



MCB-3

Seat No. _____

M. Sc. (ECI) (Sem. II) (CBCS) Examination

April / May - 2018

**Paper - 7 : Mathematics Electronics
(New Course)**

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions carry equal marks.
(2) Figures on right hand side indicate marks.

1 Answer the following : (Any **Seven**) **14**

- (1) If $Z = 1 + 6i$ Then Find $\text{Re}(z)$ and $\text{Im}(z)$.
- (2) Multiply $3 + 4i$ by $7 - 3i$.
- (3) Find the Modulus of $4 + 2i$.
- (4) Evaluate $(2, 3, 4) \cdot (5, 6, 7)$.
- (5) Find the conjugate of $i + j + 2k$.
- (6) If $Z = 1 + i$ find z^{-1}
- (7) If $Z = 2 + 3i$ then find the value of $Z + \bar{Z}$.
- (8) Find the complex conjugate of $2 + i3$
- (9) Find the modulus of $-\sqrt{3} - i$
- (10) If A and B are $(3, 4, 5)$ and $(6, 8, 9)$, find \overline{AB} .

2 Answer the following : (Any **Two**)

- (1) Find the area of a parallelogram whose adjacent sides are $i - 2j + 3k$ and $2i - j - 4k$. **7**
- (2) Express the following in the form $a + ib$ $\frac{(3 + 4i)(2 + i)}{1 + i}$ **7**
- (3) Evaluate $\int_0^2 \int_0^{x^2} e^x dy dx$. **7**

3 Answer the following :

(1) $\int_0^a \int_0^{\sqrt{ay}} xy \, dx \, dy.$ 5

(2) Solve $x^4 + i = 0.$ 5

(3) Evaluate $\int_0^1 \int_0^1 \int_0^1 (x^2 + y^2 + z^2) \, dx \, dy \, dz$ 4

OR

3 Answer the following :

(1) $\int_{-1}^1 \int_0^z \int_{x-2}^{x+2} (x - y + z) \, dx \, dy \, dz$ 5

(2) Solve $x^2 - i = 0.$ 5

(3) Show that $\bar{a} \times (\bar{b} \times \bar{a}) = (\bar{a} \times \bar{b}) \times \bar{a}.$ 4

4 Answer the following :

(1) Prove that $(\bar{a} \times \bar{b}) \cdot (\bar{a} \times \bar{c}) = a^2 (\bar{b} \cdot \bar{c}) - (\bar{a} \cdot \bar{b})(\bar{a} \cdot \bar{c})$ 7

(2) Find the area bounded by $Y = X - Z$ and $y^2 = 2x + 4.$ 7

5 Answer the following : (Any Two)

(1) Find the area bounded by $y^2 = 4 - x.$ 7

(2) Find the volume of the tetrahedron bounded by the plane $X = 0, Y = 0, Z = 0$ and $X + Y + Z = a.$ 7

(3) Prove that $i \times (\bar{a} \times i) + j \times (\bar{a} \times j) + k \times (\bar{a} \times k).$ 7

(4) $[\bar{b} \times \bar{c} \ \bar{c} \times \bar{a} \ \bar{a} \times \bar{b}] = [\bar{a} \ \bar{b} \ \bar{c}]^2$ 7