18299

Roll No. .....

BE-I EXAMINATION APRIL-MAY'2018

COMP./CIVIL BRANCHES (RE)

AMR2C1: Applied Mathematics-II

Max.Marks:60

Duration: 3Hrs.

Note: Attempt any **two** parts from every question. Questions should be solved at **one place**. All questions carry equal marks. Any assumption made answering the questions should be stated. Assume suitable data whenever necessary.

UNIT –I

Q.1 (a) Find two non-singular matrices P and Q such that PAQ is in the normal form for the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & -1 & -1 \\ 3 & 1 & 1 \end{bmatrix}$ and hence find the rank of the matrix A. **06**

(b) Find all eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$. **06**

(c) Find the values of α and β for which the equations $x + 2y + 3z = 4$, $x + 3y + 4z = 5$, $x + 3y + \alpha z = \beta$ have (i) no solution, (ii) an unique solution, and (iii) an infinite number of solutions. **06**

UNIT –II

Q.2 (a) Solve $(x^2y^3 + xy^2 + y)dx + (x^3y^2 - x^2y + x)dy = 0$. **06**

(b) Solve $3\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 5y = e^x - 2e^{2x} + 3e^{3x}$. **06**

(c) Solve the simultaneous equations: $\frac{dx}{dt} + 5x - 2y = t$, $\frac{dy}{dt} + 2x + y = 0$. **06**

UNIT –III

Q.3 (a) Form partial differential equations from the following : **06**

(i) $z = f(x + it) + g(x - it)$, where $i = \sqrt{-1}$. (ii) $z = yf(x) + xg(y)$.

(b) Solve $r - s = cos2y(sinx + cosx)$. **06**

(c) Use the method of separation of variables to solve $\frac{\partial^2 u}{\partial x \partial t} = e^{-t}cosx$ with $u(x, 0) = 0$ and $u_t(0, t) = 0$. **06**

(P.T.O.)

UNIT –IV

Q.4 (a) Define Poisson distribution and prove that mean and the variance of the poisons distribution are each equal to the parameter λ. **06**

(b) Calculate Karl Pearson's coefficient of correlation from the following data, using 20 as working mean for price and 70 as working mean for demand. **06**

Price	14	16	17	18	19	20	21	22	23
Demand	84	78	70	75	66	67	62	58	60

(c) Fit a straight line for the given data by the method of least squares: **06**

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	5

UNIT –V

Q.5 (a) Solve the equations **06**

(i) $x^3 - 7x^2 + 36 = 0$, given that one root is double of another.

(ii) $x^3 + 6x + 20 = 0$, one root being $1 + 3i$.

(b) Solve by Cardan's method $x^3 - 6x^2 + 6x - 5 = 0$. **06**

(c) Verify the Commutative laws for the fuzzy sets given by **06**

$X = \{x_1, x_2, x_3, x_4\}$

$A = \{(x_1, 0.2), (x_2, 0.5), (x_3, 0.7), (x_4, 1)\}$

$B = \{(x_1, 0.6), (x_2, 1), (x_3, 0.4), (x_4, 0.3)\}$.

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