Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

IV SEMESTER B.TECH (PRINTING & MEDIA ENGINEERING)

END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: ENGINEERING MATHEMATICS IV [MAT 2212]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	Solve $xy'' + y = 0; y(1) = 1, y(2) = 2 \, with \, h = 0.25$ using finite difference method	4marks
1B.	Out of 800 families with 4 children each, how many families would be expected to have i) 2boys and 2 girls ii) at most 2 girls iii) at least one boy. Assume equal probabilities for boys and girls.	3marks
1C.	Two cards are drawn at random from a box which contains five cards numbered 1,1, 2,2 and 3.Let X denote the sum and Y , the maximum of the two numbers drawn. Find the joint distribution of X and Y.	3marks
2A.	Solve the LPP graphically. Maximize $Z = 5x_1 + 3x_2$ subject to $4x_1 + 5x_2 \leq 1000$, $5x_1 + 2x_2 \leq 1000$, $3x_1 + 8x_2 \leq 1200$, $x_1 \geq 0$, $x_2 \geq 0$.	4marks
2B.	If the random variable 'K' is uniformly distributed over [0, 7], what is the probability that the roots of the equation $4x^2 + 4xK + K + 2 = 0$ are real ?	3marks
2C.	X=x: 0, 1, 3, 7, 13 P(X=x): 1/8, a, 1/6, 1/4, b The given is pmf of X. Find 'a' and ' b ' if $P(X^2 = 4X - 3) = ½$	3marks
3A.	Solve by Crank Nicolson's method $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, $0 < x < 5$, $t > 0$, u(x, 0) = 20, u (0, t) = 0, u(5, t) = 100. Take	4marks

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	h=1, compute u for one time step.	
3B.	The random variable (X , Y) has a joint pdf given by f(x , y) = x+ y, 0≤ x≤1 0≤ y ≤1. Compute the correlation coefficient between x and y.	3marks
3C.	In a normal distribution 13% of the items are under 45 and 42% over 64. Find the mean and standard deviation.	3marks
4A.	Find the mean and Variance of exponential distribution.	4marks
4B.	Solve $u_{xx} + u_{yy} = 0$ using five point formula. Given h = $\frac{1}{3}$, 0 < x < 1 , 0 < y < 1 , u (x , 1) = u (0 , y) = 0 , u (1 , y) = 9 (y – y^2) u(x , 0) = 9 (x – x^2).	3marks
4C.	A two dimensional random variable (X ,Y) has the joint density function f(x ,y) = $6e^{-2x-3y}$, x , y ≥ 0. Find the Marginal and conditional pdf's of X and Y.	3marks
5A.	Use simplex method to solve, Maximize z = 3x + 5y subject to 3x+2y ≤ 18 x≤ 4 , y ≤ 6 , x ≥ 0 , y ≥ 0	4marks
5B.	The chances that a Doctor A will diagnose a disease X correctly is 60%. The chance that a patient will die by his treatment after correct diagnosis is 40% and the chances of the death by wrong diagnosis is 70%. A patient of a doctor A who had disease X died. What is the chance that his disease was diagnosed correctly?	3marks
5C.	A random variable X has the following probability distribution .	3marks

x	0	1	2	3	4	5	6	7
p(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2$+ K

Find a) the value of ' K ' b) P(3 < X ≤ 6)
c) P(X≥ 5)