Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER MAKEUP EXAMINATIONS, JUNE 2018

SUBJECT: ENGINEERING MATHEMATICS-IV (MAT 2202)

REVISED CREDIT SYSTEM

Time: 3 Hours Date: 14/06/2018 MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Urn A contains 3 red and 2 white balls. Urn B contains 2 red and 5 white balls. An Urn is selected at random, a ball is drawn and put into other, then ball is drawn from that urn. Find the probability that both balls are of same color.	**4**
1B.	In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and variance of distribution.	**3**
1C.	Derive the mean and variance of gamma distribution.	**3**
2A.	Find the correlation coefficient between x and y from the given data. x: 105, 104, 102, 101, 100, 99, 98, 96, 93, 92 y: 101, 103, 100, 98, 95, 96, 104, 92, 97, 94	**4**
2B.	Calculate the mean and standard deviation of the following frequency distribution. Class interval: 90.5-109.5, 109.5-119.5, 119.5-129.5, 129.5-139.5, 139.5-149.5, 149.5-159.5, 159.5-169.5, 169.5-179.5 frequency: 15, 44, 133, 150, 125, 82, 35, 16	**3**

2C. A two dimensional random variable (X,Y) has joint pdf

$$f(x,y) = \begin{cases} e^{-y} & ,x > 0, y > x \\ 0 & , \ elsewhere \end{cases}$$

Then find marginal pdf of X, marginal pdf of Y and evaluate $P\{(X > 2) \cap (Y < 4)\}$ — **3**

3A. A coin is tossed till head appears. Let X denote the number of tosses made. Find the mgf of X and hence find its expected value. — **4**

3B. Fit a straight line to the following data. — **3**

x	1	2	3	4	6	8
y	2.4	3	3.6	4	5	6

3C. Solve by Graphical method; Maximize $z = 3x_1 + 2x_2$ subject to $5x_1 + x_2 \geq 10,\ x_1 + x_2 \geq 6, x_1 + 4x_2 \geq 12,\ x_1, x_2 \geq 0.$ — **3**

4A. Find the quartile deviation and co-efficient of quartile deviation for the following distribution of marks by students. — **4**

Marks	0-19	20-39	40-49	50-59	60-69	70-79	80-89
Students	15	31	19	15	8	7	7

4B. Out of 800 families with 5 children each, how many would expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys. — **3**

4C. Ball pen refills are packed in pouches containing 25 refills in each pouch. In a shop it was found that 5 refills failed to write in pouch 1, 10 each in pouch 2 and 3, 1 refill in pouch 4. Suppose a refill is selected at random from one of four pouches, what is the probability that it fails to write? — **3**

5A. Compute approximately the probability that mean of the random sample of size 15 from a distribution having the pdf $f(x) = \begin{cases} 3x^2, & 0 < x < 1 \\ 0, & otherwise \end{cases}$ is between $\frac{3}{5}$ and $\frac{4}{5}$. — **4**

5B. Using simplex method, solve the LPP: Maximize $z = x_1 + 3x_2$ Subject to $x_1 + 2x_2 \leq 10, x_1 \leq 5, x_2 \leq 4,\ x_1, x_2 \geq 0.$ — **3**

5C. The random variable X has the pdf $f(x) = \begin{cases} 2x, & 0 \leq x \leq 1 \\ 0, & \text{elsewhere.} \end{cases}$. Find the pdf of $Y = 8X^3$. — **3**