

II SEMESTER EXAMINATION 2017-18

SUBJECT –MATHEMATICS AND STATISTICS

STD.-XI

MARKS- 80

DATE- /03/18

TIME- 3 hrs.

Section A : Question no. 1 to 6 .

(16=6)

1 .Value of $\sin 75^\circ$ is

- (a) $\frac{3}{4} + \frac{1}{4}$ (b) $\frac{2}{9}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$

2.The normal form of equation is

- (a) $x \cos \alpha + y \sin \alpha = p$ (b) $y \cos \alpha + x \sin \alpha = r$ (c) $x \cos \alpha + y \sin \alpha = p$ (d) none of these .

3. If $a = -3i + j - k$, $b = 2i + 4j - 2k$ then $a \cdot b = ?$

- (a) 0 (b) 1 (c) 6 (d) 7

4 .If $f(x) = ax + 5$ and $f(1) = 8$ then $a =$

- (a) 1 (b) 2 (c) 3 (d) 4

5. If $y = x \log x$ then $\frac{dy}{dx} =$

- (a) $1 + \log x$ (b) $\log x$ (c) 1 (d) $2x + \log x$

6. Evaluate $\lim_{x \rightarrow 0} \sin 5x$

- (a) 5 (b) 53 (c) 3 (d) 4

Section B : Question no.7 to 14 .

(28=16)

7. Find the length of the arc of circle of diameter 10 cm .if the arc is subtending an angle of 36° at the centre .

8. Without using table prove that , $\sin 40^\circ - \cos 70^\circ = 3 \cos 80^\circ$.

9.The origin shifted to the point $(5,-3)$. the equation of system is $Y = 6x$.find the equation of the locus in the original system .

10. Find the equation of a circle in the first quadrant with centre at (h, k) and touching both the axes .

11. Write the following intervals in set builder form.

i) (-3, 0) ii) [6,12] iii) (6, 12] iv) [-23,5)

12. Solve for x, $\log(x+3) + \log(x-3) = \log 16$.

13. Evaluate $\lim_{x \rightarrow 0} 2^{\sin x} - 1$

14. If $f(x) = \operatorname{cosec} x + \cot x$ find $f(-x)$.

Or

Difference between $\cot x$ w.r.t x .

Section C : Question no. 15 to 20.

(3 6=18)

15. Find the all value of trigonometry function if $\cos \theta = -\frac{3}{5}$, $3\pi < \theta < 2\pi$.

16. If $x \in \mathbb{R}$ find the solution set of each of the following inequations represent it on number line.

$x > 0$.

or

Find the feasible solution of the following inequations.

$$x - 2y < 2, x + y > -2, x + y < 4, x > 0, y > 0.$$

17. Find the co-ordinate of the focus, equation of the directrix, the length of latus rectum and the co-ordinate of the end points of latus rectum of the parabola $3y^2 = 16x$.

18. There are 20 persons with a skin disorder. If 150 had been exposed to the chemical A, 74 to the chemical B and 36 to both chemicals A and B, find the number of persons exposed to

(a) chemical A but not B

(b) chemical B but not A

(c) chemical A or chemical B

or

Let $A = \{1, 2, 3, 4\}$, $B = \{4, 5, 6\}$, $C = \{5, 6\}$

$$I) A \times (B \cap C) \quad II) (A \cap B) \times (A \cap C) \quad III) A \times (B \cap C)$$

19. $\int \sin 4x \cdot \cos 3x \, dx$.

20. Find quartile deviation for following data.

2, 5, 6, 7, 11, 19, 20, 25

Section D : Question no. 21 to 30 .

(4 10=40)

21. Prove that, $\cos 7 \cos 14 \cos 28 \cos 56 = \frac{1}{16}$

Or

Prove that $\tan(\theta + \phi) - \tan(\theta - \phi) = 2 \tan 2\theta \tan 2\phi$

22. Find the equation of line through (2, 3) which makes an angle of 45 with the line $2x + y - 7 = 0$.

23. Find unit vector perpendicular to PQ and PR where $P = (2, 2, 0)$, $Q = (0, 3, 5)$ and $R = (5, 0, 3)$. Also find the sine angle between PQ and PR.

24 Find the minor and cofactor of following determinants . $\begin{vmatrix} 1 & 0 & 3 \\ \dots & \dots & \dots \\ \dots & \dots & \dots \end{vmatrix}$

Or

The cost of 4kg potato, 3kg wheat, 2 kg rice is Rs. 150. The cost of 1kg potato, 2 kg wheat and 3kg rice is 125. The cost of 6 kg potato,, 2 kg wheat and 3kg rice is Rs. 175. Find the cost of each item per kg, by using Cramer's Rule.

25 Find x , y, z

26. Find the square root of the following complex $1 + 4 + 3i$

27 If A , G and H are A.M ,G.M and H.M Then prove that , $G^2 = AH$.and if S_1 , S_2 and S_3 are sum of first n natural numbers , their squares and cubes respectively then show that , $9 S_2 = S_1 (1 + 8 S_3)$.

28. Find n and r , if

Or

29. Prove by induction method ,for all n $\in \mathbb{N}$

$$1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

30.