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. 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) What is the number of subsets in the set $A = \{1, 2, 3, 4\}$?

A. 4 B. 6 C. 8 D. 16

(ii) What is the probability of drawing a king of spade from a pack of 52 cards?

A. $\frac{1}{4}$ B. $\frac{1}{13}$ C. $\frac{1}{26}$ D. $\frac{1}{52}$

(iii) If for two independent events A and B, $P(A) = 0.6$ and $P(B) = 0.3$ then $P(A \cap B)$ is _____.

A. 0.90 B. 0.12 C. 0.18 D. 0.24

(iv) What is the variance of Binomial distribution $(q + p)^n$?

A. npq B. $\sqrt{npq}$ C. pq D. np

(v) In Binomial distribution what would be the value of mean if $n = 6$ and $p = 0.25$?

A. 6.25 B. 1.50 C. 24.00 D. 6.75

(vi) What is the value of p when the Binomial distribution is positively skewed?

A. $p = q$ B. $p > q$ C. $p < q$ D. $p = 0$

(vii) In sampling with replacement, the Standard Error of means is_____.

A. $\frac{\sigma^2}{n}$ B. $\frac{\sigma}{\sqrt{n}}$ C. $\frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$ D. $\sqrt{\frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)}$

(viii) $\sigma^2_{\bar{x}_1 - \bar{x}_2}$ is equal to_____.

A. $\sigma^2_{\bar{x}_1} - \sigma^2_{\bar{x}_2}$ B. $\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}$ C. $\mu_1 - \mu_2$ D. $\frac{\sigma_1^2}{n_1} - \frac{\sigma_2^2}{n_2}$

(ix) For a Normal Distribution with $\mu = 55$ and $\sigma = 10$ the area under the curve to the right of value $x = 55$

A. 1.00 B. 0.50 C. 0.55 D. 0.75

(x) In a $N(15, 16)$ the value of standard deviation is_____.

A. 15 B. 16 C. 4 D. 2

(xi) Accepting H_o when H_o is true is a_____.

A. Type I error B. Type II error C. Wrong decision D. Correct decision

(xii) For $\alpha = 0.05$ the critical value of z for two tailed test is_____.

A. ± 1.96 B. ± 2.33 C. ± 2.58 D. ± 1.96

(xiii) Assume the chi square test is to be performed on the contingency table with four rows and four columns. The degree of freedom should be_____.

A. 16 B. 9 C. 8 D. 6

(xiv) The calculated value of chi square could **NOT** be_____.

A. Positive B. Zero C. Negative D. One

(xv) If x and y are independent random variable then $E(xy)$ is equal to_____.

A. xy B. $E(x).E(y)$ C. $E(x) + E(y)$ D. $[E(x) + E(y)]^2$

(xvi) If values of x are 0, 1, 2 with their respective probabilities $\frac{1}{6}, \frac{2}{3}$ and $\frac{1}{6}$ then $E(x) =$ _____.

A. 1 B. $\frac{2}{3}$ C. $\frac{1}{6}$ D. $\frac{1}{2}$

(xvii) Window 2000, UNIX and DOS are examples of operating systems_____.

A. Software B. Hardware C. Input unit D. Program

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 attempt any two questions from Section 'C'. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.

SECTION – B (Marks 42)

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

(i) A pair of dice is rolled. What is the probability that the sum is even number.

(ii) For any two events A and B ,it is known that $P(A)=\frac{2}{3}$, $P(A\cup B)=\frac{7}{12}$ and $P(A\cap B)=\frac{5}{12}$. Find $P(B)$.

(iii) If $P(A)=0.60$, $P(B)=0.40$ and $P(B/A)=0.4$ then find $P(A\cap B)$.

(iv) A random variable x has the probability function:

x	–2	3	1
$f(x)$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{6}$

Find $E(x^2)$

(v) Find the value of $Var(x+10)$ and $Var(x-15)$ if $Var(x)=10$

(vi) Is it possible to have a Binomial distribution with mean 10 and standard deviation 4?

(vii) The mean and variance of a Binomial distribution are 42 and 12.6, respectively. Find p and n.

(viii) Using the binomial distribution, find the probability of 4 successes in 6 trials when $p=0.2$.

(ix) If $N=52$, $n=13$ and $k=12$. Find the standard deviation of Hypergeometric distribution.

(x) Write two properties of Hypergeometric distribution.

(xi) Given $N_1=3$, $n_1=2$, $N_2=3$, $n_2=2$, $\sigma_1^2=0.6667$ and $\sigma_2^2=0.6667$. Find the value of $\sigma^2_{\bar{x}_1-\bar{x}_2}$ when sampling is done with replacement.

(xii) Define Statistic and Parameter.

(xiii) Find 90% confidence interval for mean of a Normal distribution with $\sigma=3$, given the sample $(2.3,\ -0.2,\ -0.4,\ -0.9)$. $Z_{.05}=\pm 1.645$

(xiv) Given $\bar{x}=6.0$, $\mu=6.2$, $\sigma=2.25$ and $n=400$. Find the value of z.

(xv) Define Type I Error and Type II Error.

(xvi) If $(A)=480$, $(AB)=160$ and $N=1200$. Find the value of (B). When A and B are independent.

(xvii) In a Normal distribution, variance is 4. Find the first four moments about the mean.

(xviii) In a Normal distribution, mean is 20 and standard deviation is 5. Find mean deviation and quartile deviation.

(xix) Name various Input and Output devices.

SECTION – C (Marks 26)

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

Q. 3 **a.** From a well-shuffled pack of 52 cards, a card is drawn at random. What is the probability that it is:

(i) A card of diamond 01

(ii) An Ace 01

(iii) A king of hearts 01

(iv) A pictured card 01

(v) A black card 01

b. Let x be a random variable with the following probability distribution:

x	–1	0	1	2	3
$P(x)$	0.125	0.50	0.20	0.05	0.125

Find: 1½+2½

(i) $E(x)$ (ii) $E(x^2)$

c. In a Normal distribution $\mu = 20$ and $\sigma = 4$. Find the area between 15 and 25. 04

Q. 4 A population consists of 5 values 1, 3, 5, 7, 9. Find:

(i) All possible samples of size 2 with replacement. 02

(ii) Mean of each sample. 01

(iii) Form a sampling distribution of sample mean. 03

(iv) Mean and variance of sampling distribution of sample mean. 1+2

(v) Mean and variance of population. 1+2

(vi) Verify that: ½+½

(a) $\mu_{\bar{x}} = \mu$ (b) $\sigma_{\bar{x}}^2 = \dfrac{\sigma^2}{n}$

Q. 5 **a.** The random sample of 200 married men were classified according to education and number of children: 08

Education	Number of Children		
	0 – 1	2 – 3	Over 3
Elementary	14	37	32
Secondary	19	32	17
College	22	17	10

Test the hypothesis at the 0.05 level of significance that the size of family is independent of the level of education attained by the father.

b. A random sample of 25 values gives the average of 83. Can this sample be regarded as drawn from the normal population with mean 80 and $\sigma = 7$ at 5% level of significance. 05