

2016

MCA 1st Semester Examination

PROBABILITY & STATISTICS

PAPER—MCA-105

Full Marks : 100

Time : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group—A

Answer any *five* questions :

5×4

1. What is the probability that the sum 8 appear in a single toss of pair of a fair dice ?
2. Of 6 girls in a class, 3 have blue eyes, If 2 of the girls are chosen at random, find the probability that both have blue eyes.
3. A die is tossed. If the number is even then find the probability that it is prime.

(Turn Over)

4. If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{2}{3}$ then find $P(AB)$.
 $[P(AB) \equiv P(A \cap B)]$.
5. A and B are events with $P(A) = \frac{1}{3}$, $P(B) = \frac{2}{5}$ and $P(AB) = \frac{2}{15}$.
 Are A & B independent ?
6. The probability density function of a random variable X is $f(x) = k(2x - 1)$, $0 \leq x \leq 2$. Then find the value of the constant K.
7. If the Arithmetic Mean of 2, 6, x, 5, 7 be 4. Then find the value of x.

Group—B

Answer any *two* out of *three* questions : 2×15

8. (a) Write the axiomatic definition of Probability. 5
 (b) State and prove the Bayes' Theorem. 10
9. (a) If A and B are events, then write the condition that they are independent event. 3
 (b) There are two identical urns containing respectively 4 white, 3 red balls and 3 white, 7 red balls. An urn is chosen at random and a ball is drawn from it. Find that

the ball is white. If the ball drawn is white, what is the probability that it is from the second urn ? 7

- (c) Two cards are drawn from a well-shuffled pack. Find the probability that at least one of them is diamond. 5

- 10: (a) The probability density function of a random variable X is $f(x) = K(x-1)(2-x)$ for $1 \leq x \leq 2$.

Determine :

- (i) the value of the constant K
 (ii) the distribution function $F(x)$

(iii) $P\left(\frac{5}{4} \leq X \leq \frac{3}{2}\right)$. 10

- (b) Write the probability density function and distribution function of the Normal Distribution. 5

Group—C

Answer any *one* out of *two* questions : 1×20

11. (a) The Arithmetic Mean calculated from the following frequency distribution is known to be 72.5. Find the value of x :

Classes :	30-39	40-49	50-59	60-69	70-79	89-89	90-99
Frequency :	2	3	11	20	x	25	7

8

- (b) Average marks obtained by a class of 70 students was found to be 65. Later it was found that the marks of one student was wrongly recorded as 85 in place of 58. Find the corrected mean. 7
- (c) Find the median of the following frequency distribution :

x :	5	10	15	20	25	30	35	40
f :	7	10	15	18	23	21	17	8

5

12. (a) What is statistical hypothesis ? Explain the following with example :
- (i) Simple and composite hypothesis.
- (ii) Null and Alternative hypothesis. 2+3+3
- (b) Compute 5 years, 7 years and 9 years moving averages for the following data :

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Values	2	4	6	8	10	12	14	16	18	20	22

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- (c) Write the basic assumptions of ANOVA. 4

[Internal Assessment : 30]