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(B) State and prove additive property of moment generating function and discuss on change of origin and scale. 6

OR

13. (P) Joint distribution of X and Y is given by :

$$f(x, y) = 4xy\, e^{-(x^2 + y^2)};\ x \geq 0,\ y \geq 0$$

(i) Find the marginal distribution of x and y

(ii) The conditional distribution of x for given value of y

(iii) Test whether x and y are independent. 6

(Q) State and prove Addition and Multiplication theorem of Expectation in terms of continuous random variable. 6

AP–403

B.Sc. Part–I (Semester–I) Examination

1S : STATISTICS

Time—Three Hours] [Maximum Marks—80

Note :— All questions are compulsory.

1. (A) Fill in the blanks :

(i) If the moments are taken about the mean then it is called as _____.

(ii) _____ is the difference between two extreme observation.

(iii) The probability of the impossible event is _____.

(iv) The mathematical expectation of product of two _____ variables is product of their expectation. 2

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(B) Multiple Choice Questions :

(i) The expression for coefficient of variation is :

(a) $\frac{\text{S.D.}}{\text{Med}} \times 100$

(b) $\frac{\text{S.D.}}{\text{Mode}} \times 100$

(c) $\frac{\text{S.D.}}{\text{Mean}} \times 100$

(d) None of these

(ii) The moments depends on _____.

(a) Origin

(b) Scale

(c) Origin and Scale

(d) None of the above

(iii) The probability of drawing a spade card from a pack of 52 cards is :

(a) 1/13

(b) 4/13

(c) 2/13

(d) 13/13

11. (P) Define discrete and continuous random variable X and state and prove addition theorem of expectation in discrete random variable. 6

(Q) A random variable X has the following probability distribution :

X :	0	1	2	3	4	5	6	7	8
f(X) :	a	3a	5a	7a	9a	11a	13a	15a	17a

(i) Determine the value of a

(ii) Find the p (x < 3), p (x ≥ 3) 6

12. (A) The following table represents the joint probability distribution of two discrete random variable X and Y :

Y \ X	1	2	3
1	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{1}{5}$
2	0	$\frac{1}{9}$	$\frac{1}{5}$
3	$\frac{1}{18}$	$\frac{1}{4}$	$\frac{2}{15}$

(i) Evaluate Marginal distribution of X and Y

(ii) Evaluate conditional distribution of X given Y = 2. 6

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9. (P) Define :

(i) Independent Event.

(ii) Exhaustive Event. 4

(Q) If A and B are independent events then show that $\overline{A}$ an B are also independent events. 4

(R) A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls drawn are white and blue. 4

10. (A) Define Mathematical expectation in terms of continuous and discrete case. Prove that :

$E(ax + b) = a.\ E(x) + b.$ 6

(B) Define probability mean function given the probability function of random variable X. Find Mean : 6

X :	0	1	2	3
P(X):	1/8	3/8	3/8	1/8

OR

(iv) Var(c) = _____ where c is constant.

(a) 0

(b) 1

(c) c

(d) –1 2

(C) Answer in **ONE** sentence :

(i) Give the formula for coefficients of Q.D.

(ii) Who has give β and γ coefficients for moments ?

(iii) What is the probability of sure event ?

(iv) State the variance of X in terms of Mathematical expectation. 4

2. (A) What are the functions of CSO ? 4

(B) Explain nominal scale and ordering scale. 4

(C) What do you mean by Quantitative data ? Give example. 4

OR

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3. (P) What are the limitations of Statistics ? 4

(Q) Describe the scope of Statistics in Biological Science. 4

(R) What do you mean by Primary Data ? State its sources. 4

4. (A) Explain how will you obtain mode in case of continuous frequency distribution. 4

(B) Show that algebraic sum of deviations of various values from its mean is zero. 4

(C) What are the Partition Values ? 4

OR

5. (P) For two real positive numbers a and b establish the relationship between Arithmetic Mean, Geometric Mean and Harmonic Mean. 4

(Q) Define the term less than and more than Cumulative Frequency Distribution. 4

(R) What do you mean by classification and explain rules of forming the classes ? 4

6. (A) Discuss the effect of change of origin and scale on moments. 4

(B) Define mean deviation and its coefficient. 4

(C) Define the term Quartile Deviation and state its merits. 4

OR

7. (P) State the merits and demerits of Range. 4

(Q) Obtain the relation between standard deviation and root mean square deviation. 4

(R) Define Range and coefficient of Range. 4

8. (A) Define :

(i) Favourable event.

(ii) Equally likely event. 4

(B) If A and B are independent events then $\overline{A}$ are $\overline{B}$ are also independent events. 4

(C) Two coins are tossed simultaneously :

(i) Write complete sample space.

(ii) Find probability of two heads. 4

OR

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