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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

BCA

SEM: II - THEORY EXAMINATION (20..... - 20.....)

Subject: Mathematics for Computer Applications

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

20

1. Attempt all parts:-

1-a. Variance is the (CO1, K1)

1

- (a) Square root of standard deviation
- (b) Square of standard deviation
- (c) Cube root of standard deviation
- (d) Equal to standard deviation

1-b. The value of coefficient of correlation can never exceed (CO1, K2)

1

- (a) 2
- (b) 3
- (c) 1
- (d) 0

1-c. The probability of an impossible event is (CO2, K2)

1

- (a) 0
- (b) 1
- (c) Not defined
- (d) Insufficient data

1-d. Two unbiased coins are tossed. What is the probability of getting at least one head? (CO2, K3)

1

- (a) $1/2$
- (b) $1/3$

- (c) $1/6$
 (d) $3/4$
- 1-e. For Binomial distribution sum of mean and variance is 6 and difference of mean and variance is 2 then the probability of success is..... (CO3, K3) 1
- (a) 1
 (b) 0.5
 (c) 0.25
 (d) 0.75
- 1-f. Normal Distribution is symmetric about _____. (CO3, K1) 1
- (a) Variance
 (b) Mean
 (c) Standard deviation
 (d) Covariance
- 1-g. How many groups or levels of the independent variable are typically compared in a One-way ANOVA? (CO4, K1) 1
- (a) 1
 (b) 2
 (c) 3 and more
 (d) None of these
- 1-h. Goodness of fit of distribution is tested by (CO4, K1) 1
- (a) T -test
 (b) Chi-Square Test
 (c) F test
 (d) None of these
- 1-i. David is the brother of Emily. Emily is the daughter of George. How is David related to George? (CO5, K2) 1
- (a) Son
 (b) Father
 (c) Brother
 (d) None of these
- 1-j. The age of a father is three times the age of his son. After 10 years, the age of the father will be twice the age of his son. What are their present ages? (CO5, K3) 1
- (a) 10 and 30 years
 (b) 15 and 45 years
 (c) 20 and 30 years
 (d) 30 and 90 years

2. Attempt all parts:-

- 2.a. Calculate the mode of the given series: 1, 2, 2, 3, 1, 3, 1, 3, 1, 3, 2, 4, 3. (CO1, K3) 2

- 2.b. State Multiplicative theorem of probability. (CO2, K1) 2
- 2.c. Write the probability function of Binomial distribution. (CO3, K1) 2
- 2.d. In a Chi-Square test of independence, you have a contingency table with 3 rows and 4 columns. Calculate the degrees of freedom for this test. (CO4, K3) 2
- 2.e. Amanda walks 300 meters east, then turns left and walks 200 meters. Next, she turns right and walks 150 meters. Finally, she turns right again and walks 100 meters. In which direction is she from her starting point? (CO5, K3) 2

SECTION-B

30

3. Answer any five of the following:-

- 3-a. The following table gives the age distribution of a group of 50 individuals: (CO1, K3) 6

Age(in years)	15-20	20-25	25-30	30-35
No. of persons	10	15	17	8

Calculate Mean and Median.

- 3-b. Obtain both the line of regression from the given data (CO1, K3) 6

X	1	3	5	7	8	10
Y	8	12	15	17	18	20

- 3-c. A bag contains 7 white, 6 red and 5 black balls. Two balls are drawn at random. Find the probability that they will be both white. (CO2, K3) 6

- 3-d. If $f(x)$ has the probability density cx^2 , $0 < x < 1$, determine c and find the probability that $\frac{1}{3} < x < \frac{1}{2}$, i.e. $P\left(\frac{1}{3} < x < \frac{1}{2}\right)$. (CO2, K3) 6

- 3.e. Find the mean and variance of Poisson distribution. (CO3, K2) 6

- 3.f. A sample of 20 items has mean 42 units and S.D. 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units. (If the tabular value at 5% LOS for 19 d. f. is 2.09). (CO4, K3) 6

- 3.g. A container has 10 liters of a solution containing milk and water in the ratio of 2:3. How many liters of milk should be added to the solution to make the ratio 3:4? (CO5, K3) 6

SECTION-C

50

4. Answer any one of the following:-

- 4-a. Find straight line fit to the data by the method of least squares: (CO1, K3) 10

x	1	2	3	4
y	3	7	13	21

- 4-b. Calculate Karl Pearson coefficient of correlation from the following data. (CO1, K3) 10

X	1	3	5	7	8	10
Y	8	12	15	17	18	20

5. Answer any one of the following:-

5-a. A dice is thrown. Find the probability of the getting a multiple of i) 2 or 3 ii) 2 or 4. (CO2, K3) 10

5-b. A random variable X has the following probability function: (CO2, K3) 10

X:	0	1	2	3	4	5	6	7
P(x):	0	k	2k	2k	3k	k ²	2k ²	7k ² + k

i) Find the value of k ii) Evaluate $P(X < 6)$, $P(X \geq 6)$ iii) $P(0 < X < 5)$.

6. Answer any one of the following:-

6-a. A sample of 100 dry battery cells tested to find the length of life produced the following results: $\mu = 12$ hours and $\sigma = 3$ hours. Assuming the data to be normally distributed, what percentage of battery cells are expected to have life (i) more than 15 hours (ii) less than 6 hours (iii) between 10 and 14 hours? Given that the area under the standard curve between $z=0$ and $z=1$ is 0.3413, between $z=0$ and $z=2$ is 0.4772 and between $z=0$ and $z = 0.67$ is 0.2485. (CO3, K3) 10

6-b. A random variable X has the following probability distribution: 10

Value of X	0	1	2	3
P(X = x)	1/3	1/2	0	1/6

Find: (i) E(X); (ii) Var (X) . (CO3, K3)

7. Answer any one of the following:-

7-a. Fit a Poisson distribution to the following data and best the goodness of fit: (CO4, K3) 10

X	0	1	2	3	4
F	109	65	22	3	1

Given tabulated value at 5% level of significance is 5.991.

7-b. Two random samples reveal the following data: 10

Sample no.	Size	Mean	Variance
I	16	440	40
II	25	460	42

Test whether the samples come from the same population. Given tabulated value of F for

$v_1 = 15$ and $v_2 = 24$ is 2.11 and for t at 5% level of significance is 1.96. (CO4, K3)

8. Answer any one of the following:-

8-a. Khan and Shoaib decide to take a ratio of their ages. It comes out to be 5:4 respectively. Three years from now, the ratio of their ages will be 11 : 9 respectively. What is Shoaib's present age in years? (CO5, K3) 10

8-b. How many arrangements can be made of the letters of the word "ASSASSINATION"? In how many of them are the vowels always together? (CO5, K3) 10