TIME : **3 hrs**   Max. Marks: **100**

Part – I

Choose the correct answer   14 x 1 = 14

1. If g = { (1,1) , (2,3) , (3,5) , (4,7) } is a function given by g (x) = α x + β. Then the values of α and β are

   a) (- 1, 2)   b) (2 , -1)   c) (-1 , -2)   d) (1 ,2)

2. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

   a) 2025   b) 5220   c) 5025   d) 2520

3. If A = 2^{65} and B = $2^{64} + 2^{63} + 2^{62} + \ldots + 2^0$. Which of the following is true?

   a) B is 2^{64} more than A   b) A and B are equal   c) B is larger than A by 1   d) A is larger than B by 1

4. If (x – 6) is the HCF of $x^2 – kx – 6$ then the value of k is

   a) 3   b) 5   c) 6   d) 8

5. For the given matrix A $= \begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix A^T is

   a) 2 X 3   b) 3 X 2   c) 3 X 4   d) 4 X 3

6. The perimeters of two similar triangles Δ ABC and Δ PQR are 36 cm and 24 cm respectively. If PQ = 10 cm, then the length of AB is

   a) $6\frac{2}{3}$ b) $\frac{10\sqrt{6}}{3}$ c) $60\frac{2}{3}$ d) 15

7. A tangent is perpendicular to the radius at the

   a) centre   b) point of contact   c) infinity   d) chord

8. The slope of the line joining (12, 3), (4, a) is $\frac{1}{8}$. The value of 'a' is

   a) 1   b) 4   c) – 5   d) 2

9. (2, 1) is the point of intersection of two lines.

   a) x – y – 3 = 0; 3x – y – 7 = 0   b) x + y = 3; 3x + y = 7

   c) 3x + y = 3; x + y = 7   d) x + 3y – 3 = 0; x – y – 7 = 0

10. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}$: 1 then the angle of elevation of the sun has measure

   a) 45°   b) 30°   c) 90°   d) 60°

11. The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1 = 1 : 2$ then $r_2 : r_1$ is

   a) 1 : 3   b) 1 : 2   c) 2 : 1   d) 3 : 1

12. The volume of a frustum of a cone of height h and radii at the end are r_1 and r_2 is

   a) $\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$ b) $\frac{1}{3}\pi h(r_1^2 + r_2^2 - r_1 r_2)$ c) $\pi h(r_1^2 + r_2^2 + r_1 r_2)$ d) $\pi h(r_1^2 + r_2^2 - r_1 r_2)$

13. If a letter is chosen at random from the English alphabets {a,b,..z}, then the probability that the letter chosen precedes x

   a) 12 / 13   b) 1 / 13   c) $\frac{23}{26}$ d) $\frac{3}{26}$

14. If the probability of the non – happening of a event is q, then the probability of happening of that event is

   a) 1 – q   b) q   c) q / 2   d) α q

<div align="center">Part – II</div>

Answer 10 questions. Question No. 28 is compulsory.   10 x 2 = 20

15. Find the 8th term of the G.P. 9,3,1………………..

16. If α and β are the roots of $x^2 + 7x + 10 = 0$. find the values of $\alpha^4 + \beta^4$.

17. If ΔABC is similar to ΔDEF such that BC = 3cm, EF = 4cm and area of ΔABC is 54cm^2. Find the area of ΔDEF.

18. If the area of the triangle formed by the vertices A (-1 , 2) , B (k, - 2) and C (7 , 4) taken in order is 22 sq. units. Find the value of k.

19. The horizontal distance between two buildings is 140 m. The angle of depression of the top of the first building when seen from the top of the second building is 30^0. If the height of the first building is 60m, find the height of the second building.

20. As observed from the top of a 60 m high light house from the sea level, the angles of depression of two ships 30^0 and 45^0. If one ship is exactly behind the other on the same side of the light house, find the distance between two ships.

21. The radius of a conical tent is 7m and the height is 24 m. Calculate the length of the canvas used to make the tent if the width of the rectangular canvas is 4m?

22. If the total surface area of the cone of radius 7 cm is 704 cm^2, then find its slant height.

23. Marks of the students in a particular subject of a class are given below. Find its range.

Marks	0 – 10	10 – 20	20 – 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of students	8	12	17	14	9	7	4

24. Find the least positive value of x such that $67 + x \equiv 1 \pmod 4$

25. Find the sum of first 28 terms of an A.P. whose n^{th} term is $4n – 3$

26. Solve $3p^2 + 2\sqrt{5}\, p – 5 = 0$ by formula method.

27. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?

28. If $\sqrt{3}\tan\theta = 1$, then find the value of $\sin^2\theta - \cos^2\theta$

<center>Part – III</center>

Answer 10 questions. Question No. 42 is compulsory. $10 \times 5 = 50$

29. If A = { -2 , -1 , 0 , 1 , 2} and f : A → B is an onto function defined by $f(x) = x^2 + x + 1$ then find B

30. Find the GCD of the polynomials $x^3 + x^2 – x + 2$ and $2x^3 – 5x^2 + 5x – 3$

31. D and E are respectively the points on the sides AB and AC of a ΔABC such that AB = 5.6 cm , AD = 1.4 cm , AC = 7.2 cm and AE = 1.8 cm, show that DE ∥ BC

32. From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ_1 and θ_2 respectively. Show that the height of the opposite house is $h\left(1 + \frac{\cot\theta_2}{\cot\theta_1}\right)$

33. The ratio of the volumes of two cones is 2: 3. Find the ratio of their radii if the height of second cone is double the height of the first.

34. The following table gives the values of mean and variance of heights and weights of the 10th standard students of a school. Which is more varying than the other?

	Height	Weight
Mean	155 cm	46.50 kg^2
Variance	72.25 cm^2	28.09 kg^2

35. A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.

36. The product of three consecutive terms of a Geometric Progression is 343 and their sum is $\frac{91}{3}$. Find the three

   terms.

37. Find the sum of $15^2 + 16^2 + 17^2 + …..+ 28^2$

38. A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hr more it would have taken

   30 minutes less for the journey. Find the original speed of the bus.

39. The roots of the equation $2x^2 – 7x + 5 = 0$ are $\alpha \ and \ \beta$. Without solving for the roots, find $\frac{\alpha+2}{\beta+2} + \frac{\beta+2}{\alpha+2}$.

40. Seven years ago, Varun's age was five times the square of Swati's age. Three years hence Swati's age will be

   two fifth of Varun's age. Find their present ages.

41. Marks of the students in a particular subject of a class are given below. Find its standard deviation.

Marks	0 – 10	10 – 20	20 – 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of students	8	12	17	14	9	7	4

42. If the radii of the circular ends of a frustrum which is 45 cm high are 28 cm and 7cm, find the volume of the

   frustrum.

<div align="center">Part – IV</div>

   Answer both the questions.   2 x 8 = 16

43. a) Draw Δ PQR such that PQ = 6.8 cm, vertical angle is 50^0 and the bisector of the vertical angle meets the

   base at D where   PD = 5.2 cm

<div align="center">(OR)</div>

   b) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of

   the triangle PQR (scale factor $\frac{7}{3}$)

44. a) Graph the following Quadratic equations and state their nature of solutions. $x^2 - 6x + 9 = 0$

<div align="center">(OR)</div>

   b) Draw the graph of $y = 2x^2 – 3x – 5$ and hence solve $2x^2 – 4x – 6 = 0$

<div align="center">******</div>