

STVM

## SECOND REVISION EXAMINATION - 2024

Time : 3.00 Hrs

10 - STD

MATHS

Marks : 100

I Part - I i) Answer all the questions.

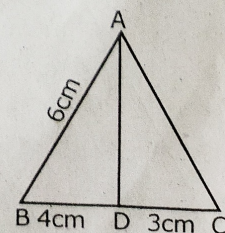
14 X 1 = 14

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

- If  $n(A \times B) = 6$  and  $A = \{1,3\}$  then  $n(B)$  is a) 1 b) 2 c) 3 d) 6
- $f(x) = (x + 1)^3 - (x - 1)^3$  represents a function which is  
a) linear b) cubic c) reciprocal d) quadratic
- The next term of the sequence  $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$  is a)  $\frac{1}{24}$  b)  $\frac{1}{27}$  c)  $\frac{2}{3}$  d)  $\frac{1}{81}$
- The sum of the exponents of the prime factors in the prime factorization of 1729 is  
a) 1 b) 2 c) 3 d) 4
- The solution of  $(2x - 1)^2 = 9$  is equal  
a) -1 b) 2 c) -1, 2 d) none of these
- If A is a 2 X 3 matrix and B is a 3 X 4 matrix, how many columns does AB have  
a) 3 b) 4 c) 2 d) 5
- If  $\Delta ABC$  is an isosceles triangle with  $\angle C = 90^\circ$  and  $AC = 5\text{cm}$ , then AB is  
a) 2.5cm b) 5 cm c) 10 cm d)  $5\sqrt{2}$  cm
- If (5,7), (3, P) and (6,6) are collinear, then the value of P is  
a) -3 b) 6 c) 9 d) 12
- The slope of the line which is perpendicular to a line joining the points (0,0) and (-8,8) is  
a) -1 b) 1 c)  $\frac{1}{3}$  d) -8
- If  $\sin \theta = \cos \theta$ , then  $2 \tan^2 \theta + \sin^2 \theta - 1$  is equal to a)  $-\frac{3}{2}$  b)  $\frac{3}{2}$  c)  $\frac{2}{3}$  d)  $-\frac{2}{3}$
- The height of a right circular cone whose radius is 5cm and slant height is 13cm will be  
a) 12cm b) 10cm c) 13cm d) 5cm
- The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is  
a) 1 : 2 : 3 b) 2 : 1 : 3 c) 1 : 3 : 2 d) 3 : 1 : 2
- If the radius of the cylinder is doubled, the new volume of the cylinder will be ..... time the original volume.  
a) same b) 3 c) 4 d) 2
- The range of the data 8,8,3,8,8, ..... 8 is a) 0 b) 1 c) 8 d) 3

II Part -II Answer any 10 questions. Question No. 28 is compulsory.

10 X 2 = 20

15. Let  $A = \{1,2,3\}$  and  $B = \{x/x \text{ is a prime number less than } 10\}$  Find  $A \times B$  and  $B \times A$ .16. Find fog when  $f(x) = 2x + 1$  and  $g(x) = x^2 - 2$ .17. "a" and "b" are two positive integers such that  $a^b \times b^a = 800$ . Find "a" and "b".18. Find the 19<sup>th</sup> term of an A.P. -11, -15, -19 .....19. Find the excluded values of the following expression  $\frac{7P+2}{8P^2+13P+5}$ .20. If  $A = \begin{bmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{bmatrix}$  then find the transpose of -A.21. In the figure AD is the bisector of  $\angle A$ . If  $BD = 4\text{cm}$ ,  $DC = 3\text{cm}$  and  $AB = 6\text{cm}$  find AC.

22. Show that the straight lines  $x-2y+3=0$  and  $6x+3y+8=0$  are perpendicular.
23. The lines through the points  $(-2, a)$  and  $(9, 3)$  has slope  $\frac{-1}{2}$ . Find the value of  $a$ .
24. Prove that  $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$ .
25. If the base area of a hemispherical solid is 1386 sq metres, then find its total surface area?
26. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.
27. A coin is tossed thrice. What is the probability of getting two consecutive tails?
28. The base area of a cone is  $9\pi$  sq cm and its slant height is 5cm. What is the height of the cone?

**III Part - III Answer any 10 questions. Question No. 42 is compulsory.** 10 X 5 = 50

29. Let  $A = \{x \in \mathbb{W} / x < 2\}$ ,  $B = \{x \in \mathbb{N} / 1 < x \leq 4\}$  and  $C = \{3, 5\}$  verify that  $A \times (B \cup C) = (A \times B) \cup (A \times C)$
30. If the function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is defined by  $f(x) = \begin{cases} 2x+7; & x < -2 \\ x^2-2; & -2 \leq x < 3 \\ 3x-2; & x \geq 3 \end{cases}$
- i)  $f(4)$     ii)  $f(-2)$     iii)  $f(4) + 2f(1)$     iv)  $\frac{f(1)-3f(4)}{f(-3)}$
31. The sum of three consecutive terms that are in A.P is 27 and their product is 288. Find the three terms.
32. Find the sum of  $15^2 + 16^2 + 17^2 + \dots + 28^2$ .
33. Find the square root of the following polynomial by division method  $x^4 - 12x^3 + 42x^2 - 36x + 9$ .
34. If  $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{bmatrix}$  show that  $(AB)^T = B^T A^T$ .
35. State and prove Thales theorem.
36. Find the area of the quadrilateral formed by the points  $(8, 6)$ ,  $(5, 11)$ ,  $(-5, 12)$  and  $(-4, 3)$ .
37. You are downloading a song. The percent  $y$  (in decimal form) of mega bytes remaining to get downloaded in  $x$  seconds is given by  $y = -0.1x + 1$ . i) find the total MB of the song.  
ii) after how many seconds will 75% of the song gets downloaded?  
iii) after how many seconds the song will be downloaded completely?
38. Two ships are sailing in the sea on either sides of a light house. The angle of elevation of the top of the lighthouse as observed from the ships are  $30^\circ$  and  $45^\circ$  respectively. If the light house is 200m high, find the distance between the two ships. ( $\sqrt{3} = 1.732$ )
39. If the radii of the circular ends of frustum which is 45cm high are 28cm and 7cm find the volume of the frustum.
40. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12mm and the diameter of the capsule is 3mm how much medicine it can hold?
41. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.
42. If  $\alpha$  and  $\beta$  are the roots of the equation  $3x^2 - 4x + 1 = 0$ , form a quadratic equation whose roots are  $\frac{\alpha^2}{\beta}$  and  $\frac{\beta^2}{\alpha}$ .

**IV Part - IV Answer all the questions.**

2 X 8 = 16

43. a) Construct a triangle  $\Delta PQR$  such that  $QR = 5$  cm  $\angle P = 30^\circ$  and the altitude from P to QR is of length 4.2cm. (OR) b) Draw the two tangents from a point which is 10cm away from the centre of a circle of radius 5cm. Also measure the lengths of the tangents.
44. a) Graph the following linear function  $y = \frac{1}{2}x$ . Identify the constant of variation of verify it with the graph. Also i) find  $y$  when  $x = 9$  ii) find  $x$  when  $y = 7.5$ . (OR)  
b) Draw the graph of  $y = x^2 + x - 2$  and hence solve  $x^2 + x - 2 = 0$ .