

Model Question – 9

Subject : Mathematics XII (Mat. 402/008)

Time : 3 hrs

F.M. 75

Attempt all the questions:

Group “A”

Rewrite the correct option in your answer sheet:

11X1=11

- 1) Five digit numbers are formed with 0, 1, 2, 3, 4 without repetitions, they can be formed in
a. 120 ways b. 96 ways c. 24 ways d. 720 ways
- 2) The condition that one root of the quadratic equation $ax^2+bx+c = 0$ is zero is
a. $a=0$ b. $b=0$ c. $c=0$ d. $b=c$
- 3) If $\sin^{-1} x = \frac{\pi}{5}$ then $\cos^{-1} x =$
a. $\frac{\pi}{10}$ b. $\frac{3\pi}{4}$ c. $\frac{3\pi}{10}$ d. $\frac{7\pi}{5}$
- 4) If a line makes an angle of $\alpha, \beta, \gamma, \delta$ with the four diagonals of a cube then
a. $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma + \sin^2 \delta = \frac{8}{3}$
b. $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma + \cos^2 \delta = \frac{4}{3}$
c. Both a and b
d. None of the above
- 5) The vector product of two non-zero vectors \vec{a} and \vec{b} is zero if and only if
a. $a=0$ b. $b=0$ c. \vec{a} and \vec{b} are parallel d.
- 6) $\int_0^a \frac{dx}{a^2+x^2}$ is equal to
a. $\frac{\pi}{a}$ b. $\frac{\pi}{2a}$ c. $\frac{\pi}{3a}$ d. $\frac{\pi}{4a}$
- 7) The value of $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan 5x}{\tan x}$ is
a. $\frac{1}{5}$ b. $\frac{2}{5}$ c. $\frac{5}{2}$ d. 5
- 8) Distance between the parallel planes $2x - 2y + z + 1 = 0$ and $4x - 4y + 2z + 3 = 0$ is
a. 3 b. $\frac{1}{3}$ c. 6 d. $\frac{1}{6}$
- 9) The correlation coefficient between the two variables is
a. 1 b. -1 c. ≥ 1 d. ≤ 1

a) Verify Rolle's theorem for the function $f(x) = \sqrt{1-x^2}$ in the interval $-1 \leq x \leq 1$.

b) Solve: $(x^2 - y^2) \frac{dy}{dx} = xy$

22)

a) Find the equation of the plane through the points (2, 2, 1) and (9, 3, -6) and normal to the plane $2x + 6y + 6z = 9$.

b) Find the angle between the lines whose direction cosines are given by $l + m + n = 0$ and $2lm - mn + 2nl = 0$.

Answers:

Group A

1) b	2) c	3) c	4) c
5) c	6) d	7) a	8) d
9) d	10) d	11) b	

Group B

13) $-1, \frac{1}{2}(1+i\sqrt{3}), \frac{1}{2}(1-i\sqrt{3})$
14) $2x + 2y - 3z + 3 = 0$
15) (a) $y = 0.65x + 28.6$ (b) $\frac{2}{17}$
16) $2x \tan x^2$
17) $\frac{1}{2(a^2 - b^2)} \{a^2 \log(x^2 + a^2) - b^2 \log(x^2 + b^2)\} + c$
18) Max. $g = 126, x = 6, y = 3$

Group C

20) (a) 84 (c) $k = 4$ (d) $\frac{1}{6}n(n+1)(n+2)$
21) (b) $x^2 + 2y^2 \log Cy = 0$
22) a) $3x + 4y - 6z = 9$ b) $\frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{-2}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{2}{\sqrt{6}}, \frac{-1}{\sqrt{6}}$ $\theta = 60^\circ$