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Version No.				
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ROLL NUMBER					

STATISTICS HSSC–II

SECTION – A (Marks 17)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed.

Do not use lead pencil.

حصہ اوّل لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

Answer Sheet No. _____

ہر سوال کے سامنے دیے گئے، کریکولم کے مطابق درست دائرہ کو پُر کریں۔ **Invigilator Sign.** _____

Fill the relevant bubble against each question according to curriculum: **Candidate Sign.** _____

	Question	A	B	C	D	A	B	C	D
1.	If $A=\{1,2\}$, $B=\{2,4,5\}$ then $A \cup B$ is:	$\{1, 2, 4. 5\}$	$\{1,2,3,4,5\}$	$\{1,2,2,4,5\}$	$\{1,2,2,3,4,5\}$	○	○	○	○
2.	If ${}^{n}C_4 = {}^{n}C_5$ then $n=$:	10	9	8	7	○	○	○	○
3.	Median of the Binomial distribution $\left(\frac{1}{2}+\frac{1}{2}\right)^{20}$ will be:	$\frac{1}{2}$	$\frac{1}{20}$	5	10	○	○	○	○
4.	When three dice are rolled then total number of possible outcomes will be:	12	18	216	36	○	○	○	○
5.	If $P(x)=\frac{1}{10}$, $x=10$, the $E(X)$ is:	1	-1	Zero	$\frac{1}{2}$	○	○	○	○
6.	The alternative hypothesis $H_1 : \mu < 100$ is a:	Simple hypothesis	Composite hypothesis	Test-statistic	Null hypothesis	○	○	○	○
7.	If X and Y are independent random variables, then var $(X-Y)$ is equal to:	Var(X)-Var(Y)	Var(X) x Var(Y)	$E(X - Y)^2$	Var(X)+Var(Y)	○	○	○	○
8.	The range of normal distribution is:	0 to $+\infty$	$-\infty$ to 0	$-\infty$ to $+\infty$	–1 to +1	○	○	○	○
9.	The quartile deviation of the normal distribution is equal to:	$\frac{2}{3}\sigma$	$\frac{5}{4}\sigma$	$\frac{3}{2}\sigma$	$\frac{4}{5}\sigma$	○	○	○	○
10.	Standard deviation of the sampling distribution of a statistic is called:	Sampling error	Standard error	Dispersion	Non-sampling error	○	○	○	○
11.	Probability of type-II error is equal to:	α	$1-\beta$	β	$1-\alpha$	○	○	○	○

	Question	A	B	C	D	A	B	C	D
12.	A passing student is failed by an examiner; It is an example of:	Critical region	Type-II error	Best decision	Type-I error	○	○	○	○
13.	The calculated value of the Chi-square could not be:	Positive	Negative	Zero	One	○	○	○	○
14.	In testing independence in a 3×4 contingency table, the number of degrees of freedom in χ^2 – distribution is:	3	4	6	12	○	○	○	○
15.	If $(AB)<\frac{(A)(B)}{N}$, then two attributes are:	Disassociated	Associated	Independent	Normal	○	○	○	○
16.	Mouse is an example of:	Secondary storage	Central processing unit	Input unit	Output unit	○	○	○	○
17.	Function keypad consists of:	6 keys	8 keys	10 keys	12 keys	○	○	○	○

ROLL NUMBER					

STATISTICS HSSC–II

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

NOTE: Answer any fourteen parts from Section 'B' and any two questions from Section 'C'. Write your answers neatly and legibly. Statistical table will be provided on demand.

SECTION – B (Marks 42)

Q. 2 Write brief answers of any FOURTEEN parts **(14 x 3 = 42)**

(i) If $S=\{1,2,3,4,5,6,7,8\}$, $A=\{1,2,3,4\}$, $B=\{2,4,6\}$, $C=\{3,4,5,6\}$ then find $(A\cap C')\cup B$

(ii) How many possible permutations can be formed from the following words?

(a) STATISTICS **(b)** COMMITTEE

(iii) If the probability that it will snow tomorrow is 0.85, what is the probability that it will not snow tomorrow?

(iv) If two coins are tossed, find the probability of getting at most one tail.

(v) If $P(A)=0.60$, $P(B)=0.40$ and $P\left(\frac{B}{A}\right)=0.40$, then find $P(A\cap B)$.

(vi) If $E(X^2)=400$ and $SD(X)=12$, then find $E(X)$.

(vii) A continuous random variable X that can assume values between 2 and 5 has a density function given by $f(x)=\frac{2(1+x)}{27}$. Find (a) $P(x<4)$ (b) $P(x=4.5)$

(viii) Show that mean = 2p for a binomial distribution in which $n=2$

(ix) State any three properties of the binomial experiment.

(x) If $N=12$, $n=4$ and $k=6$. Find the standard deviation of hypergeometric distribution.

(xi) In a normal distribution, the mean and standard deviation are 15 and 2.5 respectively. Find the mean deviation, Q_1 and Q_3

(xii) Briefly give the importance of the normal distribution.

(xiii) A normal distribution has mean $\mu=70$ and standard deviation $\sigma=36$. Find its mode and quartile deviation QD.

(xiv) Give $p_1=\frac{2}{3}$, $n_1=2$, $p_2=\frac{1}{2}$, $n_2=2$. Find $\mu_{\bar{p}1-\bar{p}2}$ and $\sigma_{\bar{p}1-\bar{p}2}$

(xv) What is the value of finite population correction factor (f.p.c) when $n=18$ and $N=125$.

(xvi) Differentiate between sampling with replacement and sampling without replacement.

(xvii) Given $n=100$, $\overline{X}=182$ and $\sigma^2=299$, $Z_{\frac{\alpha}{2}}=Z_{0.005}=2.58$. Find the 99% confidence interval for the population mean.

(xviii) Given the following information $N=1024$, $(A)=144$, $(B)=384$, $(AB)=54$, Show that attributes A and B are independent.

(xix) Differentiate between hardware and software.

SECTION – C (Marks 26)

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

Q. 3 **a.** A box contains five red, two white and three green marbles. If a marble is selected at random, find these probabilities. **(04)**

(i) That is red
(ii) That is green
(iii) That is red or white
(iv) That is not red

b. A committee of size 4 is to be selected at random from 5 women and 3 men. Find the expected number of women on the committee. **(09)**

Q. 4 **a.** In a normal distribution, $\mu = 20$ and $\sigma^2 = 25$, then find: **(04)**

(i) $P(22 < X < 28)$ **(ii)** $P(10 < X < 18$

b. A population consists of values 0, 3. Draw all possible samples of size 3 with replacement. Find the mean and variance of sampling distribution of means and verify the results: **(09)**

(i) $\mu_{\bar{x}} = \mu$ **(ii)** $\sigma^2_{\bar{X}} = \frac{\sigma^2}{n}$

Q. 5 **a.** A job placement director claims that the average starting salary for nurses is Rs. 24000. A sample of 10 nurses has a mean of Rs. 23450 and $s = 400$. Is there enough evidence to reject the director's claim at $\alpha = 0.05$? **(05)**

b. An investigation into colour-blindness and gender of a person gave following results. **(08)**

Gender	Colour Blindness	
	Colour Blind	Not Colour Blind
Male	36	964
Female	19	981

Is there evidence, at 5% level of significance for the association between gender and colour blindness.

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