

# RIMC EXAM

8<sup>th</sup> JUNE'24

SUBJECT- MATHS

ANSWER KEYS &amp; SOLUTIONS

Part-A

Q1. Let the number be  $10x + y$ .

$$x + y = 13. \text{ --- (1)}$$

Number obtained after interchanging

the digits =  $10y + x$ 

$$10y + x - (10x + y) = 27$$

$$9y - 9x = 27$$

$$9(y - x) = 27$$

$$y - x = \frac{27}{9}$$

$$y - x = 3 \text{ --- (2)}$$

Add equation (1) And (2)

$$x + y + y - x = 13 + 3$$

$$2y = 16$$

$$y = \frac{16}{2} \quad ; \quad y = 8$$

$$x + y = 13; \quad x + 8 = 13, \quad x = 13 - 8$$
$$x = 5$$

$$\begin{aligned} \text{The Required Number} &= 10x + y \\ &= 10 \times 5 + 8 \\ &= 58 \end{aligned}$$



$$\begin{aligned}
 \text{Q2. } \frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}} &= \frac{3^{-5} \times (2 \times 5)^{-5} \times 5^3}{5^{-7} \times (2 \times 3)^{-5}} \\
 &= \frac{3^{-5} \times 2^{-5} \times 5^{-5} \times 5^3}{5^{-7} \times 2^{-5} \times 3^{-5}} = \frac{5^{-5} \times 5^3}{5^{-7}} \\
 &= \frac{5^{-5+3}}{5^{-7}} = \frac{5^{-2}}{5^{-7}} = 5^{-2+7} = 5^5 = 3125.
 \end{aligned}$$

Q3. Thickness =  $R - r = 1 \text{ cm}$   
 inner diameter =  $2r = 12$ ,  $r = 6 \text{ cm}$   
 $R = 7 \text{ cm}$ ,  $h = 100 \text{ cm}$   
 volume of tube =  $\pi (R^2 - r^2) \times h$

$$\begin{aligned}
 &= \frac{22}{7} \times (R+r)(R-r) \times 100 \\
 &= \frac{22}{7} \times (7+6)(7-6) \times 100 \\
 &= \frac{22}{7} \times 13 \times 1 \times 100 \\
 &= \frac{28600}{7} \text{ cm}^3
 \end{aligned}$$

Weight of the Metallic Tube = Volume  $\times$  density =  $\frac{28600 \times 7.8}{7}$   
 $= 31868.57 \text{ gm.}$



$$Q4. \quad \frac{4(x^4 - 5x^3 - 24x^2)}{x(x-8)}$$

$$= \frac{4x(x^3 - 5x^2 - 24x)}{x(x-8)}$$

$$= \frac{4(x^3 - 5x^2 - 24x)}{(x-8)}$$

$$= \frac{4x(x^2 - 5x - 24)}{(x-8)}$$

$$= \frac{4x(x^2 - 8x + 3x - 24)}{(x-8)}$$

$$= \frac{4x(x(x-8) + 3(x-8))}{(x-8)}$$

$$= \frac{4x(x-8)(x+3)}{(x-8)}$$

$$= 4x(x+3) = 4x^2 + 12x$$

Q5. Let the ratio be  $x$

The four Angles are:  $3x, 5x, 7x, 9x$

Sum of Angles =  $360^\circ$

$$3x + 5x + 7x + 9x = 360$$

$$24x = 360, \quad x = \frac{360}{24} = 15$$

$$3x = 3 \times 15 = 45^\circ, \quad 5x = 5 \times 15 = 75^\circ,$$

$$7x = 7 \times 15 = 105^\circ, \quad 9x = 9 \times 15 = 135^\circ$$



Q6. Let  $Q$  be the Quotient.

$$\begin{aligned}\text{Number} &= 342Q + 47 \\ &= (18 \times 19)Q + 18 \times 2 + 11\end{aligned}$$

$$= 18 \times 19Q + 18 \times 2 + 11$$

$$= (19Q + 2) \times 18 + 11$$

$19Q + 2$  is Quotient, 18 is Divisor and 11 is Remainder.

Q7.  $\text{LCM} = 9 \times \text{HCF}$

$$\text{HCF} + \text{LCM} = 500$$

$$\text{HCF} + 9\text{HCF} = 500$$

$$10\text{HCF} = 500$$

$$\text{HCF} = \frac{500}{10} = 50$$

$$\text{HCF} = 50.$$

Q8. (a)  $1 + 2 + 3 + \dots + 50 = \frac{1}{2} (50 \times (50 + 1))$   
 $= \frac{1}{2} \times 50 \times 51$   
 $= 1275.$

(b)  $1 + 2 + 3 + \dots + 30 = \frac{1}{2} (30 \times (30 + 1)) = \frac{1}{2} \times 30 \times 31$   
 $= 15 \times 31 = 465$

Sum from  $31 + 32 + \dots + 50$   
 $= 1275 - 465$   
 $= 810$



Q9. Let the ratio be  $x$

$$\text{Girls} = 3x, \text{ Boys} = 5x$$

$$3x + 5x = 720$$

$$8x = 720$$

$$x = \frac{720}{8} = 90$$

$$\text{Girls} = 3x = 3 \times 90 = 270,$$

$$\text{Boys} = 5x = 5 \times 90 = 450.$$

$$\begin{aligned} \text{New Number of Boys} &= 450 + 18 \\ &= 468. \end{aligned}$$

Let new ratio be  $y$ :

$$\text{Girls} = 2y, \text{ Boys} = 3y$$

$$3y = 468 ; y = \frac{468}{3} = 156$$

$$\begin{aligned} \text{New Number of Girls} &= 2y = 2 \times 156 \\ &= 312. \end{aligned}$$

$$\begin{aligned} \text{Number of Girls Required} \\ &= 312 - 270 = 42. \end{aligned}$$



Q10. (a)  $x^2 - y^2 - 9z^2 + 6yz$

$$x^2 - (y^2 + 9z^2 - 6yz)$$

$$x^2 - (y - 3z)^2$$

$$= (x - (y - 3z))(x + (y - 3z))$$

$$= (x - y + 3z)(x + y - 3z)$$

(b)  $3 - 12(a - b)^2$

$$= 3(1 - 4(a - b)^2)$$

$$= 3(1 - (2(a - b))^2)$$

$$= 3(1 - 2(a - b))(1 + 2(a - b))$$

$$= 3(1 - 2a + 2b)(1 + 2a - 2b)$$

Q11. Let 5 Rupee Coins be  $x$

2 Rupee Coins be  $3x$

$$2 \times 3x + 5x = 77$$

$$6x + 5x = 77$$

$$11x = 77$$

$$x = \frac{77}{11} = 7$$

11

5 Rupee Coin = 7, 2 Rupee Coin =  $3x = 21$ .



$$\begin{aligned} \text{Q 12. Perimeter of Equilateral } \Delta &= 3a \\ &= 3 \times 4.18 \\ &= 12.54 \text{ cm.} \end{aligned}$$

$$\text{Circumference of Ring} = 2\pi r$$

$$2\pi r = 12.54$$

$$\frac{2 \times 22}{7} \times r = 12.54$$

$$r = \frac{12.54 \times 7}{2 \times 22}$$

$$r = 0.285 \times 7 = 1.995$$

$$\text{Diameter} = 2r$$

$$= 2 \times 1.995 = 3.99 \text{ cm.}$$

Q 13.

402.

Nearest Square Number is  $20^2 = 400$

$$402 - 400 = 2$$

2 is the least number should be subtracted to get perfect square.

$$\text{Q. } \sqrt{400} = 20.$$



$$Q14. \quad \sqrt[3]{968} + \sqrt[3]{1375}$$

2	968	5	1375
2	484	5	275
2	242	5	55
11	121	11	11
11	11		11
	1		

$$\sqrt[3]{2 \times 2 \times 2 \times 11 \times 11} + \sqrt[3]{5 \times 5 \times 5 \times 11}$$

$$= 2 \sqrt[3]{121} + 5 \sqrt[3]{11}$$

$$Q15. \quad \frac{65}{12} + \frac{12}{7} - \frac{455}{84} + \frac{144}{84} = \frac{599}{84}$$

$$\frac{65}{12} - \frac{12}{7} = \frac{455}{84} - \frac{144}{84} = \frac{311}{84}$$

$$\frac{599}{84} \div \frac{311}{84} = \frac{599}{\cancel{84}} \times \frac{\cancel{84}}{311} = \frac{599}{311}$$



$$\text{Q16. } (x^3 - 2x^2 + 3x - 4)(x - 1)$$

$$= x(x^3 - 2x^2 + 3x - 4) - 1(x^3 - 2x^2 + 3x - 4)$$

$$= x^4 - 2x^3 + 3x^2 - 4x - x^3 + 2x^2 - 3x + 4$$

$$= x^4 - 3x^3 + 5x^2 - 7x + 4$$

$$(2x - 3)(x^2 - x + 1) = 2x(x^2 - x + 1) - 3(x^2 - x + 1)$$

$$= 2x^3 - 2x^2 + 2x - 3x^2 + 3x - 3$$

$$= 2x^3 - 5x^2 + 5x - 3$$

$$= x^4 - 3x^3 + 5x^2 - 7x + 4 - (2x^3 - 5x^2 + 5x - 3)$$

$$= x^4 - 3x^3 + 5x^2 - 7x + 4 - 2x^3 + 5x^2 - 5x + 3$$

$$= x^4 - 5x^3 + 10x^2 - 12x + 7$$

$$\text{Q17. } A = \frac{1}{25}, \quad B = \frac{1}{20}, \quad A + B = \frac{1}{25} + \frac{1}{20} = \frac{4 + 5}{100}$$

$$= \frac{9}{100}$$

$$\begin{aligned} \text{5 Day work of (A+B)} &= 5 \times \frac{9}{100} = \frac{9}{20} \end{aligned}$$

$$\text{Remaining work} = \frac{11}{20}$$

$$\begin{aligned} \text{Time taken by B to Do Remaining work} &= \frac{11}{20} \times 20 = 11 \text{ Days} \end{aligned}$$



Q18. Lcm of 24, 32, 36 =  $2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$   
 $= 288$

2	24, 32, 36
2	12, 16, 18
2	6, 8, 9
2	3, 4, 9
2	3, 2, 9
3	3, 2, 9
3	1, 1, 3
	1, 1, 1

Least Number =  $288 - 8 = 280$ .

Q19.  $\frac{V_1}{V_2} = \frac{\frac{4}{3} \pi r_1^3}{\frac{4}{3} \pi r_2^3} = \frac{1}{8}; \frac{r_1^3}{r_2^3} = \frac{1}{8}$

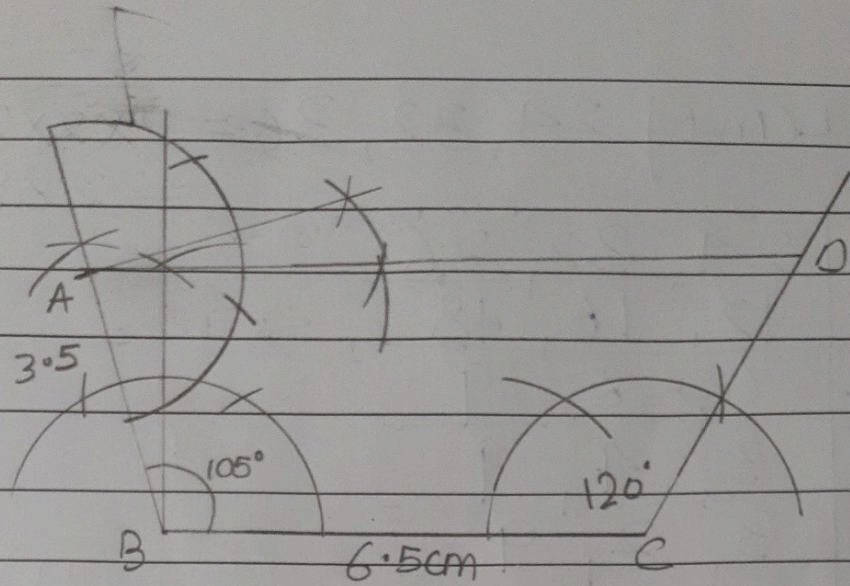
$$\frac{r_1}{r_2} = \frac{1}{2};$$

$$\frac{S_1}{S_2} = \frac{4\pi r_1^2}{4\pi r_2^2} = \frac{r_1^2}{r_2^2} = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

Ratio of surface Area = 1:4.



Q20.



Part-B

Q21.

I N D I A

1 1 1 1 1  
9 14 4 9 1

$$9+2=11, 14-1=13$$

K M F H C

1 1 1 1 1

11 13 6 8 3

$$4+2=6, 9-1=8$$

$$1+2=3$$

A M E R I C A

1 1 1 1 \ \ \ \

1 13 5 18 9 3 1

+2 -1 +2 -1 +2 -1 +2

3 12 7 17 11 2 3

C L G O K B C



Q22. diameter = 14 cm, radius = 7 cm.

$$h = 20 \text{ cm}$$

$$\text{height of the level} = 20 - (2+2) \\ = 16 \text{ cm.}$$

$$\text{Surface Area} = 2\pi r h = 2 \times \frac{22}{7} \times 7 \times 16$$

$$= 44 \times 16 = 704 \text{ cm}^2.$$

Q23. Amount =  $\frac{5}{3}$  of P =  $\frac{5P}{3}$ ,

Let Principal be P.

$$T = 6 \text{ years} + 8 \text{ month} = 6 + \frac{8}{12} = 6 + \frac{2}{3}$$

$$= \frac{20}{3} \text{ years.}$$

$$SI = A - P = \frac{5P}{3} - P = \frac{2P}{3}$$

$$\text{Rate} = \frac{SI \times 100}{P \times T} = \frac{\frac{2P}{3} \times 100}{P \times \frac{20}{3}} = \frac{2 \times 100 \times 3}{3 \times 20}$$

$$= 10\%$$



Q24.  $R = 10\%$ ,  $T = 2 \text{ year}$ ,

$P = 50,000$ .

$$\text{Cost After 2 year} = P \left( 1 - \frac{R}{100} \right)^2$$

$$= 50000 \left( 1 - \frac{10}{100} \right)^2$$

$$= 50000 \times \left( \frac{9}{10} \right)^2$$

$$= 50000 \times \frac{9}{10} \times \frac{9}{10}$$

$$= 500 \times 81 = 40500.$$

Q25.  $P:q = 3/2 : 7/2 = 3:7$

$q:r = 3 : 14/3 = 3 : 14/3$

$p:q = 3:7$ ,  $q:r = 3 : 14/3$

$p:q = 9:21$ ;  $q:r = 21 : 98/3$

$$p:q:r = 9:21:98/3$$

$$= 27:63:98.$$



Q.26. Cost of 5m cloth = 210  
Cost of 1m cloth =  $\frac{210}{5} = 42$ .

Cost of 2m =  $2 \times 42 = \text{Rs } 84$ .

Cost of 4m =  $4 \times 42 = \text{Rs } 168$

Cost of 10m =  $10 \times 42 = \text{Rs } 420$ .

Cost of 13m =  $13 \times 42 = \text{Rs } 546$

Q27.  $29^2 = 841$ ,  $20^2 = 400$ ,  $21^2 = 441$   
 $20^2 + 21^2 = 29^2$

The Given  $\Delta$  is Right Angle  $\Delta$  by Pythagoras Theorem.

$$\text{Area of } \Delta = \frac{1}{2} B \times h = \frac{1}{2} \times 20 \times 21$$
$$= 210 \text{ cm}^2.$$

Let  $x$  be the height corresponding to side 29cm.

$$\frac{1}{2} B \times h = 210 ; \frac{1}{2} \times 29 \times x = 210$$

$$x = \frac{210 \times 2}{29} = 14.48 \text{ cm.}$$



$$\text{Q 28. (a) } \angle 1 = \angle 2 \quad (\text{Given})$$

$$\angle 2 = \angle 3 \quad (\text{Alternate Angle})$$

$$\Rightarrow \angle 1 = \angle 3$$

$$\Rightarrow PT = PS \quad (\text{Triangle } PST \text{ is Isosceles } \Delta)$$

$$\Rightarrow PS = RQ \quad (\text{opposite side of } \parallel \text{gram})$$

$$PT = TQ \quad (T \text{ is midpoint of } PQ)$$

$$\Rightarrow TQ = PT = SP = RQ$$

$$\Rightarrow TQ = RQ$$

$$\Rightarrow QR = TQ$$

$$(b) \text{ In } \Delta TOR, TQ = RQ$$

$$\Rightarrow \angle 4 = \angle 5.$$

$$\angle 4 = \angle 6 \quad (\text{Alternate Angle})$$

$$\angle 5 = \angle 6$$

$$\Rightarrow RT \text{ bisect } \angle R.$$

$$(c) \quad \angle 1 + \angle 2 + \angle 6 + \angle 5 = 180^\circ \quad (\text{Adjacent Angle of parallelogram})$$

$$\Rightarrow 2\angle 2 + 2\angle 6 = 180^\circ$$

$$\angle 2 + \angle 6 = 90^\circ$$

$$\angle 2 + \angle 6 + \angle 7 = 180^\circ \quad (\text{sum of int. Angle of } \Delta)$$

$$\angle 7 = 180^\circ - 90^\circ \Rightarrow \angle 7 = 90^\circ.$$



Q29. Let 5 Rupee coins be  $x$   
2 Rupee coins be  $3x$

$$2 \times 3x + 5 \times x = 77$$

$$6x + 5x = 77$$

$$11x = 77$$

$$x = \frac{77}{11} = 7$$

5 Rupee coin = 7, 2 Rupee coin =  $3x = 21$

Q30. Volume of cube 1 =  $3^3 = 27 \text{ cm}^3$ .

Volume of cube 2 =  $4^3 = 64 \text{ cm}^3$ .

Volume of cube 3 =  $5^3 = 125 \text{ cm}^3$ .

Volume of Bigger cube formed =  $27 + 64 + 125$   
 $= 216 \text{ cm}^3$ .

Side of Bigger cube =  $\sqrt[3]{216} = 6 \text{ cm}$

Surface area =  $6a^2 = 6 \times 6 \times 6$   
 $= 216 \text{ cm}^2$ .