Roll No. | | | | | | |

Answer Sheet No._____

Sig. of Candidate._____

Sig. of Invigilator._____

STATISTICS HSSC–II

SECTION – A (Marks 17)

Time allowed: 25 Minutes

NOTE: Section–A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

(i) For collectively exhaustive events their_____ must be equal to sample space.

A. Sum B. Difference

C. Union D. Intersection

(ii) Six sides of a cubical dice are equally likely because probability of each side is:

A. $\frac{1}{6}$ B. $\frac{2}{6}$

C. 0 D. $\frac{1}{2}$

(iii) What is probability of an event which is sure to happen?

A. 0 B. 1

C. $0 < P(A) < 1$ D. Negative

(iv) Expected value of a random variable is equal to its:

A. Median B. Variance

C. Mean D. Mode

(v) If X is a continuous random variable and $f(x)$ is its p.d.f then $P(X = 24)$ is:

A. 1 B. 0

C. > 0 D. < 0

(vi) For a Binomial distribution with mean = 20 and n = 100, then 'p' will be:

A. 0 B. $\frac{1}{5}$

C. 1 D. 5

(vii) The Bionomial random variable ranges from:

A. 0, 1 B. 1, n

C. $0, \infty$ D. 0, n

(viii) The mean and variance of the standard normal variate are:

A. 0 and 1 B. $\mu \text{ and } \sigma$

C. $\mu \text{ and } \sigma^2$ D. $-1 \text{ and } 1$

(ix) The shape of Normal curve is:

A. J-Shaped B. Bell-Shaped

C. U-Shaped D. L-Shaped

(x) Sampling distribution of any statistic is _____ distribution of that statistic.

A. Probability B. Non probability

C. Frequency D. Random

(xi) $\sigma_{\overline{X}_1-\overline{X}_2}$ = _____ for with replacement.

A. $\mu_1 - \mu_2$ B. $\frac{\sigma_1 2}{n_1} + \frac{\sigma_2 2}{n_2}$

C. $\sqrt{\frac{\sigma_1 2}{n_1}\cdot\frac{N_1-n_1}{N_1-1} + \frac{\sigma_2 2}{n_2}}$ D. $\sqrt{\frac{\sigma_1 2}{n_1} + \frac{\sigma_2 2}{n_2}}$

(xii) The point estimator for population proportion P is:

A. $\frac{\Sigma X}{n}$ B. $\frac{X}{n}$

C. $\frac{n}{\Sigma x}$ D. $\frac{n}{X}$

(xiii) Single numerical value is obtained as an estimate of the parameter in case of:

A. Interval estimate B. Positive

C. Point estimate D. Testing of Hypothesis

(xiv) The critical region is decided keeping in view:

A. Null Hypothesis B. Alternative Hypothesis

C. Test Statistic D. None of these

(xv) The alternative hypothesis $H_A : \mu < 100$ is a:

A. Composite Hypothesis B. Simple Hypothesis

C. Test Statistic D. None of these

(xvi) The degree of freedom in test independence is:

A. r – 1 B. c – 1

C. (r – 1) (c– 1) D. r c

(xvii) χ^2 (chisquare)Statistic gave inflated value if expected frequency of any cell of given contingency table is:

A. 0 B. < 5

C. > 5 D. = 5

For Examiner's use only:

Total Marks: 17

Marks Obtained:

STATISTICS HSSC–II

Time allowed: 2:35 Hours **Total Marks Sections B and C: 68**

NOTE: Sections 'B' and 'C' comprise pages 1–2 and questions therein are to be answered on the separately provided answer book. Answer any fourteen parts from Section 'B' and any two questions from Section 'C'. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly. Statistical table will be provided on demand.

SECTION – B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. All parts carry equal marks. **(14 x 3 = 42)**

(i) In a game of bridge, what is the probability that a hand gets no ace.

(ii) Define a. Sample Space b. Random experiment

(iii) A continuous random variable has p.d.f.

$f(x)=\frac{1}{6}(5-2X)$ for $0\leq x\leq 2$

compute $P(x\geq 1)$

(iv) Find the missing term such that the given distribution is probability distribution:

X	−2	−1	1	2	4
$P(X)$	$\frac{12}{210}$	$\frac{80}{210}$	?	$\frac{24}{210}$	$\frac{1}{210}$

Also find the probability distribution of Y when Y = 4X+8

(v) Expand the Binomial distribution: $(\frac{1}{4}+\frac{3}{4})^5$

(vi) An event has probability $p=\frac{3}{4}$. Find complete Binomial distribution for n=5

(vii) If X follows the hypergeometric probability distribution, determine: $h(x;N,K,n)=h(3;10,5,4)$

(viii) Define Normal distribution.

(ix) In a normal distribution mean is 50 and variance is 100. Find area between 53 and 72.

(x) The value of second moment about mean in a normal distribution is 5. Find μ_4 and μ_3 for this distribution.

(xi) Describe the terms population, statistic and parameter.

(xii) Given $\mu_1=20,\mu_2=5,\sigma_1{}^2=4,\sigma_2{}^2=12 \quad n_1=2,n_2=4$

Find $\mu_{\bar{x}_1-\bar{x}_2}$ and $\sigma_{\bar{x}_1-\bar{x}_2}$

(xiii) Differentiate between point estimate and point estimator.

(xiv) Find 90% confidence interval of μ from a sample of size 25 which has mean 10, drawn from the normal population having variance 49.

(xv) Describe the general procedure for testing of hypothesis.

(xvi) A sample of 56 from a normal population with unknown variance σ^2 gave mean as 40 and variance as 950. Test $H_0:\mu=45$ against $H_1:\mu<45$ at $\alpha=0.10$

(xvii) If $s=15,\bar{X}=4,t=3,H_o:\mu=5$ then what is n?

(xviii) Differentiate between Dichotomy and Manifold classification.

(xix) If there are 304 A's and 1024 B's in 1216 observations, how many AB's and $\alpha\beta's$ will be, so that A and B becomes independent.

SECTION – C (Marks 26)

Note: **Attempt any TWO questions. All questions carry equal marks.** **(2 x 13 = 26)**

Q. 3 **a.** One bag contains 7 red and 3 white balls. A second bag contains 3 red and 7 white balls. A ball is drawn at random from 1st bag and it is transferred to 2nd bag. Then a ball is drawn from the 2nd bag, what is the probability that the drawn ball is red? **(07)**

b. From the following frequency distribution, prepare probability distribution. Also find E(X), Var (X). **(06)**

x	0	1	2	3	4
f	2	4	5	3	2

Q. 4 **a.** In a Normal distribution, 10% of the items are upto 40 and 70% are under 60. What are the mean and standard deviation of the normal distribution. **(06)**

b. Draw all possible samples of size 3 letters by without replacement from the word "FEDERAL". **(07)** Find the proportion of letter 'E' in each sample. Construct sampling distribution of proportions and verify:

(i) $\mu_p = P$ (ii) $\overset{2}{\sigma}_p = \frac{PQ}{n} \cdot \frac{N-n}{N-1}$

Q. 5 **a.** Samples of size 10 and 15 are respectively drawn from the normal populations with same but unknown standard deviations. The means of the samples are $\bar{X}_1 = 20, \bar{X}_2 = 15$ and sample variance $s_1^2 = 16$ and $s_2^2 = 14$. Is the difference between sample means significant? **(07)**

b. Find chi-square and test of association for the following data: **(06)**

	A1	A2	A3
B1	14	16	10
B2	26	24	20