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TEST -2 EXAMINATION OCTOBER -2018

B.TECH IIIRD SEMESTER (BI/BT/BTDD)

COURSE CODE: **10B11MA311** MAX. MARKS: **25**

COURSE NAME: **Probability and Statistics**

COURSE CREDITS: **04** MAX. TIME: **1.5 Hrs**

NOTE: *All questions are compulsory and carry equal marks. Carrying of* ***mobile phone*** *during examinations will be treated as case of unfair means. Use of scientific calculator is allowed.*

Q.1 Calculate the first four central moments of the following frequency distribution and hence find β_1 and β_2.

Wages (in rupees):	170-180	180-190	190-200	200-210	210-220	220-230	230-240	240-250
No. of Persons:	52	68	85	92	100	95	70	28

[5]

Q.2 Fill in the suitable word(s) or phrase(s) in the blanks-

(i) Mathematical probability is also known as…… probability.

(ii) $P(A \cup B)$ can be expressed by the…… law of probability.

(iii) Multiplication theorem is applicable only if the events are…… .

(iv) For two events A_1, A_2; if $P(A_1)=\frac{1}{2}$, $P(A_2)=\frac{1}{3}$, $P(A_1 \cup A_2)=\frac{2}{3}$, then the value of $P(A_1 \cap A_2)$ is……

(v) If A is an arbitrary event, then $P(A|A)=$…… .

[1×5=5]

Q.3 **(A)** Let X be a continuous random variable with probability density function (*pdf*):

$$f(x)=\begin{cases} ax & ;\ 0 \le x \le 1 \\ a & ;\ 1 \le x \le 2 \\ -ax+3a & ;\ 2 \le x \le 3 \\ 0 & ;\ elsewhere \end{cases}$$

(i) Determine the constant a.

(ii) Compute $P(X<2)$.

(B) Let X be a random variable with probability mass function (pmf) given below:

x:	0	1	2	3
$p(x)$:	1/3	1/2	1/24	1/8

Find the expected value of $Y=(X-1)^2$. **[3+2=5]**

P. T. O.

Q.4 Four coins are tossed 160 times. The number of times x heads occur $(x = 0, 1, 2, 3, 4)$ is given below:

x:	0	1	2	3	4
$f(x)$:	8	34	69	43	6

Fit a binomial distribution to this data on the hypothesis that coins are unbiased. **[5]**

Q.5 Calculate the coefficient of correlation between X and Y for the following data:

X:	21	23	30	54	57	58	72	78	87	90
Y:	60	71	72	83	110	84	100	92	113	135

[5]