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MBZ-003-027202 Seat No. _____

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

April / May - 2018

Paper - V : ECI Mathematics - II

(Old Course)

Faculty Code : 003

Subject Code : 027202

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) Define Set.

(2) Define finite set.

(3) Define limits.

(4) Evaluate $\frac{d}{dx}x^n$.

(5) Define integral.

(6) $\int \sin x \, dx$.

(7) Define unit vector.

(8) Find Conjugate of $2i - 4j + 5k$

(9) If $Z = 2 + i / 2 - i$ Then Find Re (z) and Im(z).

(10) If A and B are $(3,4,5)$ and $(6,8,9)$, find $\overrightarrow{AB}$

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

(1) State and prove De' Morgens law. **7**

(2) If $A\{1,2,3\}, B\{a,b,c\}$ find $A \times B$ and $B \times A$ **7**

(3) If $U = \{1,2,....,10\}$ and $A = \{1,2,3\}\ B = \{3,4,5\}$, **7**
Find $(A \cup B)'$ and draw its Venn diagram.

3 Answer the following :

(1) $U = \{1, 2, 3, ..., 20\}\ A = \{1, 2, 3, 4\}, B = \{4, 5, 6\}, c = \{4, 5, 7\}$ **5**

Verify $A \cup (B \cap C) = (A \cup B) \cap (A \cap C)$.

(2) Evaluate sin 120° and cos 160°. **5**

(3) Evaluate $\sin^{-1}\left(\frac{1}{2}\right) + \cos^{-1}\left(\frac{\sqrt{3}}{2}\right) + \tan^{-1}(1)$ **4**

OR

3 Answer the following :

(1) If $y = x^2 + 2x + 3$ Find $\frac{dy}{dx}$. **5**

(2) $f(x) = \sin x \cos x$ Find integrate of $f(x)$. **5**

(3) Evaluate $\int \tan^5 x \sec^2 x\, dx$. **4**

4 Answer the following :

(1) Evaluate $\left(\hat{l} + \hat{j} + \hat{k}\right) \times \left(3\hat{l} + 2\hat{j} + \hat{k}\right)$. **7**

(2) $f(x) = \left(x^3 + 5x^2 + 3x + 5\right)$ Find $f'(x)$. **7**

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

(1) Evaluate $\int \left(x^6 + 7x^5 + 6x^2\right) dx$. **7**

(2) $y = \frac{1}{\sin x}$ *Find* $\frac{dy}{dx}$. **7**

(3) If $U = \{1, 2, ..., 10\}\ A = \{1, 2, 4, 5\}\ B = \{4, 5, 6, 7\}$ verify De' Morgen's law. **7**

(4) $y = \sin x + \cos x + \tan x$ *Find* $\frac{dy}{dx}$. **7**