

**Choose the best answer**

1. If  $\{(a, 8) (6, b)\}$  represents an Identity function, the value of a and b is  
 a) (6, 8) b) (8, 6) c) (8, 8) d) (6, 6)
2. If  $f(x) = 2 - 3x$  then find  $f \circ f(1 - x) = ?$   
 a)  $9x - 5$  b)  $5x - 9$  c)  $5x + 9$  d)  $5 - 9x$
3.  $7^{4k} \equiv \dots \pmod{100}$  a) 4 b) 3 c) 2 d) 1
4. Given  $F_1 = 1$  and  $F_2 = 3$  and  $F_n = F_{n-1} + F_{n-2}$ , then  $F_5$  is  
 a) 8 b) 1 c) 3 d) 5
5. The solution of  $(2x - 1)^2 = 9$  is equal to a) -1, 2 b) -1 c) 2 d) None of these
6. Square root of  $4m^2 - 24m + 36 = 0$  is  
 a)  $4(m - 3)$  b)  $2(m - 3)$  c)  $(2m - 3)^2$  d)  $(m - 3)$
7. In  $\Delta LMN$ ,  $\angle L = 60^\circ$ ,  $\angle M = 50^\circ$ . If  $\Delta LMN \sim \Delta PQR$ , the value of  $\angle R$  is  
 a)  $30^\circ$  b)  $40^\circ$  c)  $70^\circ$  d)  $110^\circ$
8. The point of intersection of  $3x - y = 4$  and  $x + y = 8$  is  
 a) (3, 5) b) (2, 4) c) (5, 3) d) (4, 4)
9. If slope of the line PQ is  $\frac{1}{\sqrt{3}}$  then the slope of the perpendicular bisector of PQ is  
 a) 0 b)  $\sqrt{3}$  c)  $-\sqrt{3}$  d)  $\frac{1}{\sqrt{3}}$
10. If  $5x = \sec\theta$  and  $\frac{5}{x} = \tan\theta$ , then  $x^2 - \frac{1}{x^2}$  is equal of  
 a) 1 b) 5 c) 25 d)  $\frac{1}{25}$
11. A spherical ball of radius  $r_1$  units is melted and to 8 new identical balls each of radius  $r_2$  units, then  $r_1 : r_2$  is  
 a) 1 : 4 b) 4 : 1 c) 1 : 2 d) 2 : 1
12. The CSA of right circular cone if height in 15 cm and base diameter is 16 cm  
 a)  $68\pi \text{ cm}^2$  b)  $60\pi \text{ cm}^2$  c)  $136\pi \text{ cm}^2$  d)  $120\pi \text{ cm}^2$
13. The range of data 8, 8, 8, 8, 8... 8 is  
 a) 8 b) 3 c) 1 d) 0
14. Which of the following is incorrect?  
 a)  $P(A) + P(\bar{A}) = 1$  b)  $P(\phi) = 0$  c)  $0 \leq P(A) \leq 1$  d)  $P(A) > 1$

**PART - II**

**Answer any 10 from the following. (Question No.28 is compulsory)**

10 x 2 = 20

15. A relation R is given by  $\{(x, y) / y = x + 3, x \in \{0, 1, 2, 3, 4, 5\}\}$  Determine its domain and range.

16. If  $f(x) = 2x + 5$  and  $x \neq 0$  find  $\frac{f(x+2) - f(2)}{x}$

17. If the HCF of 210 and 55 is expressible in the form  $55x - 325$ . Find x

18. Find the excluded values of  $\frac{t}{t^2 - 5t + 6}$

19. Find the square root of  $\frac{400x^4y^{12}z^{16}}{100x^8y^4z^4}$

20. If radii of two concentric circles are 4cm and 5cm then find the length of the chord of one circle which is a tangent to the other circle.
21. If the straight line  $12y = -(P + 3)x + 12$ ,  $12x - 7y = 16$  are perpendicular then find P.
22. Find the intercepts made by the line  $4x - 9y + 36 = 0$  on the coordinate axes.

33. Find the angle of elevation of the top of a tower from a point on the ground. Which is 30 m away from the foot of a tower of height  $10\sqrt{3}$  m.
24. If the ratio of radii of two spheres is 4 : 7. Find the ratio of their volumes.
25. The volume of a solid right circular cone is  $11088 \text{ cm}^3$ . If its height is 24cm. Find radius of cone.
26. Find the standard deviation of first 21 natural numbers.
27. The probability that atleast one of A and B occur is 0.6. If A and B occur simultaneously with probability 0.2. Then find  $P(\bar{A}) + P(\bar{B})$
28. Find the sum :  $3 + 1 + \frac{1}{3} + \dots + \infty$

**Answer any 10 from the following. (Question No.42 is compulsory)**

**PART - III**

10 x 5 = 50

29. If  $A = \{5, 6\}$ ,  $B = \{4, 5, 6\}$ ,  $C = \{5, 6, 7\}$  then show that  $A \times A = (B \times B) \cap (C \times C)$
30. The function 't' which maps temperature in celcius (C) into temperature in Fahrenheit (F) is defined by  $t(C) = F$  when  $F = \frac{9}{5}C + 32$ . Find (1)  $t(0)$  (2)  $t(28)$  (3)  $t(-10)$  (4) the value of C when  $t(C) = 212$  (5) the temperature when the celcius value is equal to the fahrenheit value.
31. Find the HCF of 396, 504, 636
32. Find the square root of  $37x^2 - 28x^3 + 4x^4 + 42x + 9$
33. If  $A = \begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$  verify that  $(AB)^T = B^T A^T$
34. LMN is a Right angled triangle with  $\angle L = 90^\circ$ . A circle is inscribed in it. The length of the sides containing the right angle are 6cm and 8cm. Find the radius of the circle.
35. Find the area of the quadrilateral formed by the points (8, 6) (5, 11) (-5, 12) and (-4, 3)
36. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through (-3, 8), the find the equation.
37. A wall clock strikes the bell once at 1 O'clock, 2 times at 2 O'clock, 3 times at 3 O'clock and so on. How many times will it strike in a particular day. Find the standard deviation of the number of strikes the bell make a day.
38. From the top of a 12m high building, the angle of elevation of the top of a cable tower is  $60^\circ$  and the angle of depression of its foot is  $30^\circ$ . Determine the height of the Tower.
39. A 14m deep well with inner diameter 10m is dug and Earth taken out is evenly spread all around the well to form an embankment of width 5m. Find the height of the Embankment.
40. A solid right circular cone of diameter 14cm and height 8cm is melted to form a hollow sphere. If the external diameter of the sphere is 10cm, find the internal diameter.
41. Three fair coins are tossed together, find the probability of getting  
1) All heads 2) atleast one tail 3) atmost one head 4) atmost two tail
42. The sum of first n, 2n, and 3n terms of an A.P are  $S_1$ ,  $S_2$  and  $S_3$  respectively. Then prove that  $S_3 = 3(S_2 - S_1)$

**PART - IV**

**Answer all the questions**

2 x 8 = 16

43. a) Construct a Triangle similar to a given Triangle PQR with its side equal to  $\frac{7}{3}$  of the corresponding sides of the Triangle PQR. (Scale factor  $\frac{7}{3} > 1$ )
- (OR)
- b) Draw a tangent to the circle from the point P having radius 3.6 cm, and centre at O. Point P is at a distance 7.2 cm from the centre.
44. a) Draw the graph of  $xy = 24$ ,  $x, y > 0$ , using the graph find 1) y when  $x = 3$  2) x when  $y = 6$
- (OR)
- b) Draw the graph of  $y = x^2 + x$  and hence use it solve  $x^2 + 1 = 0$