BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - II CS&E-A&M :SUMMER- 2022
SUBJECT : PROBABILITY & STATISTICS

Day : Thursday   Time : 10:00 AM-01:00 PM
Date : 28-07-2022   **S-23930-2022**   Max. Marks : 60

N.B.:
  1) All questions are **COMPULSORY**.
  2) Figures to the **RIGHT** indicate **FULL** marks.
  3) Use of **non-programmable calculator** is allowed.
  4) Assume suitable data **WHEREVER** necessary.
  5) Draw neat diagram **WHEREVER** necessary.

Q.1 In a certain test there are multiple choice questions. There are four possible **(10)** answers to each question and one of them is correct. An intelligent student can solve 90% questions correctly by reasoning and for the remaining 10% questions he gives answers by guessing. A weak student can solve 20% questions correctly by reasoning and for the remaining 80% questions he gives answers by guessing. An intelligent students gets the correct answer what is the probability that he was guessing?

OR

Q.1 A bag contains 7 red and 3 black balls and another bag contains 4 red and **(10)** 5 black balls. One ball is transferred from the first bag to the second bag and then a ball is drawn from the second bag if this ball happens to be red, find the probability that a black ball was transferred.

Q.2 A random Variable X has the following probability density function **(10)**

$$f(x) = \begin{cases} ke^{-kx} & x > o, k > o \\ o & elsewhere \end{cases}$$

Find the m-g-f and hence the mean and variance .

OR

Q.2 Find the value of K, if the function **(10)**
$$f(x) = kx^2 (1 - x^3) \quad 0 \leq x \leq 1$$
$$= 0 \quad otherwise$$

Is a probability density function, Also find $P\left(0 \leq x \leq \frac{1}{2}\right)$ and the mean and variance .

Q.3 The hourly wages of 1000 workmen are normally distributed around a mean of **(10)** Rs 70 and with a standard deviation of Rs 5 Estimate the number of workers whose hourly wages will be:
  i)   Between Rs 69 and Rs 72
  ii)   More than Rs 75
  iii) Less than Rs 63
  iv)   Also estimate the lowest hourly wages of the 100 highest paid workers.

OR

Q.3 Six dice are thrown 729 times How many times do you expect at least three **(10)** dice to show a five or six ?

Q.4 The value of spearman's rank correlation coefficient for certain pairs of number **(10)** of observations was found to be $\frac{2}{3}$. The sum of squares of the difference between corresponding ranks was 55 , find the number of pairs .

OR

PTO

Q.4 The total of the multiplication of deviation of X and Y = 3044 No Pairs of the **(10)** observation is 10

Total of deviation of X = −170

Total of deviation of Y = −20

Total of the square of deviation of X = 8288

Total of the square of deviation of Y = 2264

Find out the coefficient of correlation when the arbitrary means of X and Y are 82 and 68 respectively.

Q.5 Obtain the lines of repression of y on x and x on y for the data given below **(10)**

$$\sum x = 50 \quad \sum y = 60 \quad \sum xy = 350$$

$$n = 10 \quad \ell_x^2 = 4 \quad \ell_y^2 = 9 \qquad \sigma_x^2 = 4 \quad \sigma_y^2 = 9$$

OR

Q.5 Calculate the two lies of regression for the data **(10)**

$$NO = 10 \quad \sum x = 350 \quad \sum y = 310 \quad \sum (x-35)^2 = 162 \quad \sum (y-31)^2 = 222$$

$$\sum (X-35)(Y-31) = 92$$

Q.6 If $r_{12} \; r_{13} \; r_{23} = r$, $(r \neq 1$ **(10)**

then prove thak

$$R_{1.23} \; R_{2.31} \; R_{3.12} = r\sqrt{\frac{2}{1+r}}$$

OR

Q.6 Set up two way ANOVA Table for data **(10)**

	Yield			
Ferilisers/Plots	A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphate	8	5	10	9

[Given Fvalue for $\gamma_1 = 3 \quad \gamma_2 = 6 \; is 4.76$ *and*

F value for $\gamma_1 = 2 \quad \gamma_2 = 6 \; is 5.14 both \; at 5\% \; Los$]

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