

- 9) A pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground, then the sun's elevation is
 A) 60° B) 45° C) 30° D) 90°
- 10) 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
- 11) A frustum of a right circular cone is of height 16cm with radii of its ends as 8cm and 20cm. Then, the volume of the frustum is
 A) $3328\pi \text{ cm}^3$ B) $3228 \pi \text{ cm}^3$ C) $3240 \pi \text{ cm}^3$ D) $3340 \pi \text{ cm}^3$
- 12) If the standard deviation of x, y, z is p then the standard deviation of $3x + 5$, $3y + 5$, $3z + 5$ is
 A) $3p + 3$ B) $3p$ C) $p + 5$ D) $9p + 15$
- 13) The variance of 15 observations is 4. If each observation is increased by 9, the variance of the new data is
 A) 13 B) 36 C) 4 D) 16
- 14) A page is selected at random from a book. The probability that the digit at units place of the page number chosen is less than 7 is
 A) $\frac{3}{10}$ B) $\frac{7}{10}$ C) $\frac{3}{9}$ D) $\frac{7}{9}$

PART -II (MARKS -20)

Note: i) Answers 10 questions in all

ii) Question no 28 is compulsory. Select any 9 questions from first 13 questions.

iii) Each questions carrier **TWO** marks. 10×2=20

- 15) Show that the function $f : \mathbb{N} \rightarrow \mathbb{N}$ defined $f(x) = 2x - 1$ is one-one but not onto
- 16) Compute x, such that $10^4 \equiv x \pmod{19}$
- 17) If $3 + k$, $18 - k$, $5k + 1$ are in A.P. then find k
- 18) Find $\frac{16x^2 - 2x - 3}{3x^2 - 2x - 1} \div \frac{8x^2 + 11x + 3}{3x^2 - 11x - 4}$
- 19) If $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ prove that $AA^T = I$
- 20) If ΔABC is similar to ΔDEF such that $BC = 3$ cm, $EF = 4$ cm and area of $\Delta ABC = 54 \text{ cm}^2$. Find the area of ΔDEF
- 21) PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such that $\angle POR = 120^\circ$. Find $\angle OPQ$
- 22) (i) What is the slope of a line whose inclination is 30° ?
 (ii) What is the inclination of a line whose slope is $\sqrt{3}$?
- 23) A kite is flying at a height of 75 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string
- 24) An aluminium sphere of radius 12 cm is melted to make a cylinder of radius 8 cm. Find the height of the cylinder

- 25) A hemi-spherical hollow bowl has material of volume $\frac{436\pi}{3}$ cubic cm. Its external diameter is 14 cm. Find its thickness
- 26) The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value
- 27) A coin is tossed thrice. What is the probability of getting two consecutive tails?
- 28) Prove that $(\operatorname{cosec} \theta - \sin \theta) (\sec \theta - \cos \theta) (\tan \theta - \cot \theta) = 1$

PART –III (MARKS –50)

Note: i) Answers 10 questions in all

ii) Question no 42 is compulsory. Select any 9 questions from first 13 questions.

iii) Each questions carrier **FIVE** marks. 10×5=50

- 29) If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$. Prove that $(f \circ g) \circ h = f \circ (g \circ h)$
- 30) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms
- 31) Find the sum to n terms of the series $5 + 55 + 555 + \dots$
- 32) The roots of the equation $x^2 + 6x - 4 = 0$ are α, β . Find the quadratic equation whose roots are
i) α^2 and β^2 ii) $\frac{2}{\alpha}$ and $\frac{2}{\beta}$ iii) $\alpha^2\beta$ and $\beta^2\alpha$
- 33) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$
- 34) Alternate Segment theorem
- 35) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3)
- 36) If $\frac{\cos \theta}{1 + \sin \theta} = \frac{1}{a}$, then prove that $\frac{a^{2-1}}{a^{2+1}} = \sin \theta$
- 37) A flag pole 'h' metres is on the top of the hemispherical dome of radius 'r' metres. A man is standing 7 m away from the dome. Seeing the top of the pole at an angle 45° and moving 5 m away from the dome and seeing the bottom of the pole at an angle 30° . Find (i) the height of the pole (ii) radius of the dome. ($\sqrt{3} = 1.732$)
- 38) An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10 m and 4 m and whose height is 4 m. Find the curved and total surface area of the bucket
- 39) 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 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?
- 40) Find the standard deviation of the following data 7, 4, 8, 10, 11. Add 3 to all the values then find the standard deviation for the new values.
- 41) A bag contains 5 red balls, 6 white balls, 7 green balls, 8 black balls. One ball is drawn at random from the bag. Find the probability that the ball drawn is (i) white (ii) black or red (iii) not white (iv) neither white nor black
- 42) Find the values of a and b if the following polynomials are perfect squares

$$\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{a}{x} + b$$

PART –IV (MARKS –16)**Note:** i) Answers the following questionsiii) Each questions carrier **EIGHT** marks

2×8=16

43) Draw the graph of $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$

Or

Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find, i) y when $x = 3$ & ii) x when $y = 6$ 44) Construct a ΔPQR in which $PQ = 8$ cm, $\angle R = 60^\circ$ and the median RG from R to PQ is 5.8 cm. Find the length of the altitude from R to PQ

Or

Draw a circle of diameter 6 cm from a point P , which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths

ALL THE BEST

தொட்டனைத் தூறும் மணற்கேணி மாந்தர்க்குக்**கற்றனைத் தூறும் அறிவு -திருவள்ளுவர்**