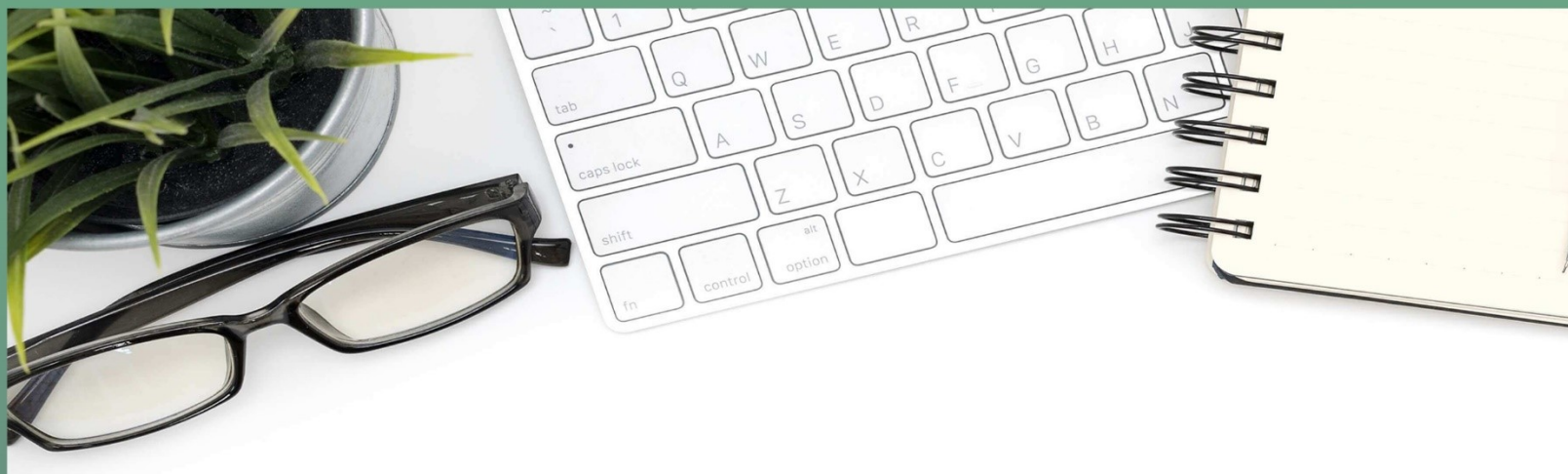

150+ Maths and Physics Questions PDF for RRB ALP Stage II Exam Part – A

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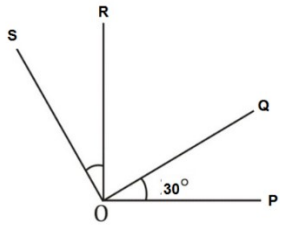
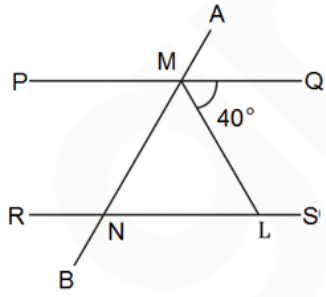
1. In the figure, OR⊥OP and OS⊥OQ. Find ∠SOR if ∠QOP = 30°



(a) 20°
(b) 30°
(c) 40°
(d) None of these
Ans.(b)
Sol.
∠QOR = 90° - ∠POQ
= 90° - 30°
= 60°
∴∠ROS = 90° - ∠BOP
= 90° - 60°
= 30°

2 .PQ and RS are two parallel lines, AB cuts PR and RS at A and B respectively. ML is the bisector of ∠BMQ. If ∠LMQ = 40° then ∠RNB will be:
(a) 70°
(b) 55°
(c) 100°
(d) 125°
Ans.(c)
Sol.
∠BMQ = 2∠BML = 80°
∵∠PMN=∠MNL=180-80=100° (∵ PQ ∥ RS)
∴∠RNB = ∠MNL = 100°

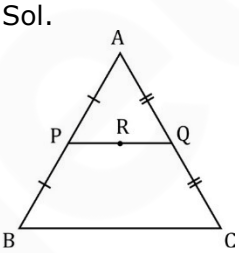


3. ΔABC and ΔPQR both are similar and perimeter of ΔABC and ΔPQR are 45 cm and 60 cm respectively if AB = 12 cm. Find PQ?
(a) 16 (b) 18
(c) 20 (d) 10
Ans.(a)
Sol.
If two triangles are similar then ratio of side = ratio of perimeter

$$\frac{perimeter of\ \Delta ABC}{Perimeter of\ \Delta PQR} = \frac{45}{60} = \frac{3}{4} = \frac{AB}{PQ}$$

PQ = $\frac{4}{3} \times 12$
PQ = 16 cm

4. In triangle ABC, P and Q are the mid points of the sides AB and AC respectively. R is a point on the segment PQ such that PR : RQ is 2 : 5 if PR = 4 cm. find the length of BC.
(a)16 cm (b)18 cm
(c)10 cm (d)28 cm
Ans.(d)
Sol.



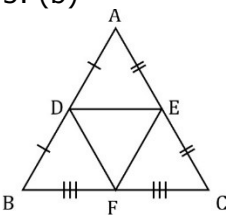
ΔAPQ ~ ΔABC

$$\therefore \frac{AP}{AB} = \frac{PQ}{BC}$$

$$\frac{1}{2} = \frac{PQ}{BC}$$

BC = 2PQ
BC = 2 (PR + RQ)
BC = 2 × 14
BC = 28 cm

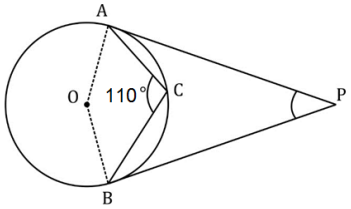
5. ABC is a triangle D, E and F are the mid points of AB, AC and BC. Find the ratio of area of ΔDEF and area of ΔABC.
(a) 1 : 2 (b) 1 : 4
(c) 1 : 6 (d) 1 : 16
5. (b)



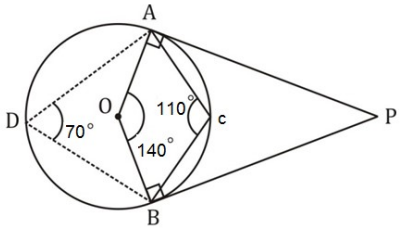
D and E are mid points of AB and AC
∴ DE ∥ BC

DE = $\frac{1}{2}$ BC
In same manner
DF = $\frac{1}{2}$ AC and EF = $\frac{1}{2}$ AB
Ratio of side = 1 : 2
Ratio of area of ΔDEF and ΔABC = 1 : 4

6. If PA and PB are tangents, and ∠ACB = 110°, find ∠APB

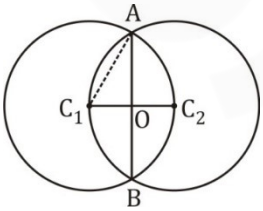


(a) 50° (b) 100°
(c) 40° (d) 80°
Ans.(c)
Sol.



$\angle OAP = \angle OBP = 90°$
In cyclic quadrilateral ACBD,
$\angle ADB + \angle ACB = 180°$
$\angle ADB = 70°$
$\angle AOB = \frac{1}{2}\angle ADB = 140°$
$\angle AOB + \angle APB = 180°$
$\angle APB = 180° - 140°$
∠APB = 40°

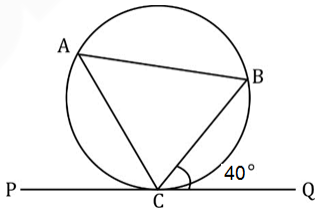
7. Two circle of equal radius of 'r' passes through centre of each other. Find the length of common tangent.
(a) $3r$ (b) $\sqrt{5}r$
(c) $\sqrt{3}r$ (d) 2r
Ans.(c)
Sol.



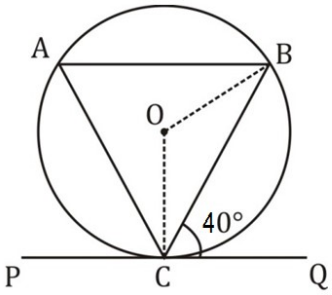
AB = common tangent
C_1 and C_2 are centres of circle with radius 'r'.
$C_1A = r$
$C_1C_2 = r$
$C_1O = \frac{r}{2}$
$AO = \sqrt{r^2 - \left(\frac{r}{2}\right)^2} = \frac{\sqrt{3}r}{2}$
AB = 2AO
AB = $\sqrt{3}r$

8. Two circle of radius 13cm and 5 cm and distance between their centre is 17 cm. Find the length of direct common tangent of the circles.
(a) 11 cm (b) 12 cm
(c) 10 cm (d) 8 cm
Ans.(b)
Sol.
Direct common tangent = $\sqrt{d^2 - (R-r)^2}$
$= \sqrt{(17)^2 - (13-5)^2}$
$= 15$ cm

9. 'PQ' is a tangent at 'C' ∠BCQ = 40°. Find ∠BAC

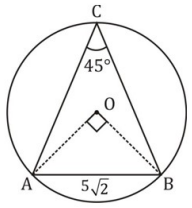


(a) 30° (b) 20°
(c) 40° (d) 60°
Ans.(c)
Sol.



Let centre of circle is 'O'
∠OCQ = 90°
∴∠OCB = 50°
∠OBC = ∠OCB = 50°
∠BOC = 80°
∴∠BAC = 40°

10. AB is chord of length of $5\sqrt{2}$ cm and ∠ACB = 45° where 'C' is a point on circle. Find area of circle.
(a) $25\pi\ cm^2$ (b) $18\pi\ cm^2$
(c) $27\pi\ cm^2$ (d) None of these
Ans.(a)
Sol.

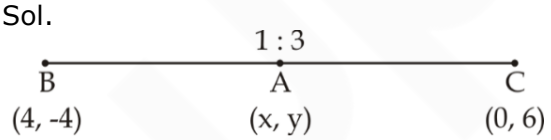


Let centre of circle is 'O'
∠AOB = 90°
OA = OB = radius of circle
$\therefore r\sqrt{2} = 5\sqrt{2}$
$r = 5$
Area of circle = πr^2
$= \pi(5)^2$
$= 25\pi cm^2$

11. The distance between the points (3, 7) and (k, –5) is 13. What is the value of k?
(a) 1 (b) 3
(c) –2 (d) –3
Ans.(c)
Sol.
ATQ,
$\sqrt{(-5-7)^2 + (K-3)^2} = 13$
144 + (K – 3)² = 169
(K – 3)² = 25
(K – 3) = ±5
K – 3 = 5 or K – 3 = -5
K = 8 or K = -2
K = -2 {as it is given in options}

12. What is the equation of the line perpendicular to the line 4x +6y= –12 and having Y-axis intercept 4?
(a) 3x – 2y = 6
(b) 3x – 2y = –8
(c) 2x – 3y = –6
(d) 2x – 3y = 8
Ans.(b)
Sol.
Slope of given line $= \frac{-2}{3}$
Slope of ⊥ line $= \frac{3}{2}$
Equation of ⊥ line ⇒ (y – 4) $= \frac{3}{2}$(x – 0)
⇒ 2y – 8 = 3x ⇒ 3x – 2y = -8

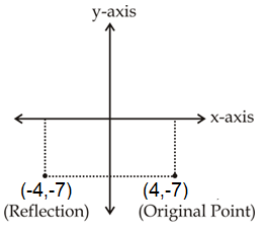
13. Point A divides segment BC in the ratio 1:3. Co-ordinates of B are (4, –4) and C are (0,6). What are the co-ordinates of point A?
(a) (–3, 1.5) (b) (–1.5, 3)
(c) (3, –1.5) (d) (1.5, 3)
Ans.(c);
Sol.



By section formula,
$\Rightarrow \frac{1\times0+3\times4}{1+3} = x\ and\ \frac{1\times6+3(-4)}{1+3} = y$
⇒ x = 3 and y = -1.5
∴ A(x, y) = (3, –1.5)

14. What is the slope of the line parallel to the line passing through the points (–3, –2) and (4, –3)?
(a) 1/7 (b)–1/7
(c) –7 (d) 7
Ans.(b);
Sol. Slope of given line $= \frac{-3-(-2)}{4-(-3)} = -\frac{1}{7}$
Because lines are parallel, hence slope will be the same for both lines.

15. What is the reflection of the point (4, -7) in the y-axis?
(a) (–4, 3.5) (b) (–4, –7)
(c) (–7, –4) (d) (7, –4)
Ans.(b);
Sol.



16. Value of $sec^2\theta - \frac{\sin^2\theta - 2\sin^4\theta}{2\cos^4\theta - \cos^2\theta}$ is

(a) 1
(b) 2
(c) -1
(d) 0
Ans: (a)
Sol.

$$sec^2\theta - \frac{\sin^2\theta - 2\sin^4\theta}{2\cos^4\theta - \cos^2\theta}$$

$$= sec^2\theta - \frac{\sin^2\theta\left(1 - 2\sin^4\theta\right)}{\cos^2\theta\left(2\cos^2\theta - 1\right)}$$

$$\left[\because \quad \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta\right]$$

$$= \sec^2\theta - \tan^2\theta$$

$$= 1$$

17. $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}}$ is equal to

(a) $2\cos\theta$
(b) $2\sin\theta$
(c) $2\cot\theta$
(d) $2\sec\theta$
Ans: (d)
Sol.

$$\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}}$$

$$= \frac{\left(\sqrt{1+\sin\theta}\right)^2 + \left(\sqrt{1-\sin\theta}\right)^2}{\sqrt{1-\sin^2\theta}}$$

$$= \frac{1+\sin\theta+1-\sin\theta}{\cos\theta}$$

$$= \frac{2}{\cos\theta} = 2\sec\theta$$

18.The numerical value of

$$\frac{11}{\text{cosec}^2\theta} + 5\cos^2\theta + \frac{6}{1+\tan^2\theta}:$$

(a) 7 (b) 11
(c) 9 (d)5
Ans: (b)
Sol.

$$\frac{11}{\text{cosec}^2\theta} + 5\cos^2\theta + \frac{6}{1+\tan^2\theta}$$

$$= 11\sin^2\theta + 5\cos^2\theta + \frac{6}{1+\tan^2\theta}$$

$$\because \quad \theta = \sec^2\theta\Big)$$

$$= 11\sin^2\theta + 5\cos^2\theta + 6\cos^2\theta$$

$$= 11\left(\sin^2\theta + \cos^2\theta\right)$$

$$= 11\left(\because \quad \cos^2\theta = 1\right)$$

$$= 11$$

19.The value of

$\tan 4^0.\tan 43^0.\tan 47^0.\tan 86^0$ is

(a) 2
(b) 3
(c) 1
(d) 4
Ans: (c)
Sol.

$\tan 4°\tan 43°\tan 47°\tan 86°$

Here,

$$\tan 86° = \tan\left(90° - 4°\right) = \cot 4°$$

$$\tan 47° = \tan\left(90° - 43\right) = \cot 43°$$

$$\tan 4°.\cot 4°, \tan 43°.\cot 43° = 1$$

20.If $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{4}{3}$, the value of $\frac{\tan^2\theta + 1}{\tan^2\theta - 1}$ is

(a) $\frac{25}{16}$
(b) $\frac{25}{7}$
(c) $\frac{25}{24}$
(d) $\frac{24}{25}$
Ans: (c)

Sol.

$$\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}=\frac{4}{3}$$

$$3\sin\theta+3\cos\theta=4\sin\theta-4\cos\theta$$

$$\sin\theta=7\cos\theta$$

$$\frac{\sin\theta}{\cos\theta}=7$$

$$\tan\theta=7$$

$$\frac{\tan^2\theta+1}{\tan^2\theta-1}=\frac{7^2+1}{7^2-1}$$

$$=\frac{50}{48}=\frac{25}{24}$$

21. If $a=256, b=258$ and $c=260$ the value of $a^3+b^3+c^3-3abc$ is

(a) 9360 (b) 9240

(c) 9288 (d) 10780

Ans.(c)

Sol

$$=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$

$$=\frac{1}{2}(a+b+c)[(a-b)^2+(b-c)^2+(c-a)^2]$$

$$=\frac{1}{2}(256+258+260)[(-2)^2+(-2)^2+4^2]$$

$$=\frac{1}{2}\times 774\times 24=9288$$

22.If $x^2+y^2+z^2=2(x-y-z)-3$, then the value of $6x-5y+3z$?

(a) 6 (b) 8

(c) 7 (d) 9

Ans(b)

Sol.

$$x^2+y^2+z^2-2x+2y+2z+1+1+1=0$$

$$(x^2-2x+1)+(y^2+2y+1)+(z^2+2z+1)=0$$

$$(x-1)^2+(y+1)^2+(z+1)^2=0$$

$$\therefore x=1, y=-1 \text{ and } z=-1$$

$$6(1)-5(-1)+3(-1)$$

$$6+5-3=11-3=8$$

23. If $x=4+\sqrt{15}$, the value of $\left(x^2+\frac{1}{x^2}\right)$ is

(a) $32\sqrt{2}$ (b) 64

(c) 48 (d) 62

Ans(d)

Sol.

$$\frac{1}{x}=\frac{1}{4+\sqrt{15}}\times\frac{4-\sqrt{15}}{4-\sqrt{15}}$$

$$=\frac{4-\sqrt{15}}{16-15}=4-\sqrt{15}$$

$$x+\frac{1}{x}=4+\sqrt{15}+4-\sqrt{15}$$

$$x+\frac{1}{x}=8$$

$$x^2+\frac{1}{x^2}=8^2-2=64-2=62$$

24. Given that, $10^{0.30}=a, 10^{0.75}=b$ and $a^c=b^2$, then the value of c is

(a) 3.45 (b) 5

(c) 2.9 (d) 3.5

Ans(b)

Sol.

$\because 10^{0.30}=a \;\&\; 10^{0.75}=b$

$\Rightarrow a^c=b^2$

$\Rightarrow (10^{0.30})^c=(10^{0.75})^2$

$\Rightarrow 10^{0.30c}=(10^{0.75})^2$

$=0.30c=1.5$

$=c=\frac{1.5}{.30}=5$

25. Quantity I : $x^2 - 9x + 20 = 0$

Quantity II : $y^2 + 3y - 10 = 0$

(a) if x < y

(b) if x ≤ y

(c) if x = y or no relation can be established between x and y.

(d) if x > y

Ans(c)

Sol.

Quantity I: $x^2 - 5x - 4x + 20 = 0$

$x(x - 5) - 4(x - 5) = 0$

$x = 4, 5$

Quantity II : $y^2 + 3y - 10 = 0$

$y^2 + 5y - 2y - 10 = 0$

$y(y + 5) - 2(y - 5) = 0$

$y = 2, 5$

Hence, no relation established

26. The ratio of curved surface area of two cones is 2 : 3 and the ratio of slant height of the two cones is 3 : 4. What is the ratio of the radius of the two cones?

(a) 2 :7

(b) 3 : 4

(c) 8 : 9
(d) 1 : 1
Ans.(c)
Sol.
ATQ, Curved surface area of two cones = 2 : 3
Ratio of slant height of two cones = 3 : 4
So, curved surface area of cone = πrl
So, $\frac{2}{3}=\frac{\pi r_1 l_1}{\pi r_2 l_2} \Rightarrow \frac{r_1}{r_2}=\frac{2}{3}\times\frac{4}{3}=\frac{8}{9}$

27. Radius of hemisphere is thrice that of a sphere. What is the ratio of total surface area of hemisphere and sphere?
(a) 27 : 4
(b) 9 :4
(c) 4 :3
(d) 6 :13
27. Ans.(a)
Sol. ATQ,
Radius of hemisphere = $3\times$ $radius\ of\ sphere$
$r = 3\times R$
The ratio of total surface area of hemisphere
& Sphere = $\frac{3\pi r^2}{4\pi R^2}$
$=\frac{3}{4}\times\frac{(3R)^2}{R^2}=\frac{3}{4}\times 9=\frac{27}{4}$

28. Diameter of a cycle wheel is 28 cm. A cyclist takes 30 minutes to reach a destination at a speed of 22 km/h. How many revolutions will the wheel make during the journey?
(a) 12500
(b) 157000
(c) 17750
(d) 20000
Ans.(a)
Sol. ATQ,
Radius of cycle wheel = 14cm
So, distance covered by 1 revolution of cycle.
$=2\pi r=2\times\frac{22}{7}\times 14$ =88cm
Distance covered in given time =30 min.
$=\frac{22000}{2}=11000\ m.$
$\Rightarrow 100\times 11000=88\times$No. of revolutions
So, No. of revolutions = 12500

29.If the perimeter of a square is 100cm, then what is the diagonal of the square (in cm)?
(a) 25√2
(b) 40√2
(c) 80√2
(d) 25
Ans.(a)
Sol.
4a = 100
a =25cm
Diagonal of the square $=\sqrt{2}a=25\sqrt{2}cm$
30.If the radius of sphere is decreased by 10%, then by what percent volume of sphere will decrease?
(a) 30
(b) 27.1
(c) 29.3
(d) 28.5
Ans.(b)
Sol.
Radius = 10 : 9
Volume = 1000 : 729
% decrease in volume $=\frac{271}{1000}\times 100$
= 27.1%

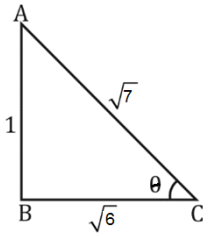
31. The value of $\frac{\sqrt{3}}{\sin 20^\circ}-\frac{1}{\cos 20^\circ}$ is
(a) 1
(b) 4
(c) 3
(d) None of these
31. Ans.(b)
Sol.
$\frac{\sqrt{3}}{\sin 20^\circ}-\frac{1}{\cos 20^\circ}$
$=\frac{\sqrt{3}\cos 20-\sin 20}{\sin 20\cos 20^\circ}=\frac{2\times\frac{\sqrt{3}}{2}\cos 20-2\times\frac{1}{2}\sin 20}{\frac{1}{2}\times 2\times\sin 20\cos 20}$
$=\frac{2\times 2|\sin 60\cos 20-\cos 60\sin 20|}{\sin 40^\circ}\left(\because \frac{1}{2}=cos60^\circ\ and\ \frac{\sqrt{3}}{2}=sin60^\circ\right)$
$=\frac{4\,|\sin(60^\circ-20^\circ)|}{\sin 40^\circ}=\frac{4\sin 40}{\sin 40}$
= 4

32. If $\tan\theta = \frac{1}{\sqrt{6}}$ and $0 < \theta < \frac{\pi}{2}$, then the value of $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$ is

(a) $\frac{3}{4}$
(b) $\frac{5}{7}$
(c) $\frac{6}{5}$
(d) $\frac{7}{6}$

Ans.(b)

Sol.



$\tan\theta = \frac{1}{\sqrt{6}} = \frac{P}{B}$

$H = \sqrt{1^2 + (\sqrt{6})^2} = \sqrt{7}$

$\text{cosec}^2\theta = \frac{7}{1}, \sec^2\theta = \frac{7}{6}$

so, $\frac{7 - \frac{7}{6}}{7 + \frac{7}{6}} = \frac{1 - \frac{1}{6}}{1 + \frac{1}{6}} = \frac{5}{7}$

33. If $\tan\theta = \frac{\sin\alpha + \cos\alpha}{\sin\alpha - \cos\alpha}$, then $(\theta + \alpha) = ?$

(a) 120°
(b) 60°
(c) 90°
(d) 135°

Ans.(d)

Sol.

$\tan\theta = \frac{\sin\alpha + \cos\alpha}{\sin\alpha - \cos\alpha}$

$\Rightarrow \tan\theta = \frac{\frac{\sin\alpha}{\cos\alpha} + 1}{\frac{\sin\alpha}{\cos\alpha} - 1} = \frac{\tan\alpha + 1}{\tan\alpha - 1}$

$\Rightarrow \tan\theta = \frac{\tan\frac{\pi}{4} + \tan\alpha}{-(1 - \tan\frac{\pi}{4}\tan\alpha)} = -\tan\left(\frac{\pi}{4} + \alpha\right)$

or $\tan\theta = \tan(\pi - \frac{\pi}{4} - \alpha) = \tan\left(\frac{3\pi}{4} - \alpha\right)$

$\theta = \frac{3\pi}{4} - \alpha$

$\theta + \alpha = \frac{3\pi}{4} = 135°$

34. If 0° < θ < 90° and $2\cot\theta = 3\sec\theta$, then θ is —

(a) $\frac{\pi}{6}$
(b) $\frac{\pi}{4}$
(c) $\frac{\pi}{3}$
(d) $\frac{\pi}{5}$

Ans.(a)

Sol.

$2\cot\theta = 3\sec\theta$

$\frac{2\cos\theta}{\sin\theta} = \frac{3}{\cos\theta} \Rightarrow 2\cos^2\theta = 3\sin\theta$

$2 - 2\sin^2\theta = 3\sin\theta$

$2\sin^2\theta + 3\sin\theta - 2 = 0$

$2\sin^2\theta + 4\sin\theta - \sin\theta - 2 = 0$

$2\sin\theta(\sin\theta + 2) - 1(\sin\theta + 2) = 0$

$(2\sin\theta - 1)(\sin\theta + 2) = 0$

$2\sin\theta - 1 = 0,\ \sin\theta + 2 \neq 0$

$\sin\theta = \frac{1}{2}$

$\theta = 30°$ or $\frac{\pi}{6}$

35. If $\sec\alpha + \tan\alpha = 4$, then the value of $\sin\alpha$ is (assume that $0^0 < \alpha < 90°$)

(a) $\frac{17}{8}$
(b) $\frac{1}{2}$
(c) $\frac{15}{17}$
(d) $\frac{8}{17}$

Ans.(c)

Sol.

$\sec\alpha + \tan\alpha = 4$

We know that $\sec^2\alpha - \tan^2\alpha = 1$

So $\sec\alpha + \tan\alpha = \frac{1}{\sec\alpha - \tan\alpha} = \frac{1}{4}$

$\sec\alpha + \tan\alpha = 4$

$\underset{+}{\sec\alpha} \underset{-}{-} \tan\alpha = \frac{1}{4}$

$2\sec\alpha = \frac{17}{4}$

$\sec\alpha = \frac{17}{8}, \cos\alpha = \frac{8}{17}$

$\sin\alpha = \sqrt{1 - \cos^2\alpha} = \sqrt{1 - \frac{64}{289}}$

$\sin\alpha = \frac{15}{17}$

36.What is the simplified value of $8.(3^2 + 1)(3^4 + 1)(3^8 + 1)$?

(a) $3^8 - 1$ (b) $3^{16} - 1$
(c) $3^{32} - 1$ (d) $3^{64} - 1$

Ans.(b)
Sol. $= (3-1)(3+1)(3^2+1)(3^4+1)(3^8+1)$
(∵we can write 8 =(3-1)×(3+1))
$= (3^2-1)(3^2+1)(3^4+1)(3^8+1)$
$= (3^4-1)(3^4+1)(3^8+1)$
$= (3^{16}-1)$

37. Which one among √10 + √4, √11 + √3, √7 + √7 is the smallest number?
(a) √10 + √4
(b) √11 + √3
(c) √7 + √7
(d) All are equal
Ans.(b)
Sol. Smallest No. = $\sqrt{11}+\sqrt{3}$

38. If 37N is divisible by 11, then what is the value of N?
(a) 1
(b) 3
(c) 4
(d) 9
Ans.(c)
Sol.

$$11\overline{)\,37N\,(3}$$
$$\underline{33}$$
$$4N$$

⇒4N should be 11.
$N = 4$

39. The sum of three consecutive natural numbers is always divisible by _____.
(a) 3
(b) 9
(c) 15
(d) 21
Ans.(a)
Sol. Let three consecutive natural no- n,(n+1) and (n+2)
So, the sum = n+n+1+n+2=3n+3= 3(n+1)
That is always divisible by 3.

40. Neha added all natural numbers from 1 to 21, however he missed one number due to which the sum becomes211. What is the number which Neha missed?
(a) 17 (b) 10
(c) 15 (d) 20
Ans.(d)
Sol. Given that,
Sum of all natural no. from 1 to 21 = $\frac{n(n+1)}{2}$
$= \frac{21}{2} \times 22 = 231$
But Neha missed one number and the sum becomes = 205
So, Difference = 231 – 211 = 20

41. If $p \times q = p + q + \frac{p}{q}$, the value of 6×3 is-
(a) 6
(b) 10
(c) 11
(d) 16
Ans: (c)
Sol.

$$6 \times 3 = 6 + 3 + \frac{6}{3}$$
$$\Rightarrow 9 + 2 = 11$$

42. The value of $\left(1+\frac{2}{x}\right)\left(1+\frac{2}{x+2}\right)\left(1+\frac{2}{x+4}\right)\left(1+\frac{2}{x+6}\right)$ is:
(a) $1+\frac{1}{x+4}$
(b) $x+8$
(c) $\frac{1}{x}$
(d) $\frac{x+8}{x}$
Ans: (d)
Sol.

$$\left(1+\frac{2}{x}\right)\left(1+\frac{2}{x+2}\right)\left(1+\frac{2}{x+4}\right)\left(1+\frac{2}{x+6}\right)$$

Taking LCM of each term

$$\left(\frac{x+2}{x}\right)\left(\frac{x+2+2}{x+2}\right)\left(\frac{x+4+2}{x+4}\right)\left(\frac{x+6+2}{x+6}\right)$$
$$\Rightarrow \frac{1}{x} \times (x+8) \Rightarrow \frac{x+8}{x}$$

43. If $8^{5x+5}=1$, then x equals-
(a) 0 (b) -1
(c) 1 (d) $-\frac{4}{5}$
Ans: b
Sol. $8^{5x+5}=1$
$8^{5x+5}=8^0\left(a^0=1\right)$ [if bases are same then power are equal]
5x+5=0
5x=-5
x=-1
44. If $3^{x+3}+7=736$,then x is equal to-
(a)5
(b) 3
(c) 2
(d) 1
Ans: (b)
Sol. $3^{x+3}+7=736$
$3^{x+3}=736-7$
$3^{x+3}=729$
$3^{x+3}=3^6$
$x+3=6$
$x=3$
45. If x: y = 4:5, then (7x+3y) : (7x-3y) is equal to
(a) 5 : 2
(b) 4 : 3
(c) 43 :13
(d) 37 : 19
Ans(c)
Sol.
$x:y=4:5$

$$\frac{7x+3y}{7x-3y}=\frac{y}{y}\left(\frac{7\frac{x}{y}+3}{7\frac{x}{y}-3}\right)=\frac{7\times\frac{4}{5}+3}{7\times\frac{4}{5}-3}$$

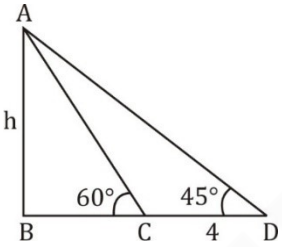
$$=\frac{\frac{28}{5}+3}{\frac{28}{5}-3}=\frac{\frac{28+15}{5}}{\frac{28-15}{5}}=\frac{43}{13}$$

46.A bag contains 6 white, 7 red and 5 black balls, find the chance that three balls drawn at random are all white?
(a)$\frac{5}{204}$ (b)$\frac{204}{5}$
(c)$\frac{6}{18}$ (d) none of these
Ans.(a)
Sol. Three balls can be drawn out of (6+7+5) = 18 balls in $18c_3$=816
And, 3 balls can be drawn out of 6 white balls in $6C_3$=20 ways
So, the chance that three balls are drawn at random and are all white is-
$\frac{20}{816}=\frac{5}{204}$
47. Which one of the following is true-?
(a) H.M≤G.M≤A.M (b) A.M≤G.M≤H.M
(c) G.M≤A.M≤H.M (d) none of the above
Ans.(a)
sol. Harmonic mean of a number series is always grater or equal to geometric mean of that number series and geometric mean of a number series is always grater or equal to arithmetic mean. So option(a) is correct.
48.from a pack of 52 cards are drawn at random. Find the chance that one is king and the other is queen.
(a)$\frac{8}{663}$ (b)$\frac{8}{660}$
(c)$\frac{4}{270.25}$ (d)$\frac{4}{270725}$
Ans.(a)
Sol. Exhaustive no. of cases = $52C_2$
A king can be drawn in $4C_1$ ways and similarly a queen in $4C_1$ ways.
Therefore the required probability
$=\frac{4C_1\times4C_1}{52C_2}=\frac{8}{633}$
49. the arithmetic mean of two numbers is 12.5 and geometric mean is 10, then the numbers are
(a)20,5 (b)13,12
(c)10,15 (d) 9,16
Ans(a)
Sol. Let the numbers be a and b
$\frac{a+b}{2}=12.5$
a+b=25
b=25-a
G.M=$\sqrt{ab}$=10
ab=100

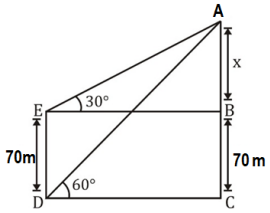
on solving..
we have- a=20,b=5
50.Qualitative data can be graphically represented by using a/an
(a)Histogram
(b) frequency polygon
(c)Ogive
(d) Bar graph
Ans(d)
Sol. Qualitative data can be graphically represented by using a Bar graph.
51. Find the 11th term of the arithmetic progression 2, 4.5, 7, 9.5……...
(a)25 (b)22.5
(c)27 (d)26
Ans(c)
Sol. d = 4.5 - 2 = 7 - 4.5 = 2.5
n = 11
a is the first term=2
11th term = a +(n-1)d = 2 + (11-1)2.5 = 2+ 10 × 2.5 = 2 + 25 = 27
52.The sum of five consecutive numbers is 120. Find the first number.
(a)18 (b) 21
(c)22 (d) 23
Ans(b)
Sol.
5 consecutive numbers form an arithmetic progression with difference 1.
n = 5,
S(5) = 120,
d = 1
Let the first number be a
$S(n) = \frac{n}{2}(2a+(n-1)d)$
$120 = \frac{5}{2}(2a+4\times1)$
$48=2a+4$
2a = 44
a = 22
The first number is 22, and the other numbers are 22, 23, 24, 25, 26.

53. Let a_n be an arithmetic progression, for which d=12 and a_3=46. Find a_1-
(a)20 (b)21
(c)22 (d)18
Ans(c)
Sol.$an=a1+(n-1).d$
=> $a_1=a_n-(n-1).d$
We substitute $n=3$ and get –
$a_1=a_3-(3-1)d= a_1=46-24$
$a_1=22$
54. What is the sum of the first 13 terms of an arithmetic progression if the 5th term is 1 and the 8th term is -17?
(a) -140 (b) 61
(c) -143 (d) 166
Ans(c)
Sol.
$T_5 = 1$
$a + 4d = 1$ … (i)
and
$T_8 = -17$
$a + 7d = -17$ … (ii)
On solving (i) and (ii) we get,
a= 25 and d=-6
$S_{13} = \frac{13}{2}[2\times25+(13-1)(-6)]$
$= \frac{13}{2}[50 - 72] = -143$
55. The 3rdand 7thterm of an arithmetic progression are 19 and 43 respectively. What is the 13thterm?
(a) 79 (b) 43
(c) 45 (d) 49
Ans.(a)
Sol. $T_3 = 19$
$a +2d = 19$ … (i)
and $T_7 = 43$
$a + 7d = 43$ ….(ii)
On solving (i) and (ii) we get
a = 7 and d = 6
$T_{13} = a + 12d$
$= 7 + 12 \times 6 = 79$
56. $(\sqrt{2}+\sqrt{7-2\sqrt{10}})$ is equal to-
(a)$\sqrt{2}$ (b)$\sqrt{7}$
(c)$\sqrt{5}$ (d)$2\sqrt{5}$
Ans(c)
Sol.
$(\sqrt{2}+\sqrt{7-2\sqrt{10}})=\sqrt{2}+\sqrt{5+2-2\sqrt{10}}$
$\sqrt{2}+\sqrt{(\sqrt{5}-\sqrt{2})^2}$
$\sqrt{2}+\sqrt{5}-\sqrt{2}$
$\sqrt{5}$
57.$(0.5\times5+0.25\times0.5+0.5\times4+0.5\times0.75)$ is equal to-
(a)5 (b)10
(c)20 (d)15

Ans.(a)
Sol. .$(0.5 \times 5 + 0.25 \times 0.5 + 0.5 \times 4 + 0.5 \times 0.75)$
=(2.5+0.125+2+0.375)
=(2.5+2+0.5)
=5
58. The value of $1 \div [1 + 1 \div \{1 + 1 \div (1 + 1 \div 2)\}]$ is-
(a)1 (b)2
(c)$\frac{1}{2}$ (d)$\frac{5}{8}$
Ans(d)
Sol. $1 \div [1 + 1 \div \{1 + 1 \div (1 + 1 \div 2)\}]$
$=1 \div \left[1 + 1 \div \left\{1 + 1 \div (1 + \frac{1}{2})\right\}\right]$
$=1 \div \left[1 + 1 \div \left\{1 + \frac{2}{3}\right\}\right]$
$=1 \div [1 + 1 \div \frac{5}{3}]$
$=1 \div \left[1 + \frac{3}{5}\right]$
$= 1 \div \left[\frac{8}{5}\right]$
$=\frac{5}{8}$
59. $\frac{2\frac{3}{4}}{1\frac{5}{6}} \div \frac{7}{8} \times \left(\frac{1}{3} + \frac{1}{4}\right) + \frac{5}{7} \div \frac{3}{4} of \frac{3}{4}$ is equal to-
(a)$\frac{55}{77}$ (b)$\frac{49}{80}$
(c)$\frac{143}{63}$ (d)$3\frac{2}{9}$
Ans(c)
Sol. $\frac{\frac{11}{4}}{\frac{11}{6}} \div \frac{7}{8} \times \left(\frac{7}{12}\right) + \frac{5}{7} \div \frac{3}{4} \times \frac{3}{4}$
$= \frac{6}{4} \times \frac{8}{7} \times \frac{7}{12} + \frac{5}{7} \times \frac{16}{9}$
$=1+\frac{80}{63}$
$=\frac{143}{63}$
60. $3\frac{2}{7} of 4\frac{4}{11} \ of \ \frac{3}{35} \ of \ 5390$ is equal to-
(a)6624 (b) 6948
(c)7014 (d) 6124
Ans(a)
Sol. $3\frac{2}{7} of 4\frac{4}{11} \ of \ \frac{3}{35} \ of \ 5390$
$=\frac{23}{7} \times \frac{48}{11} \times \frac{3}{35} \times 5390$
=6624
61. Two posts are 4 m apart. Both posts are on same side of a tree. If the angles of depressions of these posts when observed from the top of the tree are 45° and 60° respectively, then what is the height(in meters) of the tree?
(a) $\sqrt{3}$ + 1
(b) $\sqrt{3}(\sqrt{3}$ +1)
(c) $2\sqrt{3}$ ($\sqrt{3}$ + 1)
(d) $4\sqrt{3}(\sqrt{3}$ + 1)
Ans.(c)
Sol.



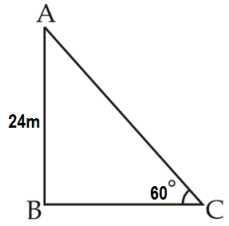
In ΔABC,
tan60° = $\frac{h}{BC}$
$\Rightarrow BC = \frac{h}{\sqrt{3}}$
In Δ ABD,
tan45° = $\frac{h}{BC+CD}$
h = BC + 4
h = $\frac{h}{\sqrt{3}} + 4$
$h\left(\frac{\sqrt{3}-1}{\sqrt{3}}\right) = 4$
h = $\frac{4\sqrt{3}}{\sqrt{3}-1} = \frac{4\sqrt{3}(\sqrt{3}+1)}{2}$
$= 2\sqrt{3}(\sqrt{3} + 1)m$
62.The angles of elevation of the top of a building from the top and bottom of a tree are 30° and 60° respectively. If the height of the tree is 70 m, then what is the height of the building?
(a) 70$\sqrt{3}$ m
(b) 105 m
(c) 70($\sqrt{3}$ + 1)m
(d) 75$\sqrt{3}$m
Ans.(b)
Sol.



From fig. EB = x$\sqrt{3}$
& $DC = \frac{70 + x}{\sqrt{3}}$
But, EB = DC

⇒ 3x = 70 + x
⇒ x = 35
So, height of building = 105 m

63. A person observes that the angle of elevation of the top of a pole of height 24 m is 60°. What is the distance (in meters) of the person from the pole?
(a) 15
(b) 8√3
(c) 24√3
(d) 30
Ans.(b)
Sol.

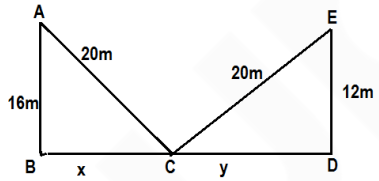


$\tan 60° = \frac{AB}{BC}$
$BC = \frac{24}{\sqrt{3}} m$
$BC = 8\sqrt{3}m$

64. If 8x/3 + [7(5 - 2x/3)]/2 = 1/2, then what is the value of x?
(a) -17 (b) 51
(c) -51 (d) 17
Ans(c)
Sol.
$\frac{8x}{3} + \frac{[7(5-\frac{2x}{3})]}{2} = \frac{1}{2}$
$\Rightarrow \frac{16x}{3} + 35 - \frac{14x}{3} = 1$
$\Rightarrow \frac{2x}{3} = -34$
$\Rightarrow x = \frac{-34\times3}{2} = -51$

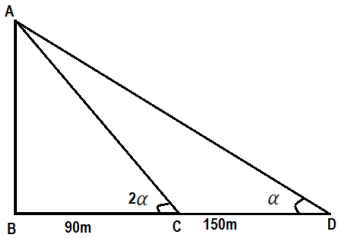
65. A fraction is greater than its reciprocal by 9/20. What is the fraction?
(a) 5/4 (b) 4/5
(c) 3/4 (d) 4/3
Ans(a)
Sol.
ATQ,
Let fraction = $\frac{x}{y}$
So, $\frac{x}{y} = \frac{y}{x} + \frac{9}{20}$ _____(i)
By options.
$\frac{x}{y} = \frac{5}{4}$ So, put in R.H.S.
$\Rightarrow \frac{4}{5} + \frac{9}{20} = \frac{16+9}{20} = \frac{25}{20} = \frac{5}{4}$
So, the fraction is $\frac{5}{4}$

66. A ladder 20m long is placed in street so as to reach a window 16m high. On turning the ladder on the other side of the street, it reaches a point 12m high. The width of the street is
(a)28.5 (b)28m
(c)27m (d)32m
Ans(b)
Sol.



In the given figure, width of the street=(x+y)
$=\sqrt{20^2 - 16^2} + \sqrt{20^2 - 12^2}$
$=\sqrt{144}+\sqrt{256}$
=12+16
=28m

63. A tower standing on a horizontal plane subtends a certain angle at a point 240 meter apart from the foot of the foot of the tower. On moving 90 meter towards it, it is found that top of the tower subtend an angle twice as before. The height of the tower is-
(a)120m (b)160m
(c) 80m (d)none of these
Ans(a)
Sol.



In △ACD,
∠ACB=∠CAD+∠ADC
∠CAD=2α-α=α
AC=CD=150m
In△ABC,
$AB=\sqrt{AC^2 - BC^2} = \sqrt{(150)^2 - (90)^2}$=120m

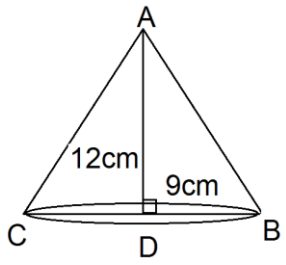
Height of the tower=120m

68. If the height and the radius of base of a cone is 12 cm and 9 cm respectively, the find the slant height of the cone-

(a) 15 cm (b) 16cm
(c) 20 cm (d)8cm

Ans(a)

Sol



By Pythagoras theorem-

$AB = \sqrt{AD^2 + BD^2} = \sqrt{12^2 + 9^2}$

=15cm

69. If perimeter of a square if 40cm the find the length of its diagonal-

(a)$5\sqrt{2}$cm (b)$10\sqrt{2}$cm
(c)$\frac{20}{\sqrt{3}}$cm (d) 10cm

Ans(b)

Sol. Perimeter of square=40cm

So, length of side =$\frac{40}{4}$=10cm

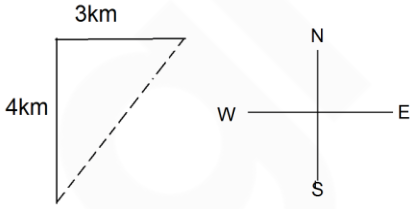
Length of diagonal =$\sqrt{10^2 + 10^2}$=$10\sqrt{2}$cm

70. Neha walks 4 km. due north and the 3km. due east. How far has she walked the crow flies from her starting point?

(a) 4.5km (b)7km
(c)8km (d)5km

Ans(d)

Sol.



Required distance=$\sqrt{4^2 + 3^3}$ =5km.

71. Identify an irrational number-

(a) $\sqrt{0.49}$ (b)2.5
(c)$\sqrt{24}$ (d) $\sqrt{144}$

Ans(c)

Sol. An irrational is a number which cannot be written as a quotient of two integers,

$\sqrt{0.49} = .7 = \frac{7}{10}$, $\sqrt{144} = 12$ and $2.5 = \frac{5}{2}$

24 in not a perfect square,$\sqrt{24}$ cannot be written as a quotient of two integer,

And $\sqrt{24}$ =4.898979485566…, which is a non-terminating and non-repeating decimal.

So, $\sqrt{24}$ is an irrational number.

72. Find an irrational number between 2 and 3

(a) 2.5 (b)2.9
(c)$\sqrt{11}$ (d)$\sqrt{5}$

Ans(d)

Sol.An irrational number between 2 and 3 is$\sqrt{5}$.

73. How many rational and irrational number can be inserted between 4 and 5?

(a) 0 (b) infinite
(c) 2 (d) none of these

Ans(b)

Sol. There are infinite number of rational and irrational number between 4 and 5.

74.zero is a –

(a) rational number
(b) irrational number
(c) both rational and irrational number
(d) none of the above.

Ans(a)

Sol.

Rational number are the ones that can be expressed in the form **p/q** such that **p is an integer** and **q a non-zero integer**. zero(0), it can be expressed in many ways with one of the cases being ratio of two integers (eg. 0/1 = 0/2 = … = 0), so, zero is rational numbers.

75.the greater number, that divides 122 and 243 leaving remanders respectively 2 and 3 is

(a)12 (b)24
(c)30 (d)120

Ans(d)

Sol. Required no. = H.F.C of (122-2) and(243-3)

=H.C.F of 120 and 240 =120.

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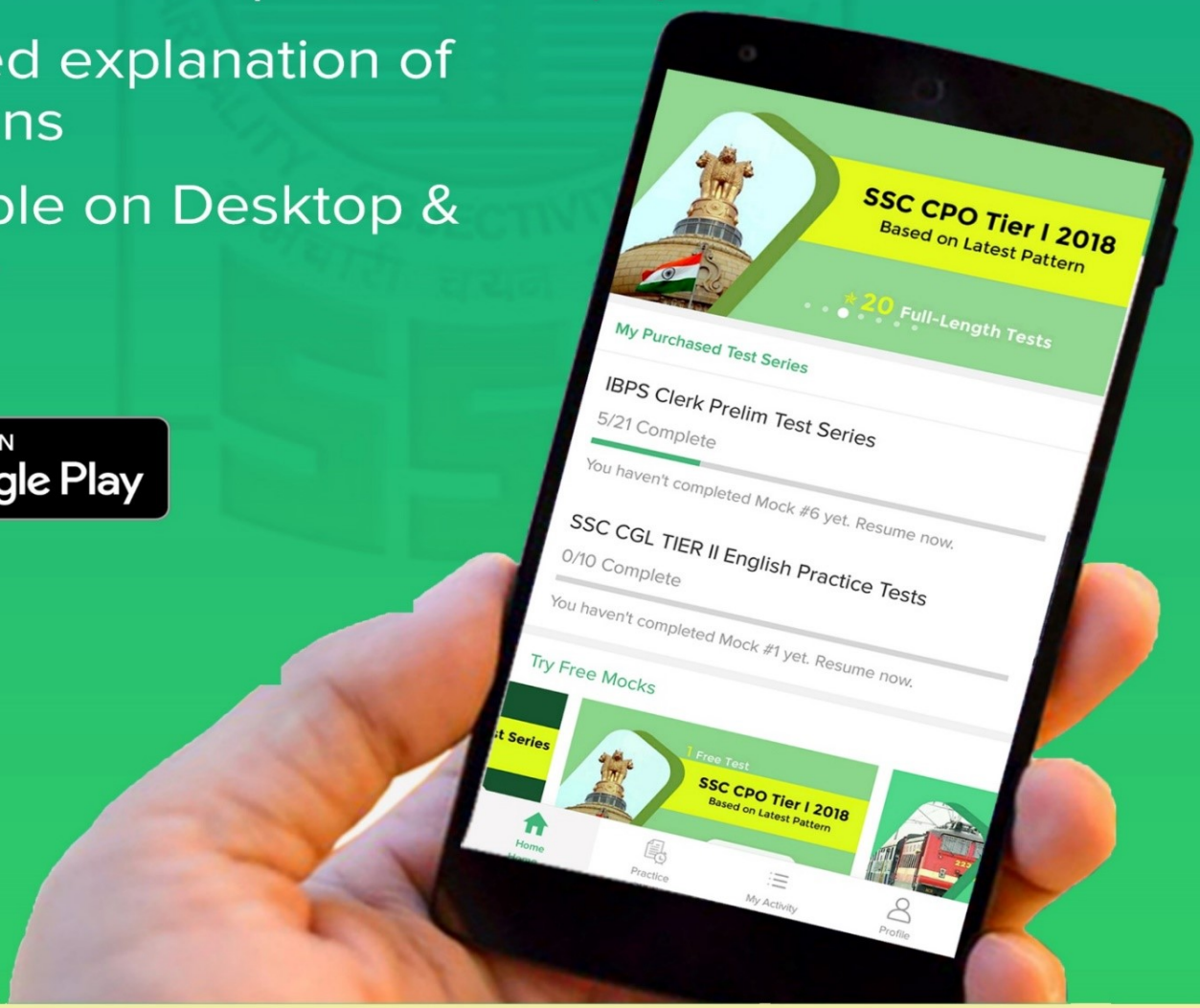

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