Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

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A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (EEE/ICE)

END SEMESTER EXAMINATIONS, APR/MAY 2017

SUBJECT: ENGINEERING MATHEMATICS [MAT 2208]

REVISED CREDIT SYSTEM

(12/06/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Two coins C_1 and C_2 have the probabilities of falling heads P_1 and P_2 respectively. You win a bet if in three tosses you get at least 2 heads in succession. You toss the coin alternatively, starting with either coin. If $P_1 > P_2$, what coin would you select to start the game?	**4**
1B.	Given $Z\{u_n\} = \frac{z}{z-1} + \frac{z}{z^2+1}$, find $Z\{u_{n+2}\}$.	**3**
1C.	If $\overline{X}$ is the mean of a random sample from a normal distribution with mean μ and variance 100, find "n" such that $P(\mu - 5 < \overline{X} < \mu + 5) = 0.954$.	**3**
2A.	If the joint pdf of X and Y is given by $f(x,y) = \begin{cases} \frac{e^{-\lvert y \rvert}}{2}, & y > \lvert x \rvert \\ 0, & elsewhere \end{cases}$. Find the co-relation co-efficient between X and Y.	**4**
2B.	Companies A, B, C produce 30%, 45% and 25% of cars respectively. It is known that 2%, 5% and 2% of cars produced by A, B and C are defective. If a car is purchased and found to be defective, what is the probability that this car is produced by company A?	**3**
2C.	Solve $y'' + xy = 0$ with $y(0) = 0,\ \ y'(1) = 1$, for n=2.	**3**

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3A.	(i) The mean weight of 500 male students at a certain college is 151 lb and the standard deviation is 15 lb. Assuming that the weights are normally distributed find how many students weigh more than 185 lb? (ii) In a book of 520 pages, 390-typo graphical errors occur. Assuming Poisson law for the number of errors per page, find the probability that a random sample of 5 pages will contain no error.	**4**
3B.	A random variable X has $p(x)=\frac{c}{2^x}$, x=1,2,3,…… (i) Find c (ii) Find P(X is even) (iii) Calculate P(X is divisible by 3)	**3**
3C.	Using Z transforms, solve $y_{n+2}-5y_{n+1}+6y_n=1$ with $y_0=0, y_1=1$.	**3**
4A.	Solve Laplace equation with h=1, for $0<x<4,\ 0<y<4$, $u(x,0)=x^2+2x$, $u(x,4)=x^2+2x-24$, $u(0,y)=-2y-y^2$, $u(4,y)=24-y^2-2y$.	**4**
4B.	Suppose that the continuous two dimensional random variable (X, Y) is uniformly distributed over the square whose vertices are (1,0), (0,1), (-1,0) and (0,-1). Find the marginal pdf's of X and Y.	**3**
4C.	Find the mgf of Chi-square distribution and hence find the variance.	**3**
5A.	Solve $y_{n+2}-2y_{n+1}+2y_n=2^n+\cos\frac{n\pi}{2}$	**4**
5B.	Solve by Crank –Nicolson's scheme: $\frac{\partial u}{\partial t}=\frac{1}{16}\frac{\partial^2 u}{\partial x^2}$, 0<x<1, $t\geq 0$, $u(x,0)=0$, $u(0,t)=0$, $u(1,t)=100t$. Compute u for one step with $h=\frac{1}{4}$.	**3**
5C.	Suppose that X is uniformly distributed over (1, 3). Obtain the pdf of Y=3X+4.	**3**

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