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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (ECE/IT/EEE/CSE/BT/Civil/ME/EE/EIE) (Sem.-2,3)
ENGG. MATHEMATICS-I/ENGG. MATHEMATICS-II/MATHEMATICS-II/APPLIED MATHEMATICS-II/APPLIED MATHEMATICS-III

Subject Code : AM-102/201

M.Code : 54002

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A**Answer the following :**

- 1) Are the vectors $(1, 1, -1), (2, 3, -5), (2, -1, 4)$ linearly dependent.
- 2) Find the eigen values of the matrix $\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix}$.
- 3) Is the differential equation $(2xy \cos x^2 - 2xy + 1) dx + (\sin x^2 - x^2) dy = 0$ exact ?
- 4) Solve $(2D^2 - 2D - 1)y = 0$.
- 5) Write any two applications of differential equations.
- 6) Find velocity of a particle which moves along the curve $\vec{r} = 2 \sin 3t \hat{i} + 2 \cos 3t \hat{j} + 8t \hat{k}$.
- 7) State Green's theorem.
- 8) If $\vec{A} = x^2 z \hat{i} - 2y^3 z^2 \hat{j} + xy^2 z \hat{k}$, then find $\text{Div}(\vec{A})$ at the point $(1, -1, 1)$.
- 9) Write formulae of mean and variance of binomial distribution.
- 10) Define null hypothesis.

SECTION-B

- 11) Find the rank of the matrix $\begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$ after converting into normal form.
- 12) Solve the differential equation $\frac{dy}{dx} + \frac{3y}{x} = \frac{\sin x}{x^3}$.
- 13) Solve the differential equation $(D^2 + 2D + 1)y = x$.
- 14) Solve the differential equation $(D^2 + 4)y = \tan 2x$ using method of variation of parameters.

SECTION-C

- 15) Find the unit normal vector to the surface $x^2y + 2xz^2 = 8$ at the point $(1, 0, 2)$.
- 16) Verify Gauss divergence theorem for $\vec{F} = 4xz \hat{i} - y^2 \hat{j} + yz \hat{k}$ over the cube $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$.
- 17) A box A contains 2 white and 4 black balls. Another box B contains 5 white and 7 black balls. A ball is transferred from the box A to the box B. Then a ball is drawn from the box B. find the probability that it is white.
- 18) A certain stimulus administered to each of 12 patients resulted in the following increases of blood pressure : 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4, 6. Can it be concluded that the stimulus will in general be accompanied by an increase in blood pressure. (Given that for $v = 11$, $t_{0.05} = 2.2$)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.