

**Shikshan Mandal, Karad's**  
**Mahila Mahavidyalay, Karad**  
**B.Sc. (Part -I)(Preliminary-I) Examination**  
**DCS-8A-STATISTICS-I (CBCS)**  
**(Descriptive Statistics-I)**

**Date: 09/01/2023 Day: Monday**

**Time: 1:00 to 3:00 pm**

**Total Marks: 40**

**Instruction:**

1. All questions are compulsory.
  2. Figures to the right indicate full marks.
- 

**1. Choose the most correct alternative.**

**(8)**

- a) Sample is-----  
i) Subset of population ii) Part of population iii) 5% of population iv) at least 50% of population  
b) A primary data is data is a data called from-----  
i) Office record ii) direct interviews iii) bulletins iv) annual reports.  
c) Which one of the following scale is the best scale in measurement of data-----  
i) Nominal Scale ii) ordinal Scale iii) Interval Scale iv) Ratio Scale  
d) Histogram is used to located-----  
i) mean ii) Median iii) Mode iv) quartile  
e) For two observation A.M.=5 , H.M.=3.2, the G.M.=-----  
i) 16 ii) 8.2 iii) 4 iv) 4  
f) In order to compare the variability of different groups , the best measure of dispersion----  
i) C.V. ii) M.D. iii) S.D. iv) Q.D.  
g) Half of the inter quartile range is----  
i) Quartile deviation ii) Inter quartile range iii) Coefficient of Range iv) Range  
h) The 1<sup>st</sup> central moments is always equal to----  
i) 0 ii) 2 iii) 1 iv) none of these

**2. Attempt any two of the following.**

**(16)**

- a) Define median and mode. Derive formula for mode in case of grouped frequency distribution.
- b) Define raw and central moments. Derive relation for central moments in term of raw moments.
- c) Define Histogram. Explain the construction of it. State its uses.

**3. Attempt any four of the following.**

**(16)**

- a) State and prove minimal property of mean square deviation.
- b) Explain term of Sample, Sampling unit, Sampling Random Sampling.
- c) Explain the construction of a less than and more than ogive curve.
- d) Define A.M. and show that algebraic sum of deviation of all observation taken from their A.M. is zero.
- e) Find mean and variance of first 'n' natural numbers.
- f) Given that  $AM=160$ ,  $Mode=157$ ,  $SD=50$  find i) Karl Pearson's coefficient of skewness, ii) Coefficient of Variation.

**Shikshan Mandal, Karad's**  
**Mahila Mahavidyalay, Karad**  
**B.Sc.(Part -I)(Preliminary-I) Examination**  
**DCS-8A-STATISTICS-II (CBCS)**  
**(Elementary Probability Theory)**

**Date: 10/01/2023 Day: -Tuesday**

**Time: 1:00 - 3:00pm**

**total Marks: 40**

**Instruction:**

1. All questions are compulsory.
  2. Figures to the right indicate full marks.
- 

**1. Choose the most correct alternative.**

**(8)**

a) De Morgan's law gives----

i)  $(A \cup B)' = (A' \cap B')$  ii)  $(A \cup B) = (B \cup A)$  iii)  $(A \cap B) = (B \cap A)$  iv)  $(A - B) = (A \cap B')$

b) An event containing all points in  $\Omega$  which are not in A is called-----

i) Simple event ii) Primary event iii) Derived event iv) Complementary event.

c) Probability of an event lies between ----

i)  $-\infty$  and  $+\infty$  ii) 0 and 1 iii) -1 and +1 iv) 0 and  $\infty$

d) If one card is drawn at random from well shuffled pack of 52 cards, then probability that the card is a diamond will be-----

i)  $13/53$  ii)  $3/4$  iii)  $1/13$  iv)  $1/2$

e) If A and B are independent events with  $P(A) = 1/2$  and  $P(A \cup B) = 2/3$  then  $P(B^c/A)$  is equal to---

i)  $1/3$  ii)  $1/2$  iii)  $2/3$  iv) 1

f) Which one of the following is true?

i) If A and B are exclusive then  $P(A \cap B) = 0$

ii) If A and B are exclusive then  $P(A \cap B) \neq P(A) \cdot P(B)$

iii) If A and B independent, they cannot be exclusive.

iv) All the above.

g) Let the p.m.f. of  $X$  be

$$P(X) = (3-X)/10; X = -1, 0, 1, 2$$

$$0; \text{otherwise}$$

Then mean of  $X$  is equal to----

i)-1 ii) 0 iii) 1 iv) 0.5

h) If  $X$  is a discrete r.v. then simplified formula of variance of  $X$  then  $E(Y) = E(X)$  if----

i)  $\text{Var}(X) = E(X^2) - E(X)$  ii)  $\text{Var}(X) = [E(X)]^2 - E(X^2)$  iii)  $\text{Var}(X) = [E(X)]^2 - E(X)$  iv)  $\text{Var}(X) = E(X^2) - [E(X)]^2$

**2. Attempt any two of the following. (16)**

a) Explain the term: i) Random Experiment ii) Sample Space iii) Compound Event

iv) Complement of event v) Sure event.

b) Define probability generating function of a r.v. What is the effect of change of origin and scale on it?

c) A box contains four tickets numbered 554, 545, 455, and 444. One ticket is drawn randomly. Let  $A_i$  ( $i=1, 2, 3$ ) be the event that the  $i^{\text{th}}$  digit of the number on the ticket is 5. Are  $A_1, A_2,$  and  $A_3$  i) Pair wise independent ii) mutually independent.

**3. Attempt any four of the following. (16)**

a) State and prove the additional theorem of probability concerning three events  $A$  and  $B$ .

b) Two fair dice are thrown. Find the probabilities of the following events.

A: the sum of the two numbers is even.

B: the sum of the two numbers is at least 8.

C: the product of the two numbers is not greater than 9

c) For any two events  $A$  and  $B$  defined on a sample space, define conditional probabilities  $P(A/B)$  and  $P(B/A)$

d) If  $A$  and  $B$  are independent events prove that

i)  $A'$  and  $B'$  are independent. ii)  $A$  and  $B'$  are independent iii)  $A'$  and  $B$  are independent.

e) Define mathematical expectation of discrete r.v.  $X$

f) Let  $X$  be a discrete r.v. with p.m.f.

$$P(X) = \frac{x}{15}, x = 1, 2, 3, 4, 5$$

$$= 0; \text{otherwise}$$

Find  $E(X)$  and  $V(2X-3)$