. To comply with environmental regulations and reduce pollution
- 

**Q.169** What does an optical pyrometer measure?

- Ans
- ☐ 1. The relative density of liquids
  - ☒ 2. The temperature of the surface
  - ☐ 3. The volume of liquids
  - ☐ 4. The pressure of gases
-

**Q.171** When drawing a curved line of a specific length in an engineering drawing, which tool is most appropriate for ensuring accuracy?

- Ans ☒ 1. Protractor  
☒ 2. Straightedge  
☒ 3. French Curve  
☒ 4. Compass
- 

**Q.172** In a single-phase transformer, which instrument is used to check continuity between the primary and secondary windings when they are not energised?

- Ans ☒ 1. Use a multimeter set to ohms  
☒ 2. Use a multimeter set to voltage  
☒ 3. Use a multimeter set to current  
☒ 4. Use an energy meter
- 

**Q.173** In engineering drawing, what is defined as the path of a moving point with no thickness?

- Ans ☒ 1. Angle  
☒ 2. Curve  
☒ 3. Point  
☒ 4. Line
- 

**Q.174** What is the primary purpose of implementing Lockout/Tagout (LOTO) procedures when working on a DC motor?

- Ans ☒ 1. To improve motor cooling  
☒ 2. To prevent accidental startup during maintenance  
☒ 3. To measure motor speed  
☒ 4. To increase motor efficiency
- 

**Q.175** What is the significance of the term 'equipotential bonding' in the context of IEEE regulations for earthing?

- Ans ☒ 1. It ensures that electrical systems operate at different voltage levels.  
☒ 2. It is a method to increase the resistance of the grounding system.  
☒ 3. It refers to the insulation of electrical cables.  
☒ 4. It refers to ensuring that all metallic parts of electrical systems are connected together to maintain the same electrical potential.
-



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS  
सी ई एन - ०१/२०२४ - CEN - 01/2024  
सहायक लोको पायलट की भर्ती / Recruitment of Assistant Loco Pilot



|           |                                  |
|-----------|----------------------------------|
| Exam      | RRB ALP 2024 CBT 2 (CEN 01/2024) |
| Paper     | Instrument Mechanic              |
| Test Date | 06 May 2025                      |
| Test Time | 9:30 AM - 12:00 PM               |
| Language  | English                          |

**\* Note**

Correct answer carries 1 mark; each incorrect answer carries a negative mark of 1/3.

1. The option shown in green with a tick is the correct answer as per the official answer key.

2. RRB shuffles question order for every candidate inside each Part; this paper follows the order of one real response sheet.

Section : Part A

Q.1 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 \_\_\_\_.

Ans ✓ 1. 1. 4R

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

X 3.  $\frac{R}{4}$

X 4. 4. 2R

Q.2 Which technology operates through an electrochemical process that transforms the energy stored in hydrogen gas ( $H_2$ ) and oxygen into electrical power without combustion?

Ans X 1. Wind power

X 2. Solar thermal power

✓ 3. Hydrogen fuel cells

X 4. Hydroelectric power

Q.3 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?

Ans X 1. Three

X 2. One

✓ 3. Two

X 4. Four

Q.4 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?

Ans X 1. Three

X 2. One

X 3. Two

✓ 4. Four

Q.5 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?

Ans X 1. 18%

✓ 2. 15%

X 3. 16%

X 4. 10%

- Q.6** 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:
- Ans** ☒ 1. 14,512  
☒ 2. 14,112  
☒ 3. 14,442  
☒ 4. 13,997
- 
- Q.7** 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?
- Ans** ☒ 1. The potential energy and kinetic energy will both increase.  
☒ 2. The potential energy would decrease while the kinetic energy would increase.  
☒ 3. The kinetic energy and potential energy will not change.  
☒ 4. The potential energy would increase while the kinetic energy would decrease.
- 
- Q.8** 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?
- Ans** ☒ 1. 30 A  
☒ 2. 20 A  
☒ 3. 10 A  
☒ 4. 15 A
- 
- Q.9** Which of the following correctly describes the role of DNS (Domain Name System) in internet architecture?
- Ans** ☒ 1. DNS routes data packets to their destination across the internet.  
☒ 2. DNS translates IP addresses into domain names to make them easier to remember.  
☒ 3. DNS translates domain names into IP addresses to allow browsers to locate web servers.  
☒ 4. DNS secures the data transmitted over the internet by encrypting it.
- 
- Q.10** How many base units are given in the SI system?
- Ans** ☒ 1. 9  
☒ 2. 3  
☒ 3. 11  
☒ 4. 7
- 
- Q.11** Which of the following is NOT one of the 5S principles?
- Ans** ☒ 1. Supervise  
☒ 2. Standardise  
☒ 3. Sustain  
☒ 4. Sort
- 
- Q.12** 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
- Ans** ☒ 1. 13 – 169 – 244 – 188  
☒ 2. 16 – 196 – 296 – 246  
☒ 3. 23 – 529 – 629 – 589  
☒ 4. 25 – 625 – 725 – 675

Q.13 Aditya is using two thin blankets instead of one thick blanket in winter to keep himself warm because \_\_\_\_\_.

- Ans
- ☐ 1. the friction between the two blankets produces heat
  - ☒ 2. the air trapped between the blankets is a poor conductor of heat
  - ☐ 3. two blankets are cheaper than one thick blanket
  - ☐ 4. the blankets are at a higher temperature than the surroundings

Q.14 Which of the following features allows the user to quickly find emails received from a specific sender?

- Ans
- ☐ 1. Draft
  - ☒ 2. Sort
  - ☐ 3. Filter
  - ☐ 4. Archive

Q.15 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)

- Ans
- ☐ 1. SL – NP
  - ☐ 2. MF – HJ
  - ☒ 3. WP – RS
  - ☐ 4. DW – YA

Q.16 Which of the following is the temperature range in a clinical thermometer?

- Ans
- ☐ 1. 10°C to 45°C
  - ☐ 2. 31°C to 44°C
  - ☐ 3. 30°C to 43°C
  - ☒ 4. 35°C to 42°C

Q.17 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

- Ans
- ☐ 1. 11 – 13 – 22 – 63
  - ☒ 2. 8 – 16 – 26 – 13
  - ☐ 3. 9 – 18 – 28 – 20
  - ☐ 4. 3 – 15 – 12 – 20

Q.18 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:  $g = 9.8 \text{ m s}^{-2}$ .

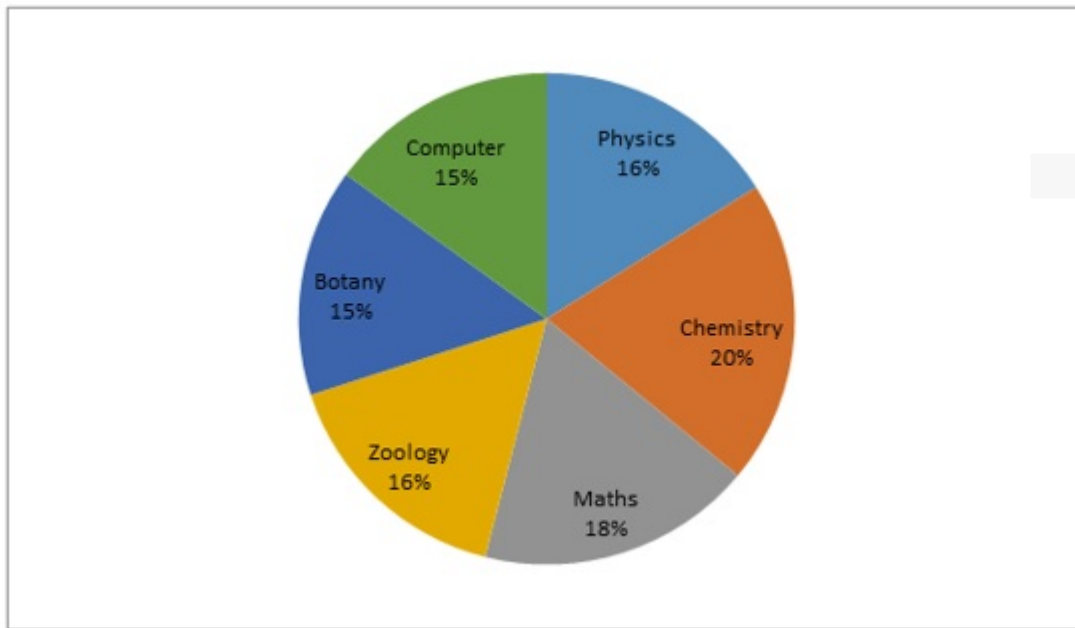
- Ans
- ☐ 1. 450 J
  - ☐ 2. 400 J
  - ☐ 3. 500 J
  - ☒ 4. 490 J

Q.19 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.

- Ans
- ☐ 1. 36
  - ☒ 2. 63
  - ☐ 3. 42
  - ☐ 4. 64

Q.20 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?

- Ans ☒ 1. 15 : 14  
☒ 2. 16 : 15  
☒ 3. 15 : 16  
☒ 4. 14 : 15

Q.21 If the sum of lengths of two adjacent sides of a parallelogram is 12 cm, then the perimeter of the parallelogram is:

- Ans ☒ 1. 36 cm  
☒ 2. 34 cm  
☒ 3. 20 cm  
☒ 4. 24 cm

Q.22 Find the value of  $96.86572 \times 10^7$ .

- Ans ☒ 1. 96,86,57,200  
☒ 2. 9,68,65,720  
☒ 3. 0.9686572  
☒ 4. 96,86,572

Q.23 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

- Ans ☒ 1. A-(IV), B-(III), C-(II), D-(I)  
☒ 2. A-(I), B-(III), C-(II), D-(IV)  
☒ 3. A-(IV), B-(II), C-(III), D-(I)  
☒ 4. A-(IV), B-(III), C-(I), D-(II)

Q.24 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?

- Ans ☒ 1. 3.33 J  
☒ 2. 120 J  
☒ 3. 720 J  
☒ 4. 840 J

Q.25 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?

- Ans ☒ 1. 1  
☒ 2. 4  
☒ 3. 3  
☒ 4. 5

Q.26 Ampere is the SI unit of \_\_\_\_\_.

- Ans ☒ 1. mass  
☒ 2. electric charge  
☒ 3. electric current  
☒ 4. electric power

Q.27 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

- Ans ☒ 1. 82 – 139 – 234 – 78  
☒ 2. 48 – 96 – 156 – 52  
☒ 3. 53 – 106 – 166 – 55  
☒ 4. 132 – 264 – 444 – 138

Q.28 The areas of three adjacent faces of a solid cuboid are  $162\text{ cm}^2$ ,  $144\text{ cm}^2$  and  $50\text{ cm}^2$ . What is the volume (in  $\text{cm}^3$ ) of the cuboid?

- Ans ☒ 1. 1365  
☒ 2. 805  
☒ 3. 833  
☒ 4. 1080

Q.29 What should come in place of the question mark (?) in the given series?

87 118 149 ? 211 242

- Ans ☒ 1. 199  
☒ 2. 171  
☒ 3. 188  
☒ 4. 180

Q.30 Which of the following is an example of uniform motion?

- Ans ☒ 1. A vehicle moving through a crowded area  
☒ 2. A sprinter running a 100-metre race with varying speed  
☒ 3. A ball rolling down a slope  
☒ 4. A train moving at a constant speed on a straight track

Q.31 What should come in place of the question mark (?) in the given series?

UT27, RQ25, NM23, ?

- Ans ☒ 1. IH21  
☐ 2. IG21  
☐ 3. IH29  
☐ 4. JH19

Q.32 A person saves 50% of his income. If his expenditure is ₹640, then his income (in ₹) is:

- Ans ☐ 1. 600  
☐ 2. 1,320  
☒ 3. 1,280  
☐ 4. 560

Q.33 Which of the following is an application of the 5S concept in a workshop?

- Ans ☐ 1. Removing safety protocols to improve efficiency  
☐ 2. Increasing the number of safety supervisors  
☐ 3. Using extra tools without proper storage  
☒ 4. Keeping tools and materials organised for easy access

Q.34  $a^2 + b^2 + ab$

- Ans ☒ 1.  $\frac{a^3 - b^3}{3}$   
☐ 2.  $\frac{a^3 - b^3}{2}$   
☐ 3.  $\frac{a^3 - b^3}{5}$   
☐ 4.  $\frac{a^3 - b^3}{5}$

Q.35 Which of the following benefits can be obtained by conducting an energy audit in a commercial building?

- Ans ☒ 1. Identification of opportunities for energy savings  
☐ 2. Increasing the cost of energy bills  
☐ 3. Reduced market value of building  
☐ 4. Reduction in price of energy per its unit usage

Q.36 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.

- Ans ☐ 1. 5,510  
☐ 2. 5,610  
☐ 3. 5,910  
☒ 4. 5,760

Q.37 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:

- Ans ☒ 1. 12%  
☐ 2. 11%  
☐ 3. 14%  
☐ 4. 13%

Q.38 Which of the following correctly describes the direction of electric current?

- Ans ☒ 1. Opposite to the direction of electron flow  
☐ 2. From low potential to high potential  
☐ 3. Same as the direction of electron flow  
☐ 4. Opposite to the direction of positive charge flow

Q.39 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.

- Ans ☐ 1. Both containers become equally hot.  
☒ 2. The black container becomes hotter than the white container.  
☐ 3. There is no effect on either container.  
☐ 4. The white container becomes hotter than the black container.

Q.40 In Engineering Drawing, principal lines are drawn to represent \_\_\_\_\_.

- Ans ☐ 1. wide lines along which the prints are trimmed  
☐ 2. interior or hidden edges  
☐ 3. axes of cylindrical, conical or spherical objects  
☒ 4. visible edges and surface boundaries of objects

Q.41 In winters, people wear jacket because \_\_\_\_.

- Ans ☐ 1. jacket allows the heat to flow from our body to surroundings  
☒ 2. fabric of jacket is an insulator of heat so it traps body heat  
☐ 3. it looks good  
☐ 4. fabric of jacket is a conductor of heat so it traps body heat

Q.42 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?

- Ans ☐ 1. 433  
☒ 2. 434  
☐ 3. 431  
☐ 4. 432

Q.43 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.)

- Ans ☐ 1. 25 m  
☐ 2. 31 m  
☐ 3. 26 m  
☒ 4. 28 m

Q.44 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 \_\_\_\_\_.

- Ans ☒ 1. uniform motion  
☐ 2. non-uniform motion  
☐ 3. retarded motion  
☐ 4. accelerated motion

Q.45 Alloys are preferred over pure metals in electrical heating devices:

- Ans ☐ 1. because the resistivity of an alloy is lower than that of its constituent metals.  
☒ 2. because the resistivity of an alloy is generally higher than its constituent metals.  
☐ 3. because the elasticity of an alloy is higher than that of its constituent metals.  
☐ 4. because alloys oxidise (burn) readily at high temperatures.

**Q.46** 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

- Ans ☒ 1. DE - FB - DF  
☒ 2. DE - FG - KL  
☒ 3. WE - DF - HI  
☒ 4. DE - FG - HI

**Q.47** 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.

- Ans ☒ 1. 227 and 5  
☒ 2. 235 and 4  
☒ 3. 275 and 3  
☒ 4. 220 and 6

**Q.48** How do we find absolute error?

- Ans ☒ 1. Absolute error = Actual value + observed value  
☒ 2. Absolute error = Actual value/observed value  
☒ 3. Absolute error = Actual value – observed value  
☒ 4. Absolute error = Actual value × observed value

**Q.49** In Engineering Drawing, which of the following is the correct definition of the term 'dimension'.

- Ans ☒ 1. A numerical value expressed in an appropriate unit of measurement  
☒ 2. A continuous thick or wide line along which the prints are trimmed  
☒ 3. The thickness of the line of a letter  
☒ 4. A line that is drawn to make a section evident

**Q.50** 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.)

- Ans ☒ 1. DL – HB  
☒ 2. WE – AU  
☒ 3. SA – WQ  
☒ 4. MU – QL

**Q.51** What should come in place of the question mark (?) in the given series?

17 29 41 59 77 101 125 ?

- Ans ☒ 1. 161  
☒ 2. 149  
☒ 3. 175  
☒ 4. 155

**Q.52** 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?

- Ans ☒ 1. R  
☒ 2. S  
☒ 3. P  
☒ 4. Q

Q.53 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?

- Ans
- ☒ 1. 1
  - ☒ 2. 7
  - ☒ 3. 8
  - ☒ 4. 2

Q.54 A line in an engineering drawing is the \_\_\_\_\_.

- Ans
- ☒ 1. closed curve where all points are the same distance from a fixed centre point
  - ☒ 2. three-dimensional object with length, breadth, and height
  - ☒ 3. dimensionless location in space or on a drawing sheet that has no width, height, or depth
  - ☒ 4. one-dimensional figure, which has length but no width

Q.55 Which of the following steps is essential when configuring a web browser to enhance both security and privacy for a user?

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

Q.56 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?

- Ans
- ☒ 1. Three
  - ☒ 2. Two
  - ☒ 3. One
  - ☒ 4. Four

Q.57 Which of the following is an effective way to prevent electrical accidents in the workplace?

- Ans
- ☒ 1. Using water to cool overheated electrical equipment
  - ☒ 2. Using insulated tools and wearing rubber gloves
  - ☒ 3. Working on live wires with bare hands
  - ☒ 4. Ignoring minor electrical faults

Q.58 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 m<sup>2</sup> is ₹11,000, then find the volume of the hall.

- Ans
- ☒ 1.
  - ☒ 2.
  - ☒ 3.
  - ☒ 4.

Q.59 Which key combination is commonly used for copying text in many text editing applications in Windows?

- Ans
- ☒ 1. Ctrl+C
  - ☒ 2. Tab
  - ☒ 3. Ctrl+V
  - ☒ 4. Ctrl+S

Q.60 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 \_\_\_\_\_.

- Ans
- ☒ 1. 5
  - ☒ 2. 5.5
  - ☒ 3. 6.5
  - ☒ 4. 6

Q.61 Which of the following is an INCORRECT formula for power?

- Ans ☒ 1.  $VI$   
☒ 2.  $I^2Rt$   
☒ 3.  $I^2R$   
☒ 4.  $V^2/R$

Q.62 What is the immediate action to take when a fire breaks out in a workplace?

- Ans ☒ 1. Raise the alarm and evacuate the area  
☒ 2. Try to put it out using water without knowing the fire type  
☒ 3. Gather near the fire to observe the situation  
☒ 4. Ignore the fire and continue working

Q.63 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?

- Ans ☒ 1. 20 years  
☒ 2. 16 years  
☒ 3. 18 years  
☒ 4. 21 years

Q.64 What is the first step when encountering a system failure in a workplace?

- Ans ☒ 1. Report the issue and follow the emergency protocol  
☒ 2. Immediately restart all systems without inspection  
☒ 3. Ignore the failure and continue working  
☒ 4. Disconnect all power sources permanently

Q.65 How fast should a cat of mass 15 kg run in order to have a kinetic energy of 120 J?

- Ans ☒ 1. 0.16 m/s  
☒ 2. 40 m/s  
☒ 3. 4 m/s  
☒ 4. 16 m/s

Q.66 How does turning off unused electrical devices contribute to energy conservation?

- Ans ☒ 1.  
☒ 2.  
☒ 3.  
☒ 4.

Q.67 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'?

- Ans ☒ 1. Brother's wife's father's brother  
☒ 2. Brother's wife's father's father  
☒ 3. Brother's wife's brother  
☒ 4. Brother's wife's father

Q.68 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 \_\_\_\_.

- Ans ☒ 1. 1 m/s  
☒ 2. 60 m/s  
☒ 3. 2 m/s  
☒ 4. 0 m/s

Q.69 Which of the following is NOT a fundamental quantity in the SI system?

- Ans ☒ 1. Force  
☒ 2. Time  
☒ 3. Luminous intensity  
☒ 4. Amount of substance

Q.70 Which of the following represents an item with kinetic energy?

- Ans ☒ 1. A stone in motion  
☒ 2. A book resting on a table  
☒ 3. A compressed spring  
☒ 4. An extended rubber band

Q.71 What will come in place of the question mark (?) in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?

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

- Ans ☒ 1. 29  
☒ 2. 26  
☒ 3. 20  
☒ 4. 32

Q.72 What is the main function of the Transport Layer in the internet architecture?

- Ans ☒ 1. Routing of packets  
☒ 2. Data encapsulation  
☒ 3. IP addressing  
☒ 4. Reliable data transfer and error correction

Q.73 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:

- Ans ☒ 1. 28.6  
☒ 2. 29.5  
☒ 3. 31  
☒ 4. 27

Q.74 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

- Ans ☒ 1. A-S, B-R, C-P, D-Q  
☒ 2. A-P, B-R, C-Q, D-S  
☒ 3. A-S, B-R, C-Q, D-P  
☒ 4. A-R, B-S, C-Q, D-P

Q.75 If  $11.6 : x :: x : 2.9$ , and  $x > 0$ , then find the value of  $x$ .

- Ans ☒ 1. 10.9  
☒ 2. 7.7  
☒ 3. 5.8  
☒ 4. 3.1

Q.76 The energy possessed by an object by virtue of its motion is known as \_\_\_\_\_.

- Ans ☒ 1. heat energy  
☒ 2. kinetic energy  
☒ 3. light energy  
☒ 4. potential energy

Q.77 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?

- Ans
- ☐ 1. 7 seconds
  - ☐ 2. 18 seconds
  - ☐ 3. 14 seconds
  - ☒ 4. 9 seconds

Q.78 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.

- Ans
- ☐ 1. 2 A
  - ☐ 2. 1.82 A
  - ☒ 3. 0.2 A
  - ☐ 4. 40 A

Q.79 What is the scientific notation for 55,60,000 km?

- Ans
- ☐ 1.  $55.6 \times 10^4$  km
  - ☐ 2.  $5.56 \times 10^4$  km
  - ☒ 3.  $5.56 \times 10^6$  km
  - ☐ 4.  $556 \times 10^6$  km

Q.80 Find the value of  $x^2 + y^2$ , given that,  $x = 7 + \sqrt{1}$ ,  $y = 7 - \sqrt{1}$ .

- Ans
- ☐ 1. 98
  - ☐ 2. 69
  - ☒ 3. 100
  - ☐ 4. 56

Q.81 The resistances of 30 ohm, 20 ohm and 60 ohm are connected in parallel. The equivalent resistance of the combination is \_\_\_\_\_.

- Ans
- ☐ 1. 12 ohm
  - ☒ 2. 10 ohm
  - ☐ 3. 0.1 ohm
  - ☐ 4. 110 ohm

Q.82  $\frac{121\tan^2\theta - 3}{169\cot^2\theta + 1}$

- Ans
- ☐ 1.  $-\frac{83}{21}$
  - ☐ 2.  $-\frac{83}{61}$
  - ☒ 3.  $\frac{83}{61}$
  - ☐ 4.  $\frac{61}{83}$

Q.83 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?

- Ans
- ☒ 1. 1,12,000
  - ☐ 2. 1,14,240
  - ☐ 3. 1,40,000
  - ☐ 4. 92,000

**Q.84** 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.

Ans ✓ 1. Neither conclusion (I) nor (II) follows.

✗ 2. Only conclusion (II) follows.

✗ 3. Only conclusion (I) follows.

✗ 4. Both conclusions (I) and (II) follow.

**Q.85** 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.

Ans ✗ 1. ₹46,500

✗ 2. ₹46,600

✓ 3. ₹46,400

✗ 4. ₹46,700

**Q.86** Which of the following groups represents conductors of heat?

Ans ✗ 1. Wood, paper, silver

✗ 2. Paper, copper, plastic

✓ 3. Aluminium, silver, copper

✗ 4. Aluminium, plastic, wood

**Q.87** 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?

Ans ✗ 1. 7

✗ 2. 4

✗ 3. 5

✓ 4. 3

**Q.88** The heat developed in a 5 ohm resistor in 2 minutes when a 2A current passes through it is \_\_\_\_\_.

Ans ✗ 1. 1000 J

✗ 2. 500 J

✓ 3. 2400 J

✗ 4. 40 J

**Q.89** A fruit seller had some apples. He sells 40% of the apples and now has 900 apples. How many apples did he originally have?

Ans ✗ 1. 1350

✗ 2. 1800

✗ 3. 2250

✓ 4. 1500

**Q.90** 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?

$$35 A 7 C 9 B 3 D 16 = ?$$

Ans ✓ 1. 16

✗ 2. 10

✗ 3. 18

✗ 4. 21

**Q.91** What should come in place of the question mark (?) in the given alpha-numeric series?

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

- Ans ☒ 1. 26A  
☒ 2. 26B  
☒ 3. 26C  
☒ 4. 24B
- 

**Q.92** 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?

- Ans ☒ 1. 18 days  
☒ 2. 16 days  
☒ 3. 12 days  
☒ 4. 14 days
- 

**Q.93** 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

- Ans ☒ 1. QGT : TDW  
☒ 2. RWH : WUM  
☒ 3. HVD : LTH  
☒ 4. KRW : NPZ
- 

**Q.94** Which of the following is a poor conductor of heat?

- Ans ☒ 1. Wool  
☒ 2. Copper  
☒ 3. Steel spoon  
☒ 4. Aluminium rod
- 

**Q.95** Which of the following options is correct when two objects at the same temperature are kept in contact with each other?

- Ans ☒ 1. Heat is transferred from object 1 to object 2.  
☒ 2. Both objects transfer heat to each other.  
☒ 3. Heat is transferred from object 2 to object 1.  
☒ 4. No heat is transferred.
- 

**Q.96** The mode of 4, 6, 4, 6, 5, 7, 5, 7, 4, 6, 7, 6 is:

- Ans ☒ 1. 5  
☒ 2. 6  
☒ 3. 4  
☒ 4. 7
-

**Q.97** 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.

- Ans**
- ☒ 1. Only II follows.
  - ☒ 2. Neither I nor II follows.
  - ☒ 3. Both I and II follow.
  - ☒ 4. Only I follows.

**Q.98** What is the main advantage of using solar energy over fossil fuels?

- Ans**
- ☒ 1. Solar energy extraction requires high operational cost when compared to fossil fuels.
  - ☒ 2. Greenhouse gas emission is higher when solar energy is used.
  - ☒ 3. Solar energy is abundantly available and renewable in nature.
  - ☒ 4. Solar energy requires mining and extraction, whereas fossil fuels are free of cost.

**Q.99** How many significant figures are there in 4.700 m?

- Ans**
- ☒ 1. 3
  - ☒ 2. 4
  - ☒ 3. 2
  - ☒ 4. 1

**Q.100** Which term describes the maximum amount of solar energy that a photovoltaic (PV) system can convert into electricity under standard test conditions?

- Ans**
- ☒ 1. Effective capacity
  - ☒ 2. Peak load
  - ☒ 3. Nameplate capacity
  - ☒ 4. Rated capacity

**Section : Part B (Instrument Mechanic)**

**Q.101** Why is a DC compound generator preferred for industrial loads?

- Ans**
- ☒ 1. It has no losses.
  - ☒ 2. It is easier to manufacture.
  - ☒ 3. It provides better efficiency.
  - ☒ 4. It has constant voltage characteristics.

**Q.102** Which component in an MCB is responsible for detecting a short circuit?

- Ans**
- ☒ 1. Bimetallic strip
  - ☒ 2. Solenoid
  - ☒ 3. Arc chute
  - ☒ 4. Handle

**Q.103** In pipe earthing, what is used to connect the earthing conductor to the pipe?

- Ans**
- ☒ 1.
  - ☒ 2.
  - ☒ 3.
  - ☒ 4.

Q.104 A rectangular floor measuring 10 m × 8 m is to be tiled. If each tile covers 0.25 m<sup>2</sup>, how many tiles are needed?

- Ans ☐ 1. 200  
☐ 2. 300  
☒ 3. 320  
☐ 4. 250

Q.105 The SI unit of 'ultimate stress' is \_\_\_\_\_.

- Ans ☒ 1. pascal (Pa)  
☐ 2. newton (N)  
☐ 3. newton per meter (N/m)  
☐ 4. joule per square meter (J/m<sup>2</sup>)

Q.107 Connection of voltage transformer and current transformer across line are \_\_\_\_\_, respectively.

- Ans ☒ 1. series and parallel  
☐ 2. series and series  
☐ 3. parallel and series  
☐ 4. parallel and parallel

Q.108 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?

- Ans ☐ 1. Undefined  
☒ 2. 1  
☐ 3. The output will depend on the type of gate used  
☐ 4. 0

Q.109 How should the electrode resistance be measured if multiple earthing electrodes are used in parallel?

- Ans ☐ 1. Measure electrode resistance individually and then add it  
☐ 2. Use a clamp meter to measure the resistance of parallel electrodes  
☐ 3. Measure electrode resistance individually and then average the values  
☒ 4. Measure the total resistance of the combined electrodes in parallel

Q.110 Which type of electrolytic capacitor is generally more stable and has better performance in small sizes?

- Ans ☐ 1. Tantalum capacitor  
☐ 2. Mica capacitor  
☒ 3. Aluminium capacitor  
☐ 4. Ceramic capacitor

Q.111 Read the Assertion (A) and Reason (R) carefully, and select the correct option.

**Assertion (A):** The earth resistance must be kept as low as possible to ensure that the earthing system is effective during fault conditions.

**Reason (R):** A low resistance allows fault current to flow easily into the ground, ensuring safety by preventing electrical hazards.

- Ans ☒ 1. Both Assertion (A) and Reason (R) are correct, and the reason correctly explains the assertion.  
☐ 2. Assertion (A) is incorrect, but Reason (R) is correct.  
☐ 3. Both Assertion (A) and Reason (R) are correct, but the reason does not correctly explain the assertion.  
☐ 4. Assertion (A) is correct, but Reason (R) is incorrect.

Q.112 While performing short circuit test on a transformer to determine its parameter, instruments are placed on the:

- Ans ☐ 1. low voltage side, while the high voltage side is short circuit  
☒ 2. high voltage side, while the low voltage side is short circuit  
☐ 3. high voltage side, while the low voltage side is open circuit  
☐ 4. low voltage side, while the high voltage side is open circuit

Q.113 According to Ohm's Law, how is current related to voltage and resistance?

- Ans
- ✓ 1. It is directly proportional to voltage and inversely proportional to resistance.
  - ✗ 2. It has no relation with voltage or resistance.
  - ✗ 3. It is directly proportional to voltage and resistance.
  - ✗ 4. It is inversely proportional to voltage and resistance.

Q.114 Which option shows the correct answer when 27°C is converted to the kelvin scale?

- Ans
- ✗ 1. – 300 K
  - ✗ 2. 246 K
  - ✓ 3. 300 K
  - ✗ 4. – 246 K

Q.116 What is the objective of testing an earthing system?

- Ans
- ✗ 1. To test the current capacity of the earthing system
  - ✗ 2. To check the voltage levels
  - ✗ 3. To measure the insulation resistance of cables
  - ✓ 4. To ensure the system has a low resistance path to the earth

Q.117 Which device is used to protect against electric shocks and fires caused by earth leakage currents?

- Ans
- ✓ 1. ELCB
  - ✗ 2. MCCB
  - ✗ 3. MCB
  - ✗ 4. ECB

Q.118 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?

- Ans
- ✓ 1. The output voltage will increase.
  - ✗ 2. The output voltage will remain constant.
  - ✗ 3. The output voltage will fluctuate depending on the resistor value.
  - ✗ 4. The output voltage will decrease.

Q.119 Transformer oil should have \_\_\_\_\_ dielectric strength and \_\_\_\_\_ viscosity.

- Ans
- ✗ 1. high; high
  - ✗ 2. low; high
  - ✓ 3. high; low
  - ✗ 4. low; low

Q.120 The energy stored (W) in an inductor is given by the formula \_\_\_\_\_, where C = Capacitance, V= Voltage, I = Current, and L= inductance.

- Ans
- ✗ 1.  $W = \frac{1}{2} VI$
  - ✓ 2.  $W = \frac{1}{2} LI^2$
  - ✗ 3.  $W = LI$
  - ✗ 4.  $W = \frac{1}{2} CV^2$

Q.121 What are the two types of mica capacitors?

- Ans
- ✗ 1. Ceramic and film capacitors
  - ✗ 2. Electrolytic and paper capacitors
  - ✗ 3. Variable and fixed capacitors
  - ✓ 4. Stacked foil and silvered mica capacitors

Q.122 Which of the following actions is a part of the emergency response team's responsibilities during an active emergency?

- Ans
- ☒ 1. Preparing reports on emergency incidents
  - ☒ 2. Rescuing persons in immediate danger
  - ☒ 3. Conducting routine safety checks
  - ☒ 4. Scheduling regular evacuation drills

Q.123 Which of the following is a primary difference between a primary and a secondary electrochemical cell?

- Ans
- ☒ 1. A secondary cell produces more energy than a primary cell.
  - ☒ 2. A primary cell can be recharged, while a secondary cell cannot be recharged.
  - ☒ 3. A primary cell cannot be recharged, while a secondary cell can be recharged.
  - ☒ 4. There is no difference between primary and secondary cells.

Q.124 What should be the position of the 'OFF' marking on a fireman's switch?

- Ans
- ☒ 1. At the top
  - ☒ 2. In the centre
  - ☒ 3. At the bottom
  - ☒ 4. On the side

Q.125 What is the primary reason for the heating effect in a conductor when an electric current passes through it?

- Ans
- ☒ 1. The electric field in the conductor causes heat generation.
  - ☒ 2. The movement of electrons causes heat generation.
  - ☒ 3. The conductor absorbs heat from the surrounding environment.
  - ☒ 4. The movement of protons causes heat generation.

Q.127 In the context of earthing system measurement, what does 'Earth resistance' refer to?

- Ans
- ☒ 1. The resistance between any two points of the ground with a distance of 1 metre
  - ☒ 2. The resistance between the live wire and the earth
  - ☒ 3. The ability of the ground to resist current flow
  - ☒ 4. The voltage required to activate the earthing system

Q.128 Which of the following types of DC motor is commonly used in electric traction applications such as trains and trams?

- Ans
- ☒ 1. Permanent Magnet DC Motor
  - ☒ 2. DC Compound Motor
  - ☒ 3. DC Series Motor
  - ☒ 4. DC Shunt Motor

Q.130 Which of the following is a key electrical safety tip in a workshop?

- Ans
- ☒ 1. Operate machines with wet hands
  - ☒ 2. Ignore frayed wires if the device is still working
  - ☒ 3. Use water to clean electrical panels
  - ☒ 4. Ensure electrical equipment is properly grounded

Q.131 Sine bars are used when a high degree of accuracy less than \_\_\_\_\_ is needed for measuring angles.

- Ans
- ☒ 1. 1 degree
  - ☒ 2. 30 degrees
  - ☒ 3. 1 minute
  - ☒ 4. 30 minutes

Q.133 For which of the following calipers, a screw and nut are provided for opening and closing the caliper legs?

- Ans
- ☒ 1. Spring joint calipers
  - ☒ 2. Firm joint calipers
  - ☒ 3. Simple calipers
  - ☒ 4. Leg and point calipers

Q.134 Which DC motor type provides the best speed regulation under varying loads?

- Ans
- ☒ 1. DC Series Motor
  - ☒ 2. Cumulative Motor
  - ☒ 3. DC Shunt Motor
  - ☒ 4. Permanent Magnet DC Motor

Q.136 Two coils, A and B, have self-inductances of 120  $\mu\text{H}$  and 300  $\mu\text{H}$ , respectively. When a current of 1 A flows through coil A, it induces a flux linkage of 100  $\mu\text{Wb}$  turns in coil B. What is the mutual inductance between the coils?

- Ans
- ☒ 1. 50  $\mu\text{H}$
  - ☒ 2. 100  $\mu\text{H}$
  - ☒ 3. 120  $\mu\text{H}$
  - ☒ 4. 300  $\mu\text{H}$

Q.137 What is the primary goal of the 5S concept?

- Ans
- ☒ 1. To replace traditional safety measures
  - ☒ 2. To increase the number of safety regulations
  - ☒ 3. To improve workplace organisation and efficiency
  - ☒ 4. To eliminate the need for maintenance

Q.138 In a transformer, insulation resistance test is carried out to measure:

- Ans
- ☒ 1. frequency
  - ☒ 2. magnetic flux
  - ☒ 3. the resistance of the insulation between windings and core
  - ☒ 4. the inductance between different parts of the transformer

Q.139 What is the primary cause of sudden insulation resistance failure in a DC generator?

- Ans
- ☒ 1. Moisture ingress or contamination
  - ☒ 2. High ambient temperature
  - ☒ 3. Increase in rotational speed
  - ☒ 4. Excessive armature current

Q.140 Which of the following screwdrivers has cross-shaped tips that are unlikely to slip from the cruciform slots in Philips recessed head screws?

- Ans
- ☒ 1. Stumpy screwdriver
  - ☒ 2. Offset screwdriver
  - ☒ 3. Cross-recess screwdriver
  - ☒ 4. Ratchet screwdriver

Q.141 Which electrical component is used to perform a polarity test to check whether or not the switches are connected in phase/live cable?

- Ans
- ☒ 1. Megger
  - ☒ 2. Ammeter
  - ☒ 3. Multimeter
  - ☒ 4. Test lamp

Q.142 What is the term used to describe programs that distinguish between uppercase and lowercase letters, treating "yes" and "YES" as different inputs?

- Ans
- ☒ 1. Case-insensitive
  - ☒ 2. Numerical
  - ☒ 3. Case-sensitive
  - ☒ 4. Alphabetical

Q.143 What is the primary purpose of preventive maintenance?

- Ans
- ☐ 1. To increase the workload of employees
  - ☒ 2. To reduce unexpected equipment failures
  - ☐ 3. To delay repairs until breakdowns occur
  - ☐ 4. To eliminate the need for regular inspections

Q.145 What is the primary reason for conducting a vehicle road test?

- Ans
- ☐ 1. To test how fast the vehicle can go
  - ☐ 2. To avoid the need for inspections
  - ☐ 3. To increase fuel efficiency
  - ☒ 4. To ensure the vehicle is functioning safely and correctly

Q.146 In crane and hoist applications, why is a DC series motor preferred over a DC shunt motor?

- Ans
- ☐ 1. It requires minimal maintenance compared to other motors.
  - ☐ 2. It maintains constant speed regardless of load variations.
  - ☒ 3. It provides a high starting torque, which is required for lifting loads.
  - ☐ 4. It consumes less power at no load.

Q.147 The voltage regulation in percentage for transformer is given by:

- Ans
- ☐ 1. Voltage regulation =  $\frac{V_{\text{no load}} - V_{\text{load}}}{V_{\text{load}}} \times 100$
  - ☒ 2. Voltage regulation =  $\frac{V_{\text{no load}} - V_{\text{load}}}{V_{\text{load}}} \times 100$
  - ☐ 3. Voltage regulation =  $\frac{V_{\text{load}} - V_{\text{no load}}}{V_{\text{load}}} \times 100$
  - ☐ 4. Voltage regulation =  $\frac{V_{\text{load}} - V_{\text{no load}}}{V_{\text{no load}}} \times 100$

Q.148 Why do cars have treaded tyres?

- Ans
- ☒ 1. To increase friction and grip on the road
  - ☐ 2. To reduce weight
  - ☐ 3. To decrease friction
  - ☐ 4. To increase speed

Q.149 Which of the following care and maintenance of a marking table is INCORRECT?

- Ans
- ☐ 1. The marking table should be protected from damage.
  - ☐ 2. The marking table should be protected from rust.
  - ☐ 3. After use, the marking table should be cleaned with a soft cloth.
  - ☒ 4. The surface of the marking table should not be given a thin layer of oil.

Q.150 What is the importance of following the manufacturer's guidelines for DC motor maintenance?

- Ans
- ☒ 1. Ensures safe and efficient operation
  - ☐ 2. Modifies the motor's design
  - ☐ 3. Increases the motor's power output
  - ☐ 4. Saves time and resources

Q.151 What is the purpose of measuring the electrode resistance during the installation of an earthing system?

- Ans
- ☐ 1. To measure the insulation resistance of the system
  - ☐ 2. To determine the electrical load capacity of the system
  - ☒ 3. To ensure the earthing system has low impedance for fault current dissipation
  - ☐ 4. To ensure proper grounding of electrical equipment

Q.153 What is the primary purpose of shielding in electrical cables?

- Ans
- ☐ 1. To increase the voltage capacity of the cable
  - ☐ 2. To increase the current-carrying capacity of the cable
  - ☒ 3. To protect the cable from external electromagnetic interference
  - ☐ 4. To prevent heat loss from the cable

Q.155 A 100-mm centre-punch could have a 10-mm diameter body and a 6-mm diameter point ground to an angle of \_\_\_\_\_.

- Ans
- ☐ 1. 120°
  - ☒ 2. 90°
  - ☐ 3. 60°
  - ☐ 4. 30°

Q.156 What is the unit of measurement for earth fault loop impedance?

- Ans
- ☐ 1. Amperes (A)
  - ☒ 2. Ohms ( $\Omega$ )
  - ☐ 3. Volts (V)
  - ☐ 4. Farads (F)

Q.157 The accuracy of measurement by a try square is about:

- Ans
- ☐ 1. 0.02 mm per 10 mm length
  - ☐ 2. 0.001 mm per 10 mm length
  - ☐ 3. 0.004 mm per 10 mm length
  - ☒ 4. 0.002 mm per 10 mm length

Q.158 Which of the following types of resistors is preferred for high-current applications?

- Ans
- ☐ 1. Film resistor
  - ☒ 2. Wire-wound resistor
  - ☐ 3. Variable resistor
  - ☐ 4. Carbon composition resistor

Q.159 \_\_\_\_\_ recommend(s) 20 mm wide margins for sheet sizes A0 and A1 in engineering drawings.

- Ans
- ☒ 1. Borders and frames: SP: 46 (2003)
  - ☐ 2. Geographic coordinate systems
  - ☐ 3. Custom grids
  - ☐ 4. Grid reference system

Q.160 Which of the following is a major risk associated with fuel spillage?

- Ans
- ☒ 1. Fire hazards and environmental contamination
  - ☐ 2. Better lubrication for workshop floors
  - ☐ 3. Increased productivity
  - ☐ 4. Reduced need for ventilation

Q.162 An angle greater than 180 degrees is referred to as \_\_\_\_\_.

- Ans
- ☐ 1. a right angle
  - ☐ 2. an acute angle
  - ☐ 3. an obtuse angle
  - ☒ 4. a reflex angle

Q.164 Which of the following is INCORRECT about line standard?

- Ans
- ☒ 1. More accurate due to line thickness
  - ☐ 2. Subject to parallax error
  - ☐ 3. Quick measurements over a wide range
  - ☐ 4. Used to measure the distance between two engraved lines

Q.165 What is the maximum total current allowed in a ring circuit as per IEE regulations?

- Ans ☒ 1.  
☒ 2.  
☒ 3.  
☒ 4.

Q.166 Which of the following conversions are correct?

- Ans ☒ 1.  $1 \text{ L} = 1000 \text{ dm}^3$  and  $1 \text{ mL} = 1000 \text{ cm}^3$   
☒ 2.  $1000 \text{ L} = 1 \text{ dm}^3$  and  $1000 \text{ mL} = 1 \text{ cm}^3$   
☒ 3.  $1 \text{ L} = 1 \text{ dm}^3$  and  $1 \text{ mL} = 1 \text{ cm}^3$   
☒ 4.  $1000 \text{ L} = 1 \text{ dm}^3$  and  $1 \text{ mL} = 1000 \text{ cm}^3$

Q.167 Match the following designations of sheets with their respective trimmed sizes in length and breadth.

**Designation Trimmed Size**

- A) A0 P)  $297 \times 420$   
B) A1 Q)  $420 \times 594$   
C) A2 R)  $594 \times 841$   
D) A3 S)  $841 \times 1189$

- Ans ☒ 1. A-S ; B-R ; C-Q ; D-P  
☒ 2. A-Q ; B-R ; C-S ; D-P  
☒ 3. A-S ; B-P ; C-Q ; D-R  
☒ 4. A-P ; B-R ; C-Q ; D-S

Q.170 The Insulation Resistance value for a transformer is measured in:

- Ans ☒ 1. megaohms  
☒ 2. ohms  
☒ 3. KVA  
☒ 4. kilohms

Q.171 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.

- Ans ☒ 1. vulcanisation  
☒ 2. molding  
☒ 3. latex  
☒ 4. extrusion

Q.173 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.

- Ans ☒ 1. Only statement 2 is true  
☒ 2. Only statement 1 is true  
☒ 3. Both statements are true  
☒ 4. Neither statement is true

**Q.174** 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.

- Ans
- ☒ 1. The conclusion does not logically follow from the statement.
  - ☒ 2. The conclusion is partially supported by the statement.
  - ☒ 3. The conclusion is unrelated to the statement.
  - ☒ 4. The conclusion logically follows from the statement.