Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER MCA DEGREE EXAMINATION, JULY 2018

Course Code: RLMCA105

Course Name: APPLIED PROBABILITY AND STATISTICS

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks Marks

1 Define skewness and kurtosis. (3)

2 Find the standard deviation for the following data: (3)

Age (in years)	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members	3	61	132	153	140	51	2

3 Write the axioms of probability. (3)

4 Define the following: (3)
i) Random variable ii) probability density function with examples

5 Find the mean and variance of a Poisson distribution. (3)

6 If X is uniformly distributed with mean 2 and variance 1/3. Find P[X>2]. (3)

7 Find the marginal probability distributions of f(x,y)= (x+y)/3, 0<x<1, 0<y<2. (3)

8 State the types of sampling with examples. (3)

Answer six questions, one full question from each module and carries 6 marks.

Module 1

9 a) Define the different types of data with examples. (3)

b) Draw a histogram for the following data (3)

Marks of students	0-10	10-20	20-30	30-40	40-50	50-60
Number of students	12	18	27	20	17	6

OR

10 a) Find the median and mode for the following data: (3)

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	8	7	12	28	20	10	10

b) Find the range and quartile deviation of the following data: (3)

x	0	1	2	3	4	5	6	7	8
f	1	9	26	59	72	52	29	7	1

Module 1I

11 a) Define the following: (3)
i) Random experiment ii) Sample space iii) Event with examples

b) Two dice are tossed. Find the probability of getting 'an even number on the first die or a total of 8'. (3)

OR

12 a) State and prove the addition rule of probability. (3)

b) A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each colour. (3)

Module 1II

13 a) Find the value of 'k' for the following probability distribution. Also find its mean and variance. (3)

X	0	1	2	3
P(X=x)	K/2	K/3	(k+1)/3	(2k-1)/6

b) Show that Poisson distribution is a limiting case of Binomial distribution. (3)

OR

14 a) In a binomial distribution consisting of 6 independent trials, probabilities of 1 and 2 successes are 0.28336 and 0.0506 respectively. Find its: (3)
i) Probability distribution ii) Mean iii) Variance

b) Derive the mean and variance of a geometric distribution. (3)

Module 1V

15 a) Buses arrive at a specified stop at 15 minutes intervals from 6 am. If a passenger arrives at the stop at a random time that is uniformly distributed between 6.00 am and 6.30 am, find the probability that he waits: (3)
i) Less than 5 minutes for a bus ii) At least 10 minutes for a bus

b) The weekly wages of 200 workmen are normally distributed about a mean of Rs. 500 with a SD of Rs 50. Estimate the number of workers whose weekly wages will be: (3)
i) Between Rs.400 and Rs. 600 ii) Less than Rs. 400 iii) Greater than Rs. 600

OR

16 The joint probability density function of 2 continuous random variables X and Y is given by $f(x,y)=kxy$, $0<x<4$, $1<y<5$. Find: (6)
i) k ii) $P(X>3,y<4)$ iii) $P(1<x<2, 2<y<3)$
iv) $P(x+y<3)$ v) Are X and Y independent.

Module V

17 a) A random sample of size 12 is taken from a normal population with SD 3. Find the probability that the variance of the sample lies between 3.4 and 14.8. (3)

b) A random sample of size 15 from a normal population with mean 12 is found to have variance $s^2 = 5$. Find the probability that the mean of the sample is less than 10. (3)

OR

18 a) Two independent random samples of sizes 8 and 10 are taken from a normal population. Find an upper bound to the ratio of the variances of the 2 samples such that the probability of the ratio exceeding the bound is 0.05. (3)

b) A random sample of size 11 from a normal population is found to have variance 12.3. (3)

Find a 95% confidence interval for the population variance.

Module VI

19 a) Define the following: (3)
i) Null hypothesis ii) Alternate hypothesis iii) Level of significance

b) The heights of students studying in college classes is believed to be distributed with SD 1.5. A sample of 400 students have their mean height 4.75 ft. Does this contradict the hypothesis that the mean height of students is 4.48 ft. (significance level is 1%)? (3)

OR

20 a) The records of a certain hospital showed the birth of 723 males and 617 females in a certain week. Do these confirm to hypothesis that the sexes are born in equal proportion. (3)

b) Random samples of sizes 500 and 400 are found to have means 11.5 and 10.9 respectively. Can the samples be regarded as random samples drawn from the same population whose SD is 5? (3)

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