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# RRB ALP 2018 CBT-2 Physics and Maths

## Assistant Loco Pilot & Technicians · CEN 01/2018 · CBT-2 (21-23 Jan 2019) · Trade: Physics and Maths · Part B (Physics and Maths) · Question Paper

**English**

All 4 Shifts (Sets) · Part B (Physics and Maths) Section · Official Answer Key

## About this Compilation

This booklet contains all **4 shift papers** of the **RRB ALP 2018 CBT-2 Physics and Maths** examination in **English** (**Part B (Physics and Maths)** section only), with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

**Source.** Original images of the official RRB response sheets (no retyping). Paper = Part A 100 (Maths, Reasoning, Basic Science & Engineering, Current Affairs) + Part B 75 (trade).

**Not in this edition** (less than half saved in English; see the Hindi edition): 21 Jan 12:30 PM; 22 Jan 12:30 PM.

### How to use

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

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## Index — All Sets (click to open)


Set 1 — 21 Jan 2019, 8:30 AM - 11:00 AM

Set 2 — 21 Jan 2019, 4:30 PM - 7:00 PM

Set 3 — 22 Jan 2019, 8:30 AM - 11:00 AM

Set 4 — 22 Jan 2019, 4:30 PM - 7:00 PM

**Q1** Part B (Physics and Maths)

Which of the following is a quadratic expression?

A. $x^{1/2}-x^2+2$

B. $x^4-3x^2+4x-7$

C. $x^2+3x^3+5$

D. $x^2+y^2-3$ ✓

**Q2** Part B (Physics and Maths)

A current of 2A flows through a 24V car head light bulb for 5 mins. How much energy transfer occurs during this time?

A. 4200 joule

B. 14400 joule ✓

C. 10800 joule

D. 43200 joule

**Q3** Part B (Physics and Maths)

A force of 10 $N$ acts on an object and the displacement is 7.5 m, in the direction of force. What is the work done in this case?

A. 7500 $J$

B. 0.75 $J$

C. 75 $J$ ✓

D. 750 $J$

**Q4** Part B (Physics and Maths)

The series 2/3, 1, 4/3, 5/3, 2, 7/3 is in

A. Harmonic Progression

B. Geometric progression

C. Arithmetico – Geometric Progression

D. Arithmetic Progression ✓

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**Q5** Part B (Physics and Maths)

The far point distance of a short sighted person is 1.5 m. Find the power of the remedial lens.

A. -0.67 D ✓

B. 0.33 D

C. 0.67 D

D. -0.33 D

**Q6** Part B (Physics and Maths)

For a/an _____, the decimal representation is non-terminating, non-repeating. Fill in the blank.

A. rational number

B. irrational number ✓

C. whole number

D. natural number

**Q7** Part B (Physics and Maths)

Electric bulbs are usually filled with chemically inactive _____ gases

A. Nitrogen and carbon monoxide

B. Nitrogen and oxygen

C. Nitrogen and carbon-dioxide

D. Nitrogen and argon ✓

**Q8** Part B (Physics and Maths)

Electrical energy used during a month is expressed in terms of 'units'. Here one unit means

A. 1kW

B. 1J

C. 1W

D. 1kWh ✓

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**Q9** Part B (Physics and Maths)

During dispersion of white light, the _____ light bends the most

A. red

B. blue

C. green

D. violet ✓

**Q10** Part B (Physics and Maths)

A die is thrown, what is the probability getting prime number?

A. 4/5

B. 2/3

C. 1/2 ✓

D. 1/3

**Q11** Part B (Physics and Maths)

If the length of a tangent to a circle is 12 cm and the shortest distance of the point from which it has been drawn, from the circumference of the circle is 8 cm, then the radius of the circle will be _____

A. 8 cm

B. 4 cm

C. 5 cm ✓

D. 6 cm

**Q12** Part B (Physics and Maths)

Which of the following is not a vector quantity?

A. displacement

B. speed ✓

C. velocity

D. acceleration

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**Q13** Part B (Physics and Maths)

An object of mass 10 kg is moving with a uniform velocity of $6ms^{-1}$.What is the kinetic energy possessed by the object

A. $18\ J$

B. $360\ J$

C. $1800\ J$

D. $180\ J$ ✓

**Q14** Part B (Physics and Maths)

_____ was the first to use a glass prism to obtain the spectrum of sunlight

A. Issac Newton ✓

B. John Dalton

C. C.V. Raman

D. Henry Cavendish

**Q15** Part B (Physics and Maths)

For a cylinder of base radius $(=r)$ and height $(=h)$, the volume is _____ cu.units

A. $\pi r^2 h$ ✓

B. $\pi rh$

C. $2\pi rh$

D. $\pi r^3 h$

**Q16** Part B (Physics and Maths)

Which of the following is not a property of similar triangles

A. They have the same shape and the same size ✓

B. Each corresponding pair of angles is equal

C. The two angles of one triangle are equal to the two angles of the other triangle.

D. The ratio of any pair of corresponding sides is the same

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**Q17** Part B (Physics and Maths)

The angle of elevation of the sun, when the length of the shadow of a tree is $1/\sqrt{3}$ times the height of the tree, is:

A. $30^\circ$

B. $45^\circ$

C. $60^\circ$ ✓

D. $75^\circ$

**Q18** Part B (Physics and Maths)

A cyclotron is not used to produce high energy electrons because electrons

A. have smaller mass ✓

B. reach relativistic speeds very quickly

C. radiate sufficiently large energy

D. cannot be inserted between the Dees

**Q19** Part B (Physics and Maths)

Identify the statements among the following which are true:-
(p) Velocity of sound increases with altitude.
(q) Velocity of sound increases during a shower.
(r) The velocity of sound in air at a particular place does not remain the same during day and night.

A. (p) & (r)

B. Only (q)

C. Only (p)

D. (q) & (r) ✓

**Q20** Part B (Physics and Maths)

A ray of light is incident on a very thin prism, the refractive index of the material of the prism is 1.6. The deviation of the ray of light is $6^\circ$. Find the angle of the prism.

A. $5^\circ$

B. $4^\circ$

C. $10^\circ$ ✓

D. $8^\circ$

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**Q21** Part B (Physics and Maths)

A metallic sphere of radius 8.4 cm is melted and recast in to the shape of a cylinder of radius 12 cm.Find the height of the cylinder.

A. 5.478 cm

B. 5.848 cm

C. 5.884 cm

D. 5.488 cm ✓

**Q22** Part B (Physics and Maths)

A bar of paramagnetic material is placed in a strong external magnetic field. Then, the field inside it is likely to

A. decrease

B. vanish completely

C. increase ✓

D. remain the same

**Q23** Part B (Physics and Maths)

Find the magnitude of gravitational force between two protons separated by a distance of 1Å. It is given that $m_p = 5/3 \times 10^{-27}$ kg.

$G=20/3\ X\ 10^{-11}Nm^2kg^{-2}$

A. $\frac{10^{-42}}{54}N$ ✓

B. $\frac{10^{-42}}{27}N$

C. $\frac{10^{-41}}{27}N$

D. $\frac{10^{-42}}{36}N$

**Q24** Part B (Physics and Maths)

If cosx = 5/13 then cotx will be

A. 13/5

B. 5/12 ✓

C. 12/5

D. 7/13

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**Q25** Part B (Physics and Maths)

At what temperature is the velocity of sound in air is twice its velocity at $30^0$ C?

A. $120^\circ$ C

B. $1212^\circ$ C

C. $939^\circ$ C ✓

D. $60^\circ$ C

**Q26** Part B (Physics and Maths)

A dice is thrown, what is the probability getting number divisible by 5?

A. 4/5

B. 1/3

C. 2/3

D. 1/6 ✓

**Q27** Part B (Physics and Maths)

For which value of $k$; 2, $3+k$ and 6 are in A.P.?

A. 2

B. 3

C. 4

D. 1 ✓

**Q28** Part B (Physics and Maths)

Which of the given statements are correct for a conservative force field

(p) The total mechanical energy is conserved.

(q) The work done round a closed path is zero.

(r) Gain in kinetic energy = Loss in potential energy.

A. Only (p)

B. (p) & (q)

C. (p), (q) & (r) ✓

D. (q) & (r)

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**Q29** Part B (Physics and Maths)

A ray of light meets a plane mirror at an angle of incidence $15^0$. What will be the deviation of the ray after reflection?

A. $150°$ ✓

B. $60°$

C. $120°$

D. $30°$

**Q30** Part B (Physics and Maths)

If $(x-\sqrt{2})$ is a factor of $x^4 - 7x^3+10x^2+14x-24$.

Find the other factors.

A. $(x-\sqrt{3}), (x-4), (x-6)$

B. $(x+\sqrt{2}), (x-3), (x-4)$ ✓

C. $(x-2), (x-\sqrt{3}), (x-4)$

D. $(x-2), (x-3), (x-4)$

**Q31** Part B (Physics and Maths)

At which one of the following angles should a projectile be launched in order to have its horizontal range to be the maximum?

A. $45^\circ$ ✓

B. $90^\circ$

C. $60^\circ$

D. $0^\circ$

**Q32** Part B (Physics and Maths)

In a triangle $\Delta ABC$, $AB$= 39 cm, $BC$=80cm, and $AC$=89cm then the triangle will be

A. right angled ✓

B. obtuse angled

C. impossible

D. acute angled

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**Q33** Part B (Physics and Maths)

Which among the given options is a non-terminating decimal?

(p) $\frac{17}{625}$ (q) $\frac{35}{210}$ (r) $\frac{27}{2^3 \times 5^2}$ (s) $\frac{9}{15}$

A. (s)

B. (p)

C. (r)

D. (q) ✓

**Q34** Part B (Physics and Maths)

Value of $\sin 45^\circ / \cos 45^\circ$

A. 1 ✓

B. $1/\sqrt{2}$

C. $\sqrt{2}$

D. 60

**Q35** Part B (Physics and Maths)

The roots of the quadratic equation $3x^2+7x+4=0$ are

A. -1, -4/3 ✓

B. -1, 4/3

C. 1, -4/3

D. 1, 4/3

**Q36** Part B (Physics and Maths)

The radius of a circle is 5 cm and the length of one of its chords is 6 cm, the distance of the chord from the centre will be

A. 6 cm

B. 5 cm

C. 4 cm ✓

D. 2 cm

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**Q37** Part B (Physics and Maths)

The efficiency of a heat energy can never be

A. 80%

B. 10%

C. 100% ✓

D. 50%

**Q38** Part B (Physics and Maths)

Which among the given alphabets will not get laterally inverted on reflection by a plane mirror?

A. L

B. N

C. M ✓

D. P

**Q39** Part B (Physics and Maths)

The fuel used in nuclear power plants is

A. U - 236

B. U - 235

C. U - 238

D. Enriched U - 235 ✓

**Q40** Part B (Physics and Maths)

In a circle of radius 5 cm, $AB$ and $AC$ are two chords such that $AB = AC = 6$ cm, the length of the chord $BC$ is

A. 9 cm

B. 9.6 cm ✓

C. 10 cm

D. 8 cm

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**Q41** Part B (Physics and Maths)

If $3x+5=7$, then $x-3=?$

A. 7//9

B. 9/7

C. -7/3 ✓

D. -9/7

**Q42** Part B (Physics and Maths)

Value of $\sin 16^\circ / \cos 74^\circ$

A. 1 ✓

B. $1/\sqrt{2}$

C. 60

D. $\sqrt{2}$

**Q43** Part B (Physics and Maths)

A ball is thrown upwards from point $A$, with a velocity of 15 m/s, and it comes back from its highest point $B$, to the ground after some time. The magnitude of the acceleration of the ball at its highest point $B$ will be

A. g/2

B. 0

C. -g

D. g ✓

**Q44** Part B (Physics and Maths)

The focal length of a convex lens is '$f$' What should be the minimum distance between the object and the screen so that a real image is formed.

A. $3f$

B. $4f$ ✓

C. $2f$

D. $5f$

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**Q45** Part B (Physics and Maths)

The eye-lens is a

A. Transparent double concave lens

B. Transparent concavo-convex lens

C. Transparent double convex lens ✓

D. Transparent plano-convex lens

**Q46** Part B (Physics and Maths)

How many prime numbers are there between $2^2$ and $9^2$?

A. 15

B. 20 ✓

C. 18

D. 24

**Q47** Part B (Physics and Maths)

Which of the following has no unit

A. Density

B. Relative Density ✓

C. Distance

D. Pressure

**Q48** Part B (Physics and Maths)

$kgms^{-1}$ is the SI unit of _____

A. Pressure

B. Momentum ✓

C. Force

D. Velocity

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**Q49** Part B (Physics and Maths)

Which of the following is a Pythagorean triplet

A. 15, 17, 7

B. 8, 15, 17 ✓

C. 9, 12, 17

D. 12, 13, 8

**Q50** Part B (Physics and Maths)

A cricket ball is thrown vertically upward. It takes 3 sec to reach the greatest height. Find the distance traversed by the ball during the last second of its ascent (take g = 10 $ms^{-2}$)

A. 10 m

B. 45 m

C. 5 m ✓

D. 15 m

**Q51** Part B (Physics and Maths)

Find the zeros of the polynominal:-

$x^3-24x^2+191x-504$

A. 7 , 8, 9 ✓

B. 4, 6, 8

C. 6, 7, 8

D. 5, 6, 8

**Q52** Part B (Physics and Maths)

Force =

A. mass x density

B. mass x acceleration ✓

C. mass x volume

D. mass x velocity

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**Q53** Part B (Physics and Maths)

In a triangle $\Delta ABC$, $AB$= 35 cm, $BC$=12cm, and $\angle B=90^0$, then length of $AC$ will be

A. 25 cm

B. 37 cm ✓

C. 15 cm

D. 20 cm

**Q54** Part B (Physics and Maths)

Zeros of the equations are $3x^2+8x+5=0$ are

A. Imaginary

B. Real and unequal ✓

C. One is real and one imaginary

D. Real and equal

**Q55** Part B (Physics and Maths)

According to equations of motion, with symbols having usual meaning, the velocity at time 't' for a body moving along a straight line is given by, v =

A. u-at

B. $ut+1/2\ at^2$

C. u+at ✓

D. u/at

**Q56** Part B (Physics and Maths)

The critical angle of incidence in a glass slab immersed in air is $30^\circ$. What will be the critical angle when it is immersed in a medium of refractive index $\sqrt{2}$?

A. $60^\circ$

B. $45^\circ$ ✓

C. $30^\circ$

D. $75^\circ$

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**Q57** Part B (Physics and Maths)

Which one of the following physical quantities is a vector quantity?

A. Gravitational Potential energy

B. Electric Power

C. Electric current

D. Dipole moment ✓

**Q58** Part B (Physics and Maths)

Which among the following is a rational number equivalent to 3/5

A. 9/20

B. 3/10

C. 9/25

D. 9/15 ✓

**Q59** Part B (Physics and Maths)

What will be the remainder if $(7x^2+4x+5)$ is divided by $(x-3)$

A. 80 ✓

B. 64

C. 72

D. 56

**Q60** Part B (Physics and Maths)

The value of the radius of earth changes from $R$ to a new value such that the value of acceleration due to gravity on the surface of earth increases by 2%. If there is no accompanying change in mass of earth, the new value of the radius of earth is

A. $(1.01)\,R$

B. $(0.98)\,R$

C. $(0.99)\,R$ ✓

D. $(1.02)\,R$

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**Q61** Part B (Physics and Maths)

A car accelerates uniformly from 5 $ms^{-1}$ to 10 $ms^{-1}$ in five seconds. Find the acceleration of the car

A. 1 $ms^{2}$

B. 1 $ms^{-2}$ ✓

C. 1 $ms^{-1}$

D. 1 $ms^{1}$

**Q62** Part B (Physics and Maths)

Value of $\sin(45^{\circ}+x) + \sin(45^{\circ}-x)=$

A. $\sqrt{3}\cot x$

B. $\sqrt{3}\cos x$

C. $\sqrt{3}\sin x$

D. $\sqrt{2}\cos x$ ✓

**Q63** Part B (Physics and Maths)

Value of $33 - 4 \times 7 \times 60 \div 5 + 13 =$

A. 350

B. 290

C. -540

D. -290 ✓

**Q64** Part B (Physics and Maths)

A vessel is in the form of a hollow hemisphere mounted on a hollow cylinder. The diameter of the hemisphere is 28 cm and the total height of the vessel is 26 cm, find the inner surface area of the vessel

( Take $\pi=22/7$)

A. 8282 $cm^{2}$

B. 2288 $cm^{2}$ ✓

C. 2828 $cm^{2}$

D. 2882 $cm^{2}$

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**Q65** Part B (Physics and Maths)

The melting point of Tungsten lies between _____ &_____ $^{\circ}$C

A. 2000, 2500

B. 2500, 3000

C. 1000, 1500

D. 3300, 3500 ✓

**Q66** Part B (Physics and Maths)

An electric heater is used on a 220V supply and it takes a current of 2A. How much power does it consume?

A. 550 W

B. 450 W

C. 400 W

D. 440 W ✓

**Q67** Part B (Physics and Maths)

(-5, 5); ($x$, 10); (10, 6); (-2, 1) are the co-ordinates of the vertices of a parallelogram.

Find $x$.

A. -2

B. 5

C. 7 ✓

D. -4

**Q68** Part B (Physics and Maths)

$11^{th}$ term of the series $\sqrt{3}, \sqrt{12}, \sqrt{27}, \sqrt{48}, \ldots$ is

A. $11\sqrt{3}$ ✓

B. $6\sqrt{3}$

C. $15\sqrt{3}$

D. $5\sqrt{3}$

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**Q69** Part B (Physics and Maths)

Find the radius of a circle in which a chord 24 cm long cuts off a segment 8 cm in height

A. 10 cm

B. 14 cm

C. 13 cm ✓

D. 12 cm

**Q70** Part B (Physics and Maths)

A coin is tossed 300 times with the frequencies of two outcomes: Head-100, Tail-200, probability of occurrence of these events will be?

A. 1/3, 2/3 ✓

B. 1/3, 1/3

C. ½, 2/3

D. ½, ½

**Q71** Part B (Physics and Maths)

The points (2, 0); (4, 3) & (6, $y$) are collinear. Find $y$.

A. 5

B. -1

C. 8

D. 6 ✓

**Q72** Part B (Physics and Maths)

$ABC$ is a right–angled triangle, right angled at $A$. $AD$ is drawn perpendicular to $BC$ from $A$. Then $AB^2$ is equal to

A. $BC.CD$

B. $AC.CD$

C. $BD.DC$

D. $BC.BD$ ✓

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**Q73** Part B (Physics and Maths)

Find the point on the $X$-axis which is equidistant from the point $(12, 5)$ and $(3, -4)$

A. $(2,0)$

B. $(6,0)$

C. $(8,0)$ ✓

D. $(4,0)$

**Q74** Part B (Physics and Maths)

The angle of elevation of a ladder leaning against a wall is $60°$ and the foot of the ladder is 9m away from the wall. The length of the ladder is:

A. 10 m

B. 20 m

C. 15 m

D. 18 m ✓

**Q75** Part B (Physics and Maths)

If $x$-$3y$=2 and $x+y=6$, then the values of $x$ and $y$ will be

A. 5, 1 ✓

B. -1,5

C. 5, -1

D. 1, 5

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**Part B (Physics and Maths)** 75 Questions • Answer Key

**Q1** Part B (Physics and Maths)

Nidhi looks at the base of a tree from her balcony. This formed a right angled triangle with an angle of depression of $30^{\circ}$. If the base of tree is 10m away from the base of the wall of the house, what is the distance between her eye and the base of the tree?

A. $20\sqrt{3}$m

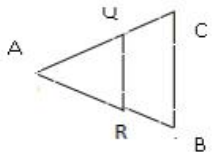
B. $\frac{\sqrt{3}}{2}$m

C. $\frac{2}{\sqrt{3}}$m

D. $\frac{20}{\sqrt{3}}$m ✓

**Q2** Part B (Physics and Maths)

For a pair of similar triangles shown in the figure, the ratio of the corresponding sides of the two triangles is $\sqrt{2}:1$. If the area of $BAC$ is 1000 $cm^2$, then what is the area of $RAQ$ in sq.cm?




A. 5

B. 4

C. 100

D. 500 ✓

**Q3** Part B (Physics and Maths)

If two hemispheres of curved surface area $8\pi$ $cm^2$ each are joined together to form a sphere. What is the total surface area of the sphere?

A. $32\pi$ $cm^2$

B. $8\pi$ $cm^2$

C. $4\pi$ $cm^2$

D. $16\pi$ $cm^2$ ✓

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**Q4** Part B (Physics and Maths)

Circular areas of same size have been marked to drill holes in a road. If the radius of one of the holes to be drilled is 21 cm, and there are 10 holes to be drilled along the road, what is the total area in sq. cm. of all the 10 circles marked to be drilled?($\pi = 22/7$)

A. 1836

B. 1386

C. 11836

D. 13860 ✓

**Q5** Part B (Physics and Maths)

Find the zeros of the function $f(x) = (x-3)(x-2)$.

A. 3, 2 ✓

B. -3, -2

C. 0

D. 0, -2

**Q6** Part B (Physics and Maths)

Let '$K$' be the area swept by the line joining the earth and the sun during Feb 2012. The area swept by the same line during the first week of that month is

A. $K/4$

B. $7K/30$

C. $7K/29$ ✓

D. $K$

**Q7** Part B (Physics and Maths)

Evaluate $\left(\frac{0.2\times0.36+0.8\times0.36}{0.18}\right)$

A. 0.3

B. 0.2

C. 2 ✓

D. 1.28

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**Q8** Part B (Physics and Maths)

If $v$ = image distance, $u$ = object distance then linear magnification, $m$ =

A. $m = \frac{v}{u}$

B. $m = -\frac{v}{u}$ ✓

C. $m = -\frac{v}{u^2}$

D. $m = -\frac{v^2}{u}$

**Q9** Part B (Physics and Maths)

When white light passes through a hollow prism, then

A. dispersion but no deviation.

B. there is no dispersion and no deviation. ✓

C. deviation but no dispersion.

D. there is both dispersion and deviation

**Q10** Part B (Physics and Maths)

The S.I. Unit of Resistivity is

A. V/m

B. ohm/m

C. ohm-m ✓

D. ohm

**Q11** Part B (Physics and Maths)

In a triangle $PQR$, the length of the side $PQ$ is 4m, the angle at $R$ is 60° and the angle at $Q$ is 30°, what is the length of side $PR$?

A. $\frac{\sqrt{3}}{2}$ m

B. $\frac{4}{\sqrt{3}}$ m ✓

C. $4\sqrt{3}$m

D. $4\sqrt{2}$m

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**Q12** Part B (Physics and Maths)

Triangles $PQR$ and $ABC$ are similar triangles.
Triangle $ABC$ have the following sides
$AB = 36\text{cm}$
$AC = 20\text{cm}$
$CA = 48\text{cm}$
Triangle $PQR$ have the following sides:
$PQ = 9\text{cm}$
$PR = 5\text{cm}$
What is the length of side $RQ = ?$

A. 15 cm
B. 30 cm
C. 3 cm
D. 12 cm ✓

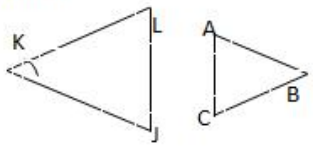
**Q13** Part B (Physics and Maths)

In a triangle the length of the sides $AB$ and $BC$ are both1.5m.What is the length of $AC$, if the angle formed at $B$ is 60°?

A. 1 m
B. 1.25 m
C. 2.25 m
D. 1.5 m ✓

**Q14** Part B (Physics and Maths)

What is the angle at $B$ in the triangle $ABC$, if the angle made at $K$ is 30° and the triangles shown in the figure are similar?




A. 70°
B. 60°
C. 30° ✓
D. 20°

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**Q15** Part B (Physics and Maths)

A particle starts moving from rest under uniform acceleration. It travels a distance '$x$' in the first two seconds and a distance 'y' in the next two seconds. If $y = nx$, then $n =$

A. 4

B. 1

C. 2

D. 3 ✓

**Q16** Part B (Physics and Maths)

A bullet of mass 20 gm is fired from a riffle of mass 8 kg with a velocity of 100 m/s. The velocity of recoil of the rifle is

A. 2.5 m/s

B. 250 m/s

C. 25 m/s

D. 0.25 m/s ✓

**Q17** Part B (Physics and Maths)

If a force of 250 N acts on a body at rest, the momentum required is 125 kgm/s. The time for which the force acts on the body is

A. 0.2 s

B. 0.5 s ✓

C. 0.3 s

D. 0.1 s

**Q18** Part B (Physics and Maths)

A planet moves around the sun in elliptical orbit. When earth is closest from the sun, it is at a distance $r$ having a speed $v$. When it is at a distance $4r$ from the sun its speed is

A. $v/4$ ✓

B. $2v$

C. $4v$

D. $v/2$

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**Q19** Part B (Physics and Maths)

Which of the following is an irrational number?

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

B. $2$

C. $7i$

D. $\sqrt{3}-3$ ✓

**Q20** Part B (Physics and Maths)

Two lenses of power -15 D and +5 D are placed in contact with each other. The focal length of the combination is:

A. -10 cm

B. +20 cm

C. +10 cm ✓

D. -20 cm

**Q21** Part B (Physics and Maths)

Form the quadratic equation whose roots are 3 and 4

A. $2x^2-7x-12=0$

B. $x^2-3x-4=0$

C. $x^2-7x+12=0$ ✓

D. $x^2+3x+4=0$

**Q22** Part B (Physics and Maths)

A farmer wants to fence his rectangular field of length 200 m and area 3000 $m^2$. If the cost of fencing per metre is 5 rupees, what is the total cost of fencing in rupees?

A. 1000

B. 2150 ✓

C. 2500

D. 500

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**Q23** Part B (Physics and Maths)

Which of the following can be produced during nuclear fission and nuclear fusion?

A. Neutron ✓

B. Proton

C. Deuteron

D. Electron

**Q24** Part B (Physics and Maths)

A farmer is marking his field to sow seeds if he marks a rectangular areas of his field in the ratio of length : width 3 : 1. Write a expression that will give the total area.

A. $3x^2 - 3$

B. $3x^2 + x$

C. $3x^2$ ✓

D. 3

**Q25** Part B (Physics and Maths)

S.I. Unit of universal gravitational constant is

A. $N^2m^2/kg^2$

B. $Nkg^2/m^2$

C. $kg^2/Nm^2$

D. $Nm^2/kg^2$ ✓

**Q26** Part B (Physics and Maths)

Which of the following is not a source of magnetic field?

A. A galvanometer carrying current

B. A rotating magnet

C. Static charges ✓

D. Electric current

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**Q27** Part B (Physics and Maths)

What is the radius of a circle where the central angle of 90° intercepts an arc of length 13cm?

A. $\frac{12}{\pi}$ cm

B. $26\pi$ cm

C. $\frac{4}{\pi}$ cm

D. $\frac{26}{\pi}$ cm ✓

**Q28** Part B (Physics and Maths)

$24 \times (15 + 45) \div 6 + (45 + 5) - 5$

A. 285 ✓

B. 275

C. 280

D. 240

**Q29** Part B (Physics and Maths)

A stone placed at the bottom of water tank appears raised by 80 cm. If refractive index of water is 4/3, The actual depth of water in tank.

A. 320 cm ✓

B. 400 cm

C. 480 cm

D. 200 cm

**Q30** Part B (Physics and Maths)

What would be the common difference in the following A.P. series?

$3, 3 + 3\sqrt{3}, 3 + 6\sqrt{3}, 3 + 9\sqrt{3}, 3 + 12\sqrt{3} \ldots \ldots$

A. $3 - 3\sqrt{3}$

B. $3\sqrt{3}$ ✓

C. $3 + \sqrt{3}$

D. $3 + 3\sqrt{3}$

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**Q31** Part B (Physics and Maths)

The dimensional formula of speed

A. $[MLT^{-2}]$

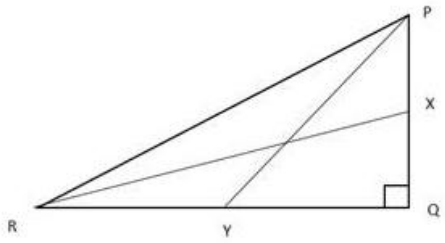
B. $[MLT^{-1}]$

C. $[ML^{0}T^{-1}]$

D. $[M^{0}LT^{-1}]$ ✓

**Q32** Part B (Physics and Maths)

In the following figure PY and RX are the medians of the right angled triangle PQR, if PR = 8cm, then $PY^2 + RX^2 = ?$ (in sq. cm.)




A. 96

B. 64

C. 128

D. 80 ✓

**Q33** Part B (Physics and Maths)

When a current carrying conductor is kept in a magnetic field, it experiences a force. The direction of this force depends on which of the following?

(a) The direction of current through the conductor
(b) The direction of the magnetic field in which the conductor is placed
(c) Both (a) and (b)
(d) Neither (a) nor (b)

A. (a)

B. (c) ✓

C. (d)

D. (b)

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**Q34** Part B (Physics and Maths)

Tungsten is used for making bulb filaments of incandescent lamps because

A. Tungsten has the highest melting point and does not melt even while it is glowing for long hours. ✓

B. Tungsten takes a long time to reach its melting point

C. Tungsten has the highest boiling point.

D. Tungsten becomes extremely bright when it glows for long hours.

**Q35** Part B (Physics and Maths)

Let $y = \frac{1}{6}x$ and $4x + 12y = 48$. What is the value of x and y?

A. $x = 3$ and $y = \frac{2}{3}$

B. $x = 3$ and $y = \frac{4}{3}$

C. $x = 8$ and $y = 1\frac{1}{3}$ ✓

D. $x = 9$ and $y = 3$

**Q36** Part B (Physics and Maths)

Frame the quadratic equation one of whose roots is $\sqrt{3} - 1$

A. $x^2 + 2x - 2 = 0$ ✓

B. $x^2 - 2x - 2 = 0$

C. $x^2 - 2x + 2 = 0$

D. $x^2 + 2x + 2 = 0$

**Q37** Part B (Physics and Maths)

A ladder resting on the wall is grounded 3 metres away from the base of the wall. If the length of the ladder is 5m, what is the height at which it is resting on the wall?

A. 2 m

B. 4 m ✓

C. 3 m

D. 5 m

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**Q38** Part B (Physics and Maths)

Which of the following are characteristics of a good fuel?

A. High calorific value ✓

B. Low density

C. Fewer residues after burning

D. Less smoke

**Q39** Part B (Physics and Maths)

1 ampere = _____

A. 1 volt / 1 second

B. 1 coulomb × 1 second

C. 1 second / 1 coulomb

D. 1 coulomb/1 second ✓

**Q40** Part B (Physics and Maths)

A spacecraft of mass 2000 kg moving with a velocity of 600 m/s suddenly explodes into two pieces. One piece of mass 500 kg is left stationary. The velocity of the other part must be ( in m/s)

A. 1500

B. 800 ✓

C. 1000

D. 600

**Q41** Part B (Physics and Maths)

In a right angled triangle, right angled at $A$, the angle formed at $B$ is 45°. If the length of side $AB$ is 5m, then what is the length of the side $AC$?

A. 5 m ✓

B. 2.5 m

C. 5.5 m

D. 3 m

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**Q42** Part B (Physics and Maths)

When the momentum of a body is doubled, by keeping its mass unchanged, the kinetic energy is

A. becomes four times of the original ✓

B. becomes three times of the original

C. doubled

D. halved

**Q43** Part B (Physics and Maths)

What would be the point which divides the line segment connecting the points $P(12, 16)$, $Q(8, 13)$ divides in the ratio 2 : 7 internally

A. (100/9, 138/9) ✓

B. (64/7, 134/7)

C. (100/7, 138/7)

D. (64/9, 134/9)

**Q44** Part B (Physics and Maths)

Two plane mirrors are at 45° to each other. If an object is placed between them, then the number of images will be

A. 9

B. 7 ✓

C. 5

D. 8

**Q45** Part B (Physics and Maths)

Five cards-the ten, jack, queen, king and ace of hearts, are well-shuffled with their face downwards. One card is then picked up at random.
What is the probability that the card is the Ace?

A. 1/5 ✓

B. 2/5

C. 4/5

D. 1/4

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**Q46** Part B (Physics and Maths)

A body is thrown with a velocity 20 m/s at an angle of 30° with the horizontal. The time taken to reach the maximum height is

( Take $g = 10\ m/s^2$)

A. 2 s

B. 4 s

C. 5 s

D. 1 s ✓

**Q47** Part B (Physics and Maths)

A shot is fired at 30° with the vertical from a point on the ground with kinetic energy K. If air resistance is ignored, the kinetic energy at the top of the trajectory is

A. K

B. 3K/4

C. K/2

D. K/4 ✓

**Q48** Part B (Physics and Maths)

find the mean of the following numbers

0.125, 0.225, 0.182, 0.156, 0.196, 0.220

A. 0.192

B. 0.184 ✓

C. 0.182

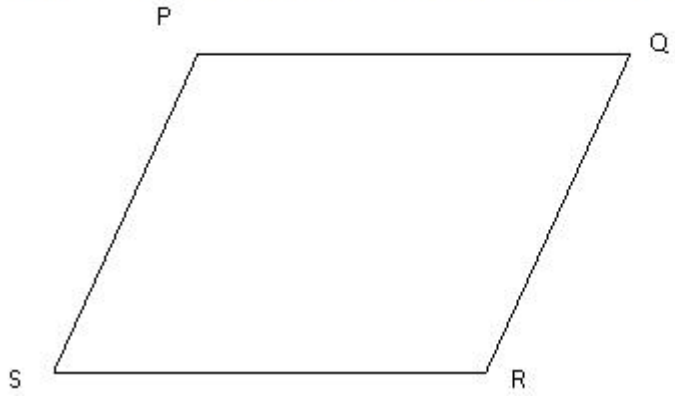
D. 0.189

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**Q49** Part B (Physics and Maths)

$PQRS$ is a rhombus than what would be $PQ^2+QR^2+RS^2+SP^2$ =?




A. $(PR^2 + QS^2)$ ✓

B. $4(PR^2 + QS^2)$

C. $2\,(PR^2 + QS^2)$

D. $2PQ.RS$

**Q50** Part B (Physics and Maths)

A dice is rolled, what is the probability of even numbered outcomes

A. 2/3

B. 1/3

C. 1/5

D. 1/2 ✓

**Q51** Part B (Physics and Maths)

A ray of light incident on a transparent block at an angle of incidence 60°. If $\mu$ of block is $\sqrt{3}$ then the angle of deviation of the refracted ray is:

A. 25°

B. 45°

C. 30° ✓

D. 15°

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**Q52** Part B (Physics and Maths)

The near point of a person with hypermetropia is 50 cm from the eye. The power of the lens required to enable the person to read clearly a book held at 25 cm from the eye is

A. 2 D ✓

B. 8 D

C. 4 D

D. 1 D

**Q53** Part B (Physics and Maths)

A freely falling body takes 4 s to reach the ground. One second after release, the percentage of its potential energy, that is still retained is

A. 6.25%

B. 37.5%

C. 93.75% ✓

D. 25%

**Q54** Part B (Physics and Maths)

A car moving with a speed of 50 km/hr can be stopped by brakes after travelling at least 6 m. If the same car is moving at a speed of 100 km/hr, the minimum stopping distance is

A. 12 m

B. 18 m

C. 24 m ✓

D. 6 m

**Q55** Part B (Physics and Maths)

Reduce to linear form

$$\frac{15x+3}{6x}=\frac{2}{3}$$

A. $33x+4=0$

B. $11x-2=0$

C. $11x-3=0$

D. $11x+3=0$ ✓

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**Q56** Part B (Physics and Maths)

Light year is the unit of

A. time

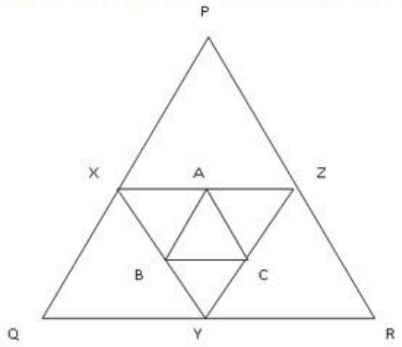
B. mass

C. length ✓

D. area

**Q57** Part B (Physics and Maths)

$PQR$ is a triangle
$X, Y, Z$ are the mid points of $PQ$, $QR$ and $RP$ respectively, similarly $A, B, C$ are the mid points of the sides $XY$, $YZ$, $ZX$ respectively.
What is the ratio of areas of $\Delta XYZ$ to $\Delta ABC$?




A. 2 : 3

B. 1 : 4

C. 3 : 4

D. 4 : 1 ✓

**Q58** Part B (Physics and Maths)

If $x = a + bt + ct^2$, where $x$ is metres and $t$ in seconds, then the unit of $a$ is:

A. $m^2s$

B. $ms^{-2}$

C. m ✓

D. $ms^{-1}$

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**Q59** Part B (Physics and Maths)

Which one of the following is not a characteristic of sound wave?

A. Brightness ✓

B. Frequency

C. Wave length

D. Amplitude

**Q60** Part B (Physics and Maths)

The length of a board is 12 cm and its breadth is 3 cm. The board needs to be taped around its sides covering all four sides. How long the tape should be?

A. 12 cm

B. 3 cm

C. 30 cm ✓

D. 15 cm

**Q61** Part B (Physics and Maths)

The minute hand of a watch is 2 cm long. How far does its tip move in 10 minutes?

A. $\frac{\pi}{4}$ cm

B. $\frac{\pi}{3}$ cm

C. $\frac{2\pi}{3}$ cm ✓

D. $\frac{4}{\pi}$ cm

**Q62** Part B (Physics and Maths)

In a right angled triangle $ABC$, the angle $A$ is $90°$. What is the value of sec$B$, if $BC$ is 5 cm and $AB$ is 3 cm.

A. 1.73

B. 1.67 ✓

C. 1.07

D. 1.5

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**Q63** Part B (Physics and Maths)

A crown glass prism with refracting angle 6° is to be achromatised for red and blue light with flint glass prism. Angle of the flint glass prism should be (Given $\mu_r = 1.513$, $\mu_b = 1.523$ for crown glass and $\mu_r = 1.645$, $\mu_b = 1.665$ for flint glass.)

A. 2.4°

B. 4.5°

C. 3° ✓

D. 1.5°

**Q64** Part B (Physics and Maths)

When objects at different distances are seen distinctly by the eye, which of the following remains constant:

A. The object distance from the eye lens

B. The image distance from the eye lens ✓

C. The radius of curvature of the eye lens

D. The focal length of the eye lens

**Q65** Part B (Physics and Maths)

Find the least value of * for which the number 82178342*52 is divisible by 11

A. 2

B. 0

C. 5

D. 7 ✓

**Q66** Part B (Physics and Maths)

A 10 N force is applied on a body which produces in it an acceleration of 2 $m/s^2$. The mass of the body is

A. 20 kg

B. 15 kg

C. 5 kg ✓

D. 10 kg

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**Q67** Part B (Physics and Maths)

1 kWh = _____ J

A. $3.6 \times 10^3$ J

B. $3.6 \times 10^5$ J

C. $3.6 \times 10^6$ J ✓

D. $3.6 \times 10^4$ J

**Q68** Part B (Physics and Maths)

What would be the seventh term in the following series
2, 11, 20, 29, 38, ….

A. 56 ✓

B. 54

C. 65

D. 67

**Q69** Part B (Physics and Maths)

Sum of first 25 terms in the following series would be

7, 11, 15, 19, 23, …

A. 1375 ✓

B. 1296

C. 1325

D. 1258

**Q70** Part B (Physics and Maths)

If $A(15, 14)$, $B(30, 15)$, $C(27, 5)$ and $D(10, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral $ABCD$ (in terms of sq. units)

A. 150 ✓

B. 85

C. 65

D. 175

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**Q71** Part B (Physics and Maths)

Divide $\frac{(-12x+48)}{(x-4)}$, when $x \neq 4$

A. $(x-4)$

B. $12(x-4)$

C. $\frac{(12x)}{(x-4)}$

D. -12 ✓

**Q72** Part B (Physics and Maths)

Which of the following is a rational number?

A. $\frac{4}{15}$ ✓

B. $\sqrt{5}$

C. $4\sqrt{7}$

D. $\frac{\pi}{\sqrt{3}}$

**Q73** Part B (Physics and Maths)

Roots of the following equation are $6x^2 + 4x - 2 = 0$

A. 1, 1/3

B. 1/3, -1/3

C. -1, 1/3 ✓

D. 1, -1/3

**Q74** Part B (Physics and Maths)

Two isolated open pipes, filled with a gas, of lengths 20 cm and 20.1 cm produces 5 beats/s when sounded together in their fundamental modes. The velocity of sound in the gas is:

A. 360 m/s

B. 402 m/s ✓

C. 420 m/s

D. 330 m/s

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**Q75** Part B (Physics and Maths)

If the points $P(15, 15)$, $Q(50, 25)$ and $R(\beta, 35)$ are collinear then what would be $\beta$

A. -82

B. -25

C. 85 ✓

D. 24

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**Q1** Part B (Physics and Maths)

The quantity of motion of a body is best represented by

A. its mass

B. its linear momentum ✓

C. its speed

D. its velocity

**Q2** Part B (Physics and Maths)

A symmetrical biconvex lens of focal length '$f$' is cut into four identical pieces along and perpendicular to its principal axis The focal length of each of four pieces is

A. $4f$

B. $2f$ ✓

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

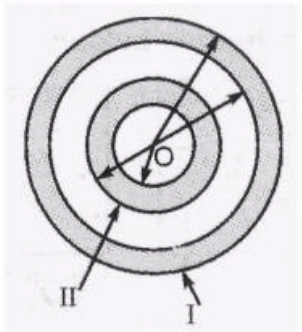
D. $\frac{f}{2}$

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**Q3** Part B (Physics and Maths)

The inner and outer diameters of ring I of a dartboard are 15cm and 17 cm respectively and those of ring II are 12 cm and 13 cm respectively.
What is the total area of these two rings?




A. $89\pi cm^2$ ✓

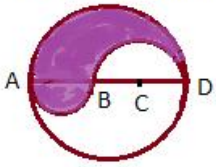
B. $106.85\pi cm^2$

C. $25\pi cm^2$

D. $34\pi cm^2$

**Q4** Part B (Physics and Maths)

$ABCD$ is a diameter of a circle of radius 12 cm. The lengths $AB$, $BC$ and $CD$ are equal. Semi-circles are drawn on $AB$ and $BD$ as diameters as shown in the given figure. Find area of the shaded region.




A. $24\pi cm^2$

B. $84\pi cm^2$

C. $48\pi cm^2$ ✓

D. $96\pi cm^2$

**Q5** Part B (Physics and Maths)

Solve for x in $12x^2 + 45x = 0$

A. $x = 0, x = -12$

B. $x = 0, x = \frac{15}{4}$

C. $x = 0, x = -45$

D. $x = 0, x = \frac{-15}{4}$ ✓

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**Q6** Part B (Physics and Maths)

Dams are constructed to collect water flowing in high altitude rivers. The stored water has a lot of

A. Neither KE nor PE

B. Both KE and PE

C. potential energy (PE) ✓

D. Kinetic energy (KE)

**Q7** Part B (Physics and Maths)

If a spherical mirror is immersed in a liquid, its focal length will

A. remain unchanged

B. decrease

C. depend on the nature of liquid ✓

D. increase

**Q8** Part B (Physics and Maths)

A long sighted person has a least distance of distinct vision of 50 cm. He wants to reduce to 25 cm. He should use a

A. convex lens of focal length 50 cm

B. concave lens of focal length 25 cm

C. convex lens of focal length 25 cm

D. concave lens of focal length 50 cm ✓

**Q9** Part B (Physics and Maths)

Pick the rational number from the given options

A. $\pi$

B. $\sqrt{3}$

C. $\sqrt{64}$ ✓

D. e

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**Q10** Part B (Physics and Maths)

Two resistors 1 ohm and 2 ohm are connected in series. The effective resistance is

A. 2 ohm

B. 1 ohm

C. 2/3 ohm

D. 3 ohm ✓

**Q11** Part B (Physics and Maths)

What would be the area of the triangle with $A(8, 8)$, $B(22, 8)$ and $C(16, -10)$ as vertices?

A. 126 sq. units ✓

B. 128 sq. units

C. 129 sq. units

D. 118 sq. units

**Q12** Part B (Physics and Maths)

A pump is required to lift 600 kg of water per minute from a well 25m deep and to eject it with a speed of 50 m/s. If $g = 10$ m/s$^2$, the power required to perform the above task is

A. 20 kW

B. 10 kW

C. 22.5 kW

D. 13.75 kW ✓

**Q13** Part B (Physics and Maths)

If '$c$' is the velocity of light in free space, the time taken by light to travel a distance $x$ in medium of refractive index $\mu$ is given by

A. $\mu x c$

B. $\frac{x}{\mu c}$

C. $\frac{\mu x}{c}$ ✓

D. $\frac{\mu c}{x}$

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**Q14** Part B (Physics and Maths)

A man walks 6 km towards north and turns left and walks 2 kms towards West. If he has started from point Z and reached point A, then what is the shortest distance between point Z and A.

A. $\sqrt{15}$ km

B. $2\sqrt{5}$ km

C. $2\sqrt{10}$ km ✓

D. $\sqrt{10}$ km

**Q15** Part B (Physics and Maths)

In an arithmetic progression the $1^{st}$ term is 7 and the third term is 28, what is the second term?

A. 10

B. 8

C. 18

D. 17.5 ✓

**Q16** Part B (Physics and Maths)

Which of the following forces is conservative?

A. Electrostatic force ✓

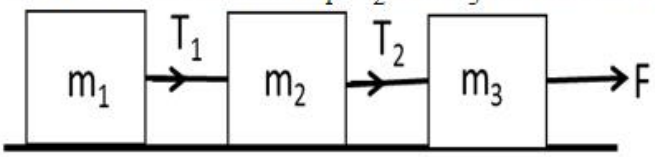
B. Viscous force

C. Frictional force

D. Air resistance

**Q17** Part B (Physics and Maths)

Three blocks of masses $m_1$, $m_2$ and $m_3$ are connected by massless strings as shown in figure on a frictionless table.




They are pulled with a force $F = 40$ N. If $m_1 = 10$ kg, $m_2 = 6$ kg and $m_3 = 4$ kg, then tension $T_2$ will be

A. 20 N

B. 32 N ✓

C. 40 N

D. 10 N

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**Q18** Part B (Physics and Maths)

Dispersive power of the material of a prism is 0.0221. If the deviation produced by it for yellow colour is 38°, then the angular dispersion between red and violet colours is

A. $0.65°$

B. $0.84°$ ✓

C. $0.48°$

D. $1.26°$

**Q19** Part B (Physics and Maths) HINDI - no English version saved

दिए गए व्यंजक को सरल बनाएं: $32 \div 16 + 8(96 \div 12) - 8$ का मान ज्ञात कीजिये।

A. 54

B. 68

C. 64

D. 58 ✓

**Q20** Part B (Physics and Maths)

Complete the statement with correct option.

In dispersion without deviation,_____

A. all the rays are parallel, but not parallel to the incident ray.

B. yellow coloured ray is parallel to the incident ray ✓

C. the emergent rays of all the colours are parallel to the incident ray.

D. only red coloured ray is parallel to the incident ray

**Q21** Part B (Physics and Maths)

What is the area in sq. cm. of the triangle with a base of 8 cm and sides of length 6 cm each?

A. $16\sqrt{5}$

B. $8\sqrt{5}$ ✓

C. $4\sqrt{5}$

D. 16

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**Q22** Part B (Physics and Maths)

What would be the value of $\cos(105°)$

A. $\frac{(1-\sqrt{3})}{\sqrt{2}}$

B. $\frac{(1-\sqrt{3})}{2}$

C. $\frac{(1+\sqrt{3})}{2\sqrt{2}}$

D. $\frac{(1-\sqrt{3})}{2\sqrt{2}}$ ✓

**Q23** Part B (Physics and Maths)

Reduce to linear form

$$\frac{5x+1}{2x}=\frac{5}{4}$$

A. $5x+2=0$ ✓

B. $5x-4=0$

C. $5x+1=0$

D. $5x-2=0$

**Q24** Part B (Physics and Maths)

If two hemispheres of curved surface area $8\pi$ $cm^2$ each are joined together to form a sphere. What is the volume of the sphere so formed in $cm^3$?

A. $8\pi$

B. $4\pi$

C. $32\pi/3$ ✓

D. $16\pi$

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**Q25** Part B (Physics and Maths)

Triangles $PQR$ and $ABC$ are similar triangles.
Triangle $ABC$ have the following sides
$AB = 12$ cm
$AC = 15$ cm
$CB = 21$ cm
Triangle $PQR$ have the following sides:
$PQ = 4$ cm
$RQ = 7$ cm
What is the length of side $PR$?

A. 5 cm ✓

B. 15 cm

C. 3 cm

D. 12 cm

**Q26** Part B (Physics and Maths)

What would be the result of the following expression

$$\frac{sec^2x + tan^2x}{sin^2x + 1} = ?$$

A. 0

B. $-cos^2x$

C. $\frac{1}{cos^2x}$ ✓

D. $\frac{1}{sin^2x}$

**Q27** Part B (Physics and Maths)

If three particles, each of mass $M$ are placed at the three corners of an equilateral triangle of side $a$, the force exerted by this system on another particle of mass $M$ placed at the midpoint of a side is

A. $2GM^2/3a^2$

B. $2GM^2/5a^2$

C. $4GM^2/3a^2$

D. $4GM^2/3a^2$ ✓

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**Q28** Part B (Physics and Maths)

What is the real part of the number $15 + 2i$

A. $2$

B. $15$ ✓

C. $3$

D. $2$

**Q29** Part B (Physics and Maths)

A bird in air is at a height '$y$' from the surface of water. A fish is at a depth '$x$' below the surface of water. The apparent distance of fish from the bird is (The refractive index of water is μ)

A. $\frac{x}{\mu} + y$ ✓

B. $\mu x + y$

C. $\frac{x}{\mu} - y$

D. $x + \frac{y}{\mu}$

**Q30** Part B (Physics and Maths)

A tree breaks due to storm and the broken part bends, so that the top of the tree touches the ground making an angle of 30° with the ground. The distance between the foot of the tree to the point where the top touches the ground is 18 m. find the height of the tree (in metres).

A. $18\sqrt{3}$ ✓

B. $9\sqrt{3}$

C. $9$

D. $24\sqrt{3}$

**Q31** Part B (Physics and Maths)

A body falling from rest has a velocity '$v$' after it falls through a distance '$h$'. The distance it has to fall down further, for its velocity to become double, is _____ times '$h$'.

A. $0.5$

B. $1.5$

C. $2$

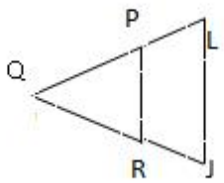
D. $3$ ✓

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**Q32** Part B (Physics and Maths)

For a pair of similar triangles, the angles made at $Q$ is same in both the triangles $PQR$ and $LQJ$.




If the length of side $QJ$ is 10 cm and $QR$ is 5 cm, what is the ratio of their total areas?

A. 4 ✓

B. 5

C. 2

D. 10

**Q33** Part B (Physics and Maths)

The length and the cross-sectional area of a conductor in the shape of a cylinder are '$l$' and '$A$' respectively. The resistivity of the material of the conductor is 'ρ'. Its resistance depends upon
(p) $l$ only
(q) $l$ and $A$
(r) ρ, $l$ and $A$
(s) ρ and $l$, but not $A$
Pick up the right option from those given above.

A. (s)

B. (p)

C. (q)

D. (r) ✓

**Q34** Part B (Physics and Maths)

An automobile that is towing a trailer is accelerating on a level road. The force that the automobile exerts on the trailer is

A. equal to the force the trailer exerts on the road

B. equal to the force the trailer exerts on the automobile ✓

C. equal to the force the road exerts on the trailer

D. greater than the force the trailer exerts on the automobile

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**Q35** Part B (Physics and Maths)

What is the quadratic equation whose roots are 5 and 2

A. $x^2 - 14x + 10 = 0$

B. $x^2 - 7x + 10 = 0$ ✓

C. $x^2 + 7x + 10 = 0$

D. $x^2 + 14 + 10 = 0$

**Q36** Part B (Physics and Maths)

What would be the value of $0.\overline{53}$

A. $\frac{53}{90}$

B. $\frac{53}{99}$ ✓

C. $\frac{24}{45}$

D. $\frac{48}{99}$

**Q37** Part B (Physics and Maths)

A body is projected horizontally with a velocity $u$ from a point which is at a height h above the ground level. The range ($R$) is (Take acceleration due to gravity = $g$ units)

A. $R = h\sqrt{\frac{2u}{g}}$

B. $R = u\sqrt{\frac{2g}{h}}$

C. $R = u\sqrt{\frac{2h}{g}}$ ✓

D. $R = g\sqrt{\frac{2h}{u}}$

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**Q38** Part B (Physics and Maths)

Light year is the unit of a quantity whose unit can also be

A. Angstrom ✓

B. second

C. square metre

D. kg

**Q39** Part B (Physics and Maths)

Magnetic field lines being more crowded towards the pole of a magnet indicates that the magnetic field due to the magnet in that region is

A. the weakest

B. the strongest ✓

C. aligned with the magnetic field of earth

D. the outcome of a property of a ferromagnetic substance

**Q40** Part B (Physics and Maths)

Find the quadratic equation with real coefficients which has (-5-i) as a root.

A. $x^2 - 26x - 10 = 0$

B. $x^2 - 10x - 26 = 0$

C. $x^2 + 10x + 26 = 0$ ✓

D. $x^2 - 26x + 10 = 0$

**Q41** Part B (Physics and Maths)

What is the missing term in the Arithmetic progression?

243, 255, …, 279, 291

A. 267 ✓

B. 265

C. 264

D. 261

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**Q42** Part B (Physics and Maths)

An electric bulb is connected to a 200 V generator.The current is 0.5 A. The power of the bulb is

A. 1000 W

B. 10 W

C. 1 W

D. 100 W ✓

**Q43** Part B (Physics and Maths)

A 1.8 m tall boy is standing at some distance from a 12 m tall building. The angle of elevation from his eyes to the top of the building increases from 45° to 60° as he walks towards the building. Find the distance (in meters) he walked towards the building.

A. $\frac{12(\sqrt{3}-1)}{\sqrt{3}}$

B. $\frac{12(\sqrt{3}+1)}{\sqrt{3}}$

C. $\frac{51(\sqrt{3}-1)}{5\sqrt{3}}$ ✓

D. $\frac{51(\sqrt{3}+1)}{5\sqrt{3}}$

**Q44** Part B (Physics and Maths)

A spring when compressed by 4 cm has 2 J energy stored in it. The force required to extend it by 8 cm will be

A. 200 N ✓

B. 20 N

C. 2 N

D. 2000 N

**Q45** Part B (Physics and Maths)

An object of mass 3 kg is at rest. Now a 6N force is applied on the object for 3 seconds. Find the velocity of the object acquired by it in m/s.

A. 12

B. 9

C. 8

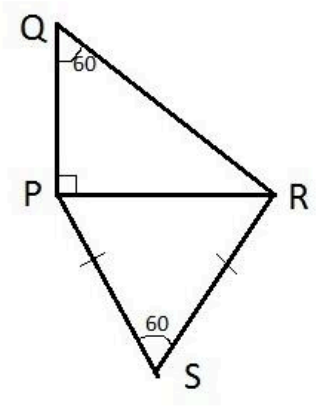
D. 6 ✓

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**Q46** Part B (Physics and Maths)

In the given figure, if $RS = 3\sqrt{3}$ cm and $RPS$ is an equilateral triangle, then find the value of $QR$




A. 24 cm

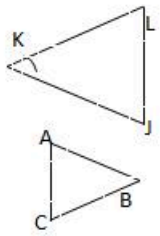
B. 6 cm ✓

C. $6\sqrt{3}$ cm

D. $12\sqrt{3}$ cm

**Q47** Part B (Physics and Maths)

What is the angle at $B$ in the triangle $ABC$, if the angle made at $K$ is 60°? The triangles shown in the figure are similar.




A. 75°

B. 40°

C. 60° ✓

D. 20°

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**Q48** Part B (Physics and Maths)

Two tuning forks have frequencies 200 Hz and x. When they are sounded together 4 beats / sec are heard. The value of x is

A. 200 Hz or 198 Hz

B. 196 Hz or 204 Hz ✓

C. 200 Hz only

D. 205 Hz or 201 Hz

**Q49** Part B (Physics and Maths)

A boy throws two balls in air in such a manner that when the first ball is at its maximum height he throws the second ball. If the balls are thrown with the time difference of one second, the maximum height attained by each ball is ($g = 10\ m/s^2$)

A. 3.5 m

B. 10 m

C. 5 m ✓

D. 2.5 m

**Q50** Part B (Physics and Maths)

What is the missing term in this A.P?
2, 25, _____, 71

A. 36

B. 43

C. 48 ✓

D. 38

**Q51** Part B (Physics and Maths)

Two spheres of masses $m$ and $M$ are situated in air and the gravitational force between them is $F$. The space between the masses is now filled with a liquid of specific gravity 3. The gravitational force will now be

A. $F$ ✓

B. $F/9$

C. $F/3$

D. $3F$

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**Q52** Part B (Physics and Maths)

Find the zeros of the function $f(x) = (x - 17)(x - 7)$

A. 17, 7 ✓

B. 2, 7

C. -17, -7

D. 0, -7

**Q53** Part B (Physics and Maths)

Atom bomb is based on the principle of

A. nuclear fission ✓

B. atomic energy imbalance

C. nuclear fusion

D. atomic mass conservation

**Q54** Part B (Physics and Maths)

The length of a board is 12 cm and its breadth is 3 cm. The board needs to be taped around its sides covering all four sides. How long the tape should be?

A. 3 cm

B. 15 cm

C. 30 cm ✓

D. 12 cm

**Q55** Part B (Physics and Maths)

What would be the point which divides the line segment connecting the points $P(10, 18)$, $Q(5, 8)$ in the ratio 2 : 3 internally

A. (9, 15)

B. (8, 12)

C. (7, 12)

D. (8, 14) ✓

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**Q56** Part B (Physics and Maths)

A farmer wants to fence his rectangular field of length 200 m and area 3000 $m^2$. If the cost of fencing per metre is 5 rupees, what is the total cost of fencing in rupees?

A. 500

B. 1000

C. 2500

D. 2150 ✓

**Q57** Part B (Physics and Maths)

Divide $\frac{(-10x+50)}{(x-5)}$, when $x \neq 5$

A. $10(x-5)$

B. $(x-5)$

C. -10 ✓

D. $(-10x)$

**Q58** Part B (Physics and Maths)

An echo is heard after 0.6 s when a boy fires a cracker, 99 m away from a tall building then the speed of sound is

A. 340 m/s

B. 165 m/s

C. 330 m/s ✓

D. 350 m/s

**Q59** Part B (Physics and Maths)

$A(1, 2)$, $B(\alpha, -26)$, $C(13, -14)$ and $D(6, 14)$ s are the vertices of a parallelogram, taken in order, find the value of $\alpha$.

A. 22

B. 14

C. 8 ✓

D. 6

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**Q60** Part B (Physics and Maths)

Two circles have radius in the ratio 4 : 3, write a polynomial to express the combined total surface area of the two circles.

A. $\pi x^2$

B. $25\pi x^2$ ✓

C. $12\pi x^2$

D. $7\pi x^2$

**Q61** Part B (Physics and Maths)

What is the value of $(2 - 3i) + (3 + 5i)$

A. $6 - 15i$

B. $5 + 2i$ ✓

C. $5 - 2i$

D. $6 - 2i$

**Q62** Part B (Physics and Maths)

The Table given below represents the ages of students in a private music school. What is the average age of the students?

| Age Band | Students |
|---|---|
| 0 - 10 | 4 |
| 10 - 20 | 5 |
| 20 - 30 | 15 |
| 30 - 40 | 4 |

A. approximately 22 years ✓

B. approximately 20 years

C. approximately 26 years

D. approximately 15 years

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**Q63** Part B (Physics and Maths)

In a right angled triangle, with angle at $A$ being 90°, the side $AB$ is of length 3cm and $BC$ is 12 cm. What is the length of side $AC$?

A. $3\sqrt{3}\,\text{cm}$

B. $3\sqrt{17}\,\text{cm}$

C. $3\text{cm}$

D. $3\sqrt{15}\,\text{cm}$ ✓

**Q64** Part B (Physics and Maths)

The ability of eye to focus on both near and far objects is called

A. Myopia

B. Power of accommodation ✓

C. Presbyopia

D. Hypermetropia

**Q65** Part B (Physics and Maths)

A trading website states 40% of its customers prefer to buy that particular stock, what is the probability that a customer will not prefer to buy stock?

A. 0.6 ✓

B. 0.1

C. 0.4

D. 0.8

**Q66** Part B (Physics and Maths)

The relation between acceleration due to gravity (g) and universal gravitational constant ($G$) is given by,

A. $M = gGR^2$

B. $R = \frac{GM}{g}$

C. $g = \frac{GM}{R^2}$ ✓

D. $G = \frac{gM}{R^2}$

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**Q67** Part B (Physics and Maths)

A car has two wipers which do not overlap. Each wiper has a blade of length 18 cm sweeping through an angle of 126°. Find the total area cleaned at each sweep of the blades.Take $\pi = 22/7$

A. $196.5\ cm^2$

B. $188.2\ cm^2$

C. $712.8\ cm^2$ ✓

D. $356.4\ cm^2$

**Q68** Part B (Physics and Maths)

A current through a horizontal power line flows in east to west direction. The direction of magnetic field at a point directly below it is

A. east to west

B. west to east

C. north to south ✓

D. south to north

**Q69** Part B (Physics and Maths)

Let $y = \frac{1}{10}x$ and $x + 50y = 120$. What is the value of x and y?

A. x = 10 and y = 2

B. x = 2 and y = 20

C. x = 20 and y = 2 ✓

D. x = 60 and y = 6

**Q70** Part B (Physics and Maths)

If $x = a^3 + bt + ct^2$, where $x$ is metres and t in seconds, then the unit of $a$ is

A. $m^2s$

B. $m^3s^{-2}$

C. $ms^{-1}$

D. $m^{-3}$ ✓

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**Q71** Part B (Physics and Maths)

What would be the value of $\sin(75°)$

A. $\frac{\sqrt{2+\sqrt{3}}}{2}$ ✓

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

C. $\frac{\sqrt{2-\sqrt{3}}}{2}$

D. $\frac{2-\sqrt{3}}{2}$

**Q72** Part B (Physics and Maths)

In a car showroom different models of car are on display. There are two models of 800 cc car and four models of 1500 cc car. What is the probability that a customer will choose an 800 cc car?

A. 0.33 ✓

B. 0.22

C. 0.5

D. 0.67

**Q73** Part B (Physics and Maths)

The dimensional formula of speed

A. $[MLT^{-1}]$

B. $[MLT^{-2}]$

C. $[M^0LT^{-1}]$ ✓

D. $[ML^0T^{-1}]$

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**Q74** Part B (Physics and Maths)

The heat generated while transferring 96000 coulomb of charge in one hour through a potential difference of 50 V is

A. $4.8 \times 10^4$ J

B. $4.8 \times 10^6$ J ✓

C. $1.33 \times 10^4$ J

D. $1.33 \times 10^3$ J

**Q75** Part B (Physics and Maths)

Which of the following mirrors is used by doctors to focus a parallel beam of light on the patient's organs like teeth for the examination?

A. Convex mirror

B. Plano-convex mirror

C. Concave mirror ✓

D. Plane mirror

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**Part B (Physics and Maths)** 75 Questions • Answer Key

**Q1** Part B (Physics and Maths)

A ball, having speed $V_0$ moves in a straight line under the influence of a constant acceleration a. Then its final speed after travelling a distance x for time t will be

A. $(\frac{x}{t})$-$v_0$

B. $(\frac{2x}{t}) - v_0$

C. $V_0$+2ax ✓

D. $V_0+\frac{1}{2}at^2$

**Q2** Part B (Physics and Maths)

Which of the following is an irrational number?

A. $\sqrt{49}+\sqrt{64}$

B. $\sqrt{3}\times\sqrt{144}$ ✓

C. $4\sqrt{81}$

D. $\sqrt{289}-\sqrt{196}$

**Q3** Part B (Physics and Maths)

Value of $\sin26^\circ/\cos64^\circ$

A. $\sqrt{2}$

B. 1 ✓

C. $60^\circ$

D. $1/\sqrt{2}$

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**Q4** Part B (Physics and Maths)

Imagine that there exists a planet that has half the radius of the earth and half its mass. Then, the acceleration due to gravity on the surface of that planet in relation to the acceleration due to gravity g on the surface of the earth is

A. $g^1=g/2$

B. $G^1=g/4$

C. $G^1=g$

D. $G^1=2g$ ✓

**Q5** Part B (Physics and Maths)

The radiant energy of the sun results from the process of

A. Nuclear fission

B. Nuclear fusion ✓

C. Combustion

D. Chemical reaction

**Q6** Part B (Physics and Maths)

The series 1/3, 5/6, 4/3, 11/6, … is in

A. Numeric progression

B. Geometric progression

C. Harmonic Progression

D. Arithmetic Progression ✓

**Q7** Part B (Physics and Maths)

Circles having equal radii are called:

A. Center of the circle

B. Chord of the circle

C. Congruent circles ✓

D. Similar circles

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**Q8** Part B (Physics and Maths)

If $X+ 1/x=4$, then value of $x^3+1/x^3$ =?

A. 96

B. 85

C. 64

D. 52 ✓

**Q9** Part B (Physics and Maths)

A dice is thrown, what is the probability getting number divisible by 4?

A. 2/3

B. 4/5

C. 1/6 ✓

D. 1/3

**Q10** Part B (Physics and Maths)

Four cells of emf 1.5 V each are connected in parallel combination of cells. Then the output voltage of the parallel combination is

A. 4.0 V

B. 1.5 V ✓

C. 2.5 V

D. 6.0 V

**Q11** Part B (Physics and Maths)

$19^{th}$ term of the series 22, 26, 30, 34, … is

A. 90

B. 92

C. 94 ✓

D. 96

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**Q12** Part B (Physics and Maths)

Value of $23-5\times17+85\div17+120$

A. 79

B. 63 ✓

C. -97

D. -123

**Q13** Part B (Physics and Maths)

A bullet of mass 0.05kg is moving with a speed of 90m/s and hits a heavy wooden block. The bullet enters the block and stops at a depth of 30 cm. Then the average force exerted by the wooden block on the bullet to resist the motion is

A. 675 N ✓

B. 150 N

C. 270 N

D. 250 N

**Q14** Part B (Physics and Maths)

Which of the following is not an irrational number?

A. $\sqrt{81}$ ✓

B. $\sqrt{161}$

C. $\sqrt{63}$

D. $\sqrt{72}$

**Q15** Part B (Physics and Maths)

The angle of elevation of a ladder leaning against a wall is 45° and the foot of the ladder is 15m away from the wall. The length of the ladder is:

A. $15\sqrt{2}$m ✓

B. 20 m

C. $10\sqrt{2}$m

D. $18\sqrt{2}$m

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**Q16** Part B (Physics and Maths)

An object is made to move with uniform speed such that the magnitude of its velocity remains constant with its direction of motion continuously changing with time. Then, the unbalanced force acting on the object will be in the direction

- A. Parallel to the direction of its acceleration ✓
- B. Opposite to that of its velocity
- C. Inclined at an angle of 60° with the direction of its acceleration
- D. Parallel to that of its velocity

**Q17** Part B (Physics and Maths)

Two dice are thrown, what is the probability getting sum of number on both dice divisible by 7?

- A. 1/6 ✓
- B. 4/15
- C. 5/12
- D. 1/13

**Q18** Part B (Physics and Maths)

A moving coil galvanometer can be converted into a ammeter by connecting to the moving coil galvanometer

- A. A low resistance in series
- B. A high resistance in series
- C. A low resistance in in parallel ✓
- D. A high resistance in parallel

**Q19** Part B (Physics and Maths)

Moment of inertia of a thin circular ring of mass M and R rotating about an axis, passing through its centre and perpendicular to the plane is

- A. $MR^2/4$
- B. $MR^2$ ✓
- C. $MR^2/2$
- D. $(2/5)\ MR^2$

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**Q20** Part B (Physics and Maths)

The circumference of a circular field is 440 m, the area of the circular field will be?

A. $7000\ m^2$

B. $15400\ m^2$ ✓

C. $1000\ m^2$

D. $10000\ m^2$

**Q21** Part B (Physics and Maths)

The thermal coefficient of linear expansion of a material is $\propto$. Then the thermal coefficient of its volume expansion will be

A. $\propto$

B. $3 \propto$ ✓

C. $\propto 3$

D. $2 \propto$

**Q22** Part B (Physics and Maths)

Two lights waves having intensities in the ratio of 9 : 4, produce interference. Then the ratio of maximum to minimum intensities in the resulting interference pattern will be

A. 25 : 4

B. 9 : 4

C. 25 : 1 ✓

D. 9 : 1

**Q23** Part B (Physics and Maths)

The angle of elevation of the sun, when the length of the shadow of a tree is equal to the height of the tree, is:

A. $75^\circ$

B. $45^\circ$ ✓

C. $30^\circ$

D. $60^\circ$

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**Q24** Part B (Physics and Maths)

Which of the following is not the SI base unit?

A. Kilogram

B. Coulomb ✓

C. Ampere

D. Metre

**Q25** Part B (Physics and Maths)

Sound travels fastest in the medium

A. Air

B. Sea water

C. Aluminum ✓

D. Hydrogen

**Q26** Part B (Physics and Maths)

The radius of a circle is 25 cm and the length of one of its chords is 48 cm, the distance of the chord from the center will be

A. 13 cm

B. 16 cm

C. 7 cm ✓

D. 9 cm

**Q27** Part B (Physics and Maths)

The ratio of molar specific heat capacities (Cp / Cv ) for a mole of diatomic (rigid) gas molecules is $\propto$ (rigid diatomic) as

A. 5/3

B. 4/3

C. 9/7

D. 7/5 ✓

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**Q28** Part B (Physics and Maths)

Which of the following is not a Pythagorean triplet?

A. 8, 15, 17

B. 20, 21, 29

C. 20, 99, 100 ✓

D. 12, 35, 37

**Q29** Part B (Physics and Maths)

Four identical balls, marked A, B, C and D are projected with a given projection velocity Vo at angles of projection of 30°, 45°, 60° and 90° respectively. Which one of these balls will achieve greatest vertical height?

A. D ✓

B. B

C. A

D. C

**Q30** Part B (Physics and Maths)

Two triangle are called similar if

A. No sides are equal

B. One angle and one side is equal to another triangle angle and side

C. The two angles of one triangle are equal to the two angles of the other triangle ✓

D. No angles of two triangles are equal

**Q31** Part B (Physics and Maths)

If 2x-y=7 and x-y= 6, then value of x and y will be

A. -1,5

B. 1, -5 ✓

C. 5, -1

D. 5, 1

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**Q32** Part B (Physics and Maths)

An electric motor has a power rating of 3.3 kw. If its motor turns at a rate of 120 rev/min the torque of the shaft of the electric motor required for the purpose will be nearly

A. 396 nm

B. 263nm ✓

C. 528 nm

D. 350 J

**Q33** Part B (Physics and Maths)

The process of electroplating, using the phenomenon of electrolysis, is primarily based on

A. Chemical effect of electric current ✓

B. Heating effect of electric current

C. Magnetic effect of electric current

D. Electromagnetic induction

**Q34** Part B (Physics and Maths)

If length of the tangent is 12 cm and distance from circumference is 8 cm then radius will be

A. 13 cm

B. 4 cm

C. 5 cm ✓

D. 12 cm

**Q35** Part B (Physics and Maths)

Which one of the following physical quantities is a scalar quantity?

A. Dipole moment

B. Angular momentum

C. Electric current ✓

D. Torque

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**Q36** Part B (Physics and Maths)

For which value of k 5, 4+k and 6 are in AP?

A. 1

B. 1/3

C. ½

D. 3/2 ✓

**Q37** Part B (Physics and Maths)

A car of mass 800 Kg is moving on an expressway. In order to increase the speed of the car from 54km/hr to 90km/hr the work required to be done will be

A. 150 KJ

B. 160 KJ ✓

C. 250 KJ

D. 200 KJ

**Q38** Part B (Physics and Maths)

Dirt can be removed from a carpet by shaking it vigorously for some time in a process that is based on

A. Second law of motion

B. Both third and second laws of motion

C. First law of motion ✓

D. Third law of motion

**Q39** Part B (Physics and Maths)

If $X - 1/x = 8$, then $x^3 - 1/x^3 = ?$

A. 696

B. 536 ✓

C. 512

D. 678

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**Q40** Part B (Physics and Maths)

Which one of the following cannot be the square of a natural number?

A. 3969

B. 1681

C. 2704

D. 3482 ✓

**Q41** Part B (Physics and Maths)

A monochromatic ray of light is incident on a medium at an angle of 60°. The reflecting rays is found to be completely polarized. Then the refractive index of the medium is nearly

A. 1.73 ✓

B. 1.50

C. 1.33

D. 1.41

**Q42** Part B (Physics and Maths)

Zeros of the equations $x^2-7x+6=0$ are

A. Imaginary

B. Real and equal

C. One is real and one imaginary

D. Real and unequal ✓

**Q43** Part B (Physics and Maths)

If $\cos\theta = 24/25$ then $\cot\theta$ will be

A. 24/7 ✓

B. 19/24

C. 7/24

D. 25/24

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**Q44** Part B (Physics and Maths)

Which of the following will not exist for a liquid in a gravity – free space

A. Upward thrust ✓

B. Viscosity

C. Pressure

D. Surface tension

**Q45** Part B (Physics and Maths)

Kirchoffs first rule of any junction of several circuit elements in an electric circuit is based on the law of conservation of:

A. Charge ✓

B. Mass

C. Linear momentum

D. Energy

**Q46** Part B (Physics and Maths)

Which one of the following physical quantities represent stress?

A. Impulse / volume

B. Energy / area

C. Force / length

D. Restoring force / area ✓

**Q47** Part B (Physics and Maths)

Surface area of the Sphere is:

A. $4\pi^2$ ✓

B. $\left(\frac{4}{5}\right)\pi r^2$

C. $\left(\frac{4}{3}\right)\pi r^2$

D. $\left(\frac{3}{4}\right)\pi r^2$

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**Q48** Part B (Physics and Maths)

An ideal gas heat engine operates in a Carnot Cycle, absorbing heat from a heat source as a hot reservoir at a temperature of 127° C. It rejects heat to the sink at a colder reservoir at a temperature of 87° C. Then the efficiency of the engine is nearly

A. 10% ✓

B. 32%

C. 26%

D. 68%

**Q49** Part B (Physics and Maths)

In a triangle ΔABC AB= 13 cm, BC=84cm, and $\angle B=90^0$, then length of AC will be

A. 65 cm

B. 85 cm ✓

C. 70 cm

D. 60 cm

**Q50** Part B (Physics and Maths)

The distance between A( 5,8) and B(4, -6)

A. $2\sqrt{157}$ unit

B. $4\sqrt{12}$ unit

C. $\sqrt{197}$ unit ✓

D. $\sqrt{147}$ unit

**Q51** Part B (Physics and Maths)

Value of $\sin(60^\circ+x) + \sin(60^\circ-x) = ?$

A. $\sqrt{3}\cot x$

B. $\sqrt{3}\cos x$ ✓

C. $\sqrt{3}\sin x$

D. $\sqrt{2}\cos x$

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**Q52** Part B (Physics and Maths)

If point C is equidistant from A(5, -6) and B(7, 8), coordinate of C will be

A. (4,3)

B. (6,3)

C. (6,7)

D. (6,1) ✓

**Q53** Part B (Physics and Maths)

A ball is thrown vertically upwards with initial velocity $V_0$ and returns to its starting point in 6 seconds then the initial velocity with which the ball was thrown will be

A. 58.8m/s

B. 19.6 m/s

C. 39.2 m/s

D. 29.4m/s ✓

**Q54** Part B (Physics and Maths)

The power factor of a series LCR circuit at resonance is

A. 0.707

B. 1.00 ✓

C. 0.00

D. 0.50

**Q55** Part B (Physics and Maths)

Two resistors, A and B are connected in parallel combination in an electric circuit as to have an equivalent resistance of 3 Ω. On connecting the resistors A and B in series combination the equivalent resistant is found to be 12Ω. Then the resistance R1 and R2 of the two resistors A and B respectively could be

A. 6Ω ; 6Ω ✓

B. 10Ω ; 2Ω

C. 8Ω ; 4Ω

D. 9Ω ;3Ω

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**Q56** Part B (Physics and Maths)

If $4x+8=7$, then $x-3=?$

A. -2/4

B. 1/6

C. -13/4 ✓

D. 12/5

**Q57** Part B (Physics and Maths)

When the potential difference across a resistive conductor of resistance R obeying ohm's law, is doubled, the rate of generation of heat will become

A. One-forth

B. Half

C. Two times

D. Four times ✓

**Q58** Part B (Physics and Maths)

Sum of the zeros of the equation $3x^2+2x-5$ is?

A. 5/3

B. 2/3

C. -5/3

D. -2/3 ✓

**Q59** Part B (Physics and Maths)

Two wires, A and B, of same material and length are stretched by applying the same load. If the diameter of wire A is twice that of wire B, then the ratio of the extensions produced in the wires by applying the same load will be

A. 1 : 4 ✓

B. 2 : 1

C. 1 : 2

D. 1 : 1

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**Q60** Part B (Physics and Maths)

In a triangle ΔABC AB= 16cm, BC=63cm, and AC=65cm then triangle will be

A. Obtuse angle triangle

B. Acute angle Triangle

C. Right angled Triangle ✓

D. Equilateral Triangle

**Q61** Part B (Physics and Maths)

For which value of k number 345k6 is divisible by 3

A. 2

B. 4

C. 6 ✓

D. 1

**Q62** Part B (Physics and Maths)

Which of the following is a quadratic equation?

A. $X^2+3x^3+5$

B. $X^2-2x^{1/5}+2$

C. $5x^2+4-7x$ ✓

D. $X^{3/5}+y^2-3$

**Q63** Part B (Physics and Maths)

Value of $\sin60^\circ/\cos60^\circ$

A. $60^\circ$

B. $\sqrt{3}$ ✓

C. 1

D. $1/\sqrt{2}$

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**Q64** Part B (Physics and Maths)

In which quadrant do the point (-16, 9) lies

A. IV quadrant

B. III quadrant

C. II quadrant ✓

D. I quadrant

**Q65** Part B (Physics and Maths)

A resonant system has a fundamental frequency of 140 Hz. If the next higher frequencies that are able to give resonance are 280 Hz and 420 Hz the system could be

A. An organ pipe closed at both ends

B. A taut string vibrating between two fixed points.

C. An organ pipe open at both ends ✓

D. An organ pipe closed at one end and open at the other end

**Q66** Part B (Physics and Maths)

An object of mass m follows a circular path of radius r with a constant speed v in uniform circular motion. Then, the work done by the centripetal force for the object to move once in a full circle is

A. $(MV^2/r).2\pi r$

B. Zero ✓

C. $(Mv^2/r).2\pi r$

D. $(MV^2/r).2r$

**Q67** Part B (Physics and Maths)

If in triangle ΔABC AB= 2cm, BC=4cm, and AC= 5 cm and in triangle ΔPQR PQ= 12cm, QR= 24 cm, and PR=30 cm, then triangles are:

A. Isosceles

B. Similar ✓

C. Right angled triangle

D. Equilateral

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**Q68** Part B (Physics and Maths)

A capacitor of capacitance 800 pF is charged by an electric source of 100 V. The electrostatic energy stored by the capacitor is nearly

A. $8.0\ J$

B. $4.0\,\mu J$ ✓

C. $4.0\,nj$

D. $8.0\,\mu J$

**Q69** Part B (Physics and Maths)

Which of the following is the property of similar triangle?

A. The ratio of the area of both triangles is proportional to the square of the ratio of their corresponding sides. ✓

B. All sides in both triangles are equal.

C. The areas of both triangles are equal.

D. All angles are double to corresponding angles.

**Q70** Part B (Physics and Maths)

A rigid body is made to rotate about an axis of rotation. Its moment of inertia about the axis of rotation depends on

A. Its angular velocity only

B. The torque applied only

C. Its angular momentum only

D. The distribution of its mass about the axis about which it rotates, and also the orientation and position of this axis of rotation ✓

**Q71** Part B (Physics and Maths)

The specific heat capacity of water is

A. 540 KJ/KG°C

B. 4186KJ/KG°C ✓

C. 335 KJ/KG°C

D. 2260KJ/KG°C

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**Q72** Part B (Physics and Maths)

Two objects A and B of masses 4 kg and 6 kg are acted upon by the forces $F_1$ and $F_2$ required to accelerate them at 7 $m/s^2$ and 4 $m/s^2$ respectively. Which of the following relationships between the force $F_1$ and $F_2$ holds true for the required purpose?

A. $F_1<F_2$ or $F_1>F_2$, depending on the mass density of the material of the objects

B. $F_1> F_2$ only ✓

C. $F_1<F_2$ only

D. $F_1= F_2$

**Q73** Part B (Physics and Maths)

Zeros of equation $x^2-9x+18=0$ are

A. 3, 6 ✓

B. 6, -2

C. -6, 2

D. -2, -6

**Q74** Part B (Physics and Maths)

A dice is thrown, what is the probability getting composite number?

A. 1/3 ✓

B. 1/2

C. 2/3

D. 4/5

**Q75** Part B (Physics and Maths)

Area of the Trapezium is

A. Base × height

B. $\left(\frac{1}{2}\right)$ × (Sum of parallel sides) × height ✓

C. $\left(\frac{1}{4}\right)$ × base×height

D. $\left(\frac{1}{2}\right)$ × base-height

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