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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
MCA I Year I Semester Regular & Supplementary Examinations December 2017
PROBABILITY & STATISTICS

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 X 12 = 60 Marks)

UNIT-I

- 1 a Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box, what is the probability that they are both of same colour. 6M
- b State and prove the Baye's Theorem. 6M

OR

- 2 a A random variable X has the following probability distribution function:

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

- (i) Determine K (ii) if $P(X \leq K) > 1/2$, find the minimum value of K 6M
 (iii) Variance.
- b The probability density function is $f(x) = \begin{cases} kxe^{-\lambda x}, & \text{for } x \geq 0, \lambda > 0 \\ 0, & \text{otherwise} \end{cases}$ 6M
 Determine (i) k (ii) Mean

UNIT-II

- 3 a Two dice are thrown five times. Find the probability of getting 7 as sum 6M
 (i) at least once (ii) Two times (iii) $P(1 < X < 5)$.
- b Using recurrence formula find the probabilities when $x=0, 1, 2, 3, 4$ and 5; if the mean of Poisson distribution is 3. 6M

OR

- 4 a In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find 6M
 (i) how many students score between 12 and 15 ?
 (ii) how many students score above 18 ?
 (iii) how many students score below 18 ?
- b Define the Gamma Distribution and derive its mean and variance. 6M

UNIT-III

- 5 a Write about working rule for testing of hypothesis. 5M
- b Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5% level. 7M

OR

- 6 a The Blood pressure of 5 women before and after intake of certain drug are below:

Before	110	120	125	132	125
After	120	118	125	136	121

Test whether there is significant change in Blood Pressure at 1% level of significance.

7M

- b The number of automobiles accidents per week in a certain community are as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period.

5M

UNIT-IV

- 7 Explain the meaning of ANOVA. Describe briefly the technique of ANOVA for one-way classification.

12M

OR

- 8 A farmer applies three types of fertilizers on 4 separate plots. The figure on yield per acre are tabulated below

Plots	YIELD			
Fertilizers	A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphates	8	5	10	9

Find out if the plots are materially different in fertility, as also, if three fertilizers make any material difference in yields.

12M

UNIT-V

- 9 The following are the sample means and ranges for 10 samples each of size 5. Construct a \bar{X} - chart and a \bar{R} - chart and determine whether the process is in control.

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean (\bar{X})	20	34	45	39	26	29	13	34	37	23
Range	23	39	15	05	20	17	21	11	40	10

12M

OR

- 10 a A drilling machine bores holes with a mean diameter of 0.5230 cm and a standard deviation of 0.0032 cm. Calculate the 2-sigma and 3-sigma upper and lower control limits for means of samples 4, and prepare a control chart.

6M

- b The following are the figures of defectives in 22 lots each containing 2000 rubber belts: 425, 430, 216, 341, 225, 322, 280, 306, 337, 305, 356, 402, 216, 264, 126, 409, 193, 280, 326, 389, 451, 420. Draw control chart for fraction defective and comment on the state of control of the process.

6M

***** END *****