F-226

Roll Number	PR XII (01) 17	Superintendent
In Figures: _____	**STATISTICS**	Signature / Stamp:
In Words: _____	Inter Part-II	_____
_____	(Fresh / Reappear)	
	Fic. No. _____	
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STATISTICS

Inter Part-II

(Fresh / Reappear)

Fic. No. _____
(For Board's Office use only)

Time Allowed: 3 Hours **Marks:** 85

Note: There are THREE sections in this paper i.e. Section **A**, **B** and **C**.
Attempt Section-A on the same paper and return it to the Superintendent within the given time.
No marks will be awarded for **Cutting, Erasing** or **Overwriting. Marks of Identification** will lead to UFM case, **Mobile Phone** etc are not allowed in the examination hall.

Time Allowed: 20 minutes **Marks:** 18

Q-I Write the correct option i.e. A, B, C or D in the empty box provided opposite to each part.

i. A normal curve with a small S.D (σ) will be.....
A. More spread out B. Less spread out C. Positively skewed D. None of these

ii. The degree of accuracy in using normal approximation for a binomial distribution depends upon values of.....
A. n B. p C. Both n and p D. None of these

iii. If The sampling from finite population is done without replacement then $\sigma_{\bar{x}}$ = ...
A. $\frac{\sigma}{n}$ B. $\frac{\sigma}{\sqrt{n}}\sqrt{\frac{N-n}{N+1}}$ C. σ D. S^2

iv. When sampling is performed with replacement the $\sigma^2_{\bar{x}_1-\bar{x}_2}$ = ...
A. $\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}$ B. $\frac{\sigma^2}{n}$ C. $\mu_1-\mu_2$ D. $\frac{\sigma}{n}$

v. Which of the given is simple hypothesis?
A. $\mu = 20$ B. $\mu > 20$ C. $\mu < 20$ D. $\mu \neq 20$

vi. As compared to normal distribution, t – distribution is .....
A. Flatter B. More peaked C. Symmetric D. Negatively skewed

vii. A binary characteristic of a population is referred to as .....
A. Median B. Mean C. Proportion D. None of these

viii. If y = 2 + 0.6 x then value of y intercept is .....
A. 0.6 B. 2 C. X D. 0

ix. In regression analysis if dependent variable is measured in rupees, the independent variable.....
A. Must also be in rupees B. Can be any unit C. Must be in some unit of currency D. None of these

x. In normal distribution the area P [0 < z < 1.31] = ...
A. 0.4032 B. 0.3413 C. 0.4049 D. 1

xi. The coefficient of correlation is symmetric about X and Y that is .....
A. $r_{xy} = 1$ B. $b_{xy} = b_{yx}$ C. $r_{xy} = r_{yx}$ D. $r_{xy} = 0$

xii. The test statistic used to test the Independence of attributes is .....
A. Normal B. Chi Square C. Binomial D. "t" distribution

xiii. In r x c contingency table the sum of all observed frequencies are 249 then the sum of expected frequencies are.....
A. 1000 B. 500 C. 249 D. 0

xiv. Damage to wheat crop due to rain is.....
A. Regular variation B. Secular trend C. Seasonal variation D. Irregular variation

xv. Semi average method is used for measurement of .....variation
A. Secular B. Seasonal C. Cyclical D. Irregular

xvi. There are.....components of time series,
A. 1 B. 3 C. 2 D. 4

xvii. Which of the given is application software?
A. Word processors B. Educational C. Games D. All of these

xviii. $f(x) \geq$ .....
A. 1 B. 0 C. 0.5 D. None of these

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STATISTICS

Inter Part – II
(Fresh / Reappear)

Note: Time allowed for Section – B and Section – C is 2 Hours and 40 minutes.

Section – B

Marks: 40

Q-II Answer any TEN parts. Each part carries FOUR marks.

1. Find the area between (i) – 1.73 and – 1.45 (ii) $P(z > 1.96)$
2. The number of customers entering a certain store in any given day is approximately normally distributed mean = 50 and standard deviation = 11. Find probability that during a given day.
   (i) At least 50 (i.e 50 or more) customers arrive (ii) Between 45 and 55 customers arrive.
3. Explain sampling and non sampling errors.
4. The marks obtained by six students in a general knowledge test carrying 10 marks are 5, 3, 8, 5, 4 and 6. For each of possible sample of size 3 in case of sampling replacement, Find value of sample mean $\bar{x}$. Write down sampling distribution of $\bar{x}$, and verify that $E(\bar{x}) = \mu$ and standard errors of $\bar{x}$ is equal to $\sigma/\sqrt{n}$.
5. A population consists of four numbers 8, 10,12, 14. Draw all possible samples of size 2 which can be drawn with replacement from this population. Find the population variance.
6. A soft drinking vending machine is set to dispense 8 ounces per cup. The machine was tested 36 times and average cup filled was 8.2 ounces with a Standard deviation of 0.12 ounces. At 0.01 level of significance, we can accept or reject null hypothesis of $\mu = 8.0$ ounces against the alternative hypothesis of $\mu > 8.0$ ounces against the alternative hypothesis of $\mu > 8.0$ ounces.
7. Out line the test procedure for testing hypothesis about a single population mean μ, when population Standard deviation is known.
8. Explain the meaning of regression of Y on X and X on Y.
9. Given the bivariate data:

X	1	5	3	2	1	1	7	3
Y	6	1	0	0	1	2	1	5

   Find regression line of Y on X and hence predict Y, if X = 10.
10. Consider 2 x 2 table responding smoking and lung cancer. Perform a chi squared test of independence to decide whether smoking is a cause of cancer. Use 0.05 level of significance.

	Cancer	Urban	Total
Smoking	75	34	109
No Smoking	28	112	140
Total	103	146	249

11. Use methods of least squares to fit a straight line to following data.

Year	1995	1996	1997	1998	1999	2000
Profit (in thousand Rs.)	80	90	85	100	115	120

12. Convert the following into required base.
    (i) $(741)_8 = (?)_{10}$ and (ii) $(693)_{10} = (?)_{16}$
13. What is meant by secular trend?

Section – C

Marks: 27

Note : Attempt any THREE questions. All questions carry equal marks.

Q-III The lifetime of a brand of light bulbs is normally distributed with a mean of 30 hours and Standard deviation of 5.6 hours. Let X be the lifetime of a randomly selected light bulb of this brand. Determine (i) $P[x > 20]$ (ii) $P[15 \leq X \leq 45]$ (iii) $P[X \leq 25]$.

Q-IV In a study to estimate the proportion of residents in a certain city and its suburbs who favour the construction of a nuclear power plant, it is found that 52 of 100 urban residents favour the construction while only 34 of 125 sub urban residents are in favour. Describe the sampling distribution of difference between the sample proportions.

Q-V Gymnasts were ranked by two judges in following table. Calculate spearman's rank correlation.

First Judge	4	5	8	3	1	2	7	6
2nd Judge	5	4	6	1	2	3	7	8

Q-VI Ten oil tins are taken at random from on automatic filling machine the mean weight of tins if found to be 15.8 kg, with a Standard deviation of 0.5 kg. Does the sample mean differ significantly from intended weight of 16 kg.