



Name :

Roll No. :

Invigilator's Signature :

CS/B.Arch/SEM-2/ARCH-201/2013

2013

MATHEMATICS – II

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Graph sheet (S) will be supplied by the Institution.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) \vec{a} and \vec{b} are two non-zero vectors and $\vec{a} \cdot \vec{b} = 0$ then

a) \vec{a} , \vec{b} are parallel

b) \vec{a} , \vec{b} are perpendicular

c) $|\vec{a}| = 0$

d) $|\vec{b}| = 0$.

ii)  This is a

a) convex set

b) not a convex set

c) both

d) cannot be determined.

iii) 3, 3, 3, 3, 8 Mean of these data is

a) 3

b) 4

c) 5

d) 6.

iv) The general solution of the ordinary differential equation

$$\frac{d^2y}{dx^2} + 4y = 0$$

a) $Ae^{2x} + Be^{-2x}$

b) $(A + Bx) e^{2x}$

c) $A \cos 2x + B \sin 2x$

d) $(A + Bx) \cos 2x$.

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- b) Solve graphically the following L.P.P. :
Maximize $Z = x_1 + 3x_2$
subject to $3x_1 + 6x_2 \leq 8$
 $5x_1 + 2x_2 \leq 10$
 $x_1 \geq 0, x_2 \geq 0$
- c) Write down the statement of fundamental theorem of Linear Programming Problem. 6 + 6 + 3
9. a) Determine the nature of the conic
 $x^2 + 4xy + y^2 - 2x + 2y + 6 = 0$
- b) Reduce the above equation to its canonical form. 5 + 10
10. a) Prove that variance = $\overline{X^2} - (\overline{X})^2$
- b) Solve the following LPP by simplex method :
Maximize $Z = 60x_1 + 50x_2$
subject to $x_1 + 2x_2 \leq 40$
 $3x_1 + 2x_2 \leq 60$
 $x_1 \geq 0, x_2 \geq 0$. 6 + 9
11. a) Solve $x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + 2y = 0$
- b) Find the equation of the sphere described on the join of P and Q where $P \equiv (2, -3, 4)$ and $Q \equiv (-5, 6, -7)$ as diameter.
- c) Solve $\frac{d^2y}{dx^2} - 5 \frac{dy}{dx} + 6y = e^{4x}$. 6 + 4 + 5
12. a) Show that the triangle formed by the points (2, 3, 1), (-2, 2, 0) and (0, 1, -1) is right angled. Find also the other angles.
- b) Find the point where the straight line joining the points (2, -3, 1) and (3, -4, -5) cuts the plane.
- c) Solve the differential equation
 $(D^2 - 3D + 2)y = 0$ 5 + 5 + 5
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