BBA., SEMESTER IV
CC-210: BUSINESS STATISTICS

SECTION - I

Q-1 (A) State different methods of taking a random sample and explain them in brief. **10 Marks**

(B) Answer the following: **10 Marks**

1. The life 'x' of battery in hours is supposed to be normally distributed as

$$f(x)=\frac{1}{75\sqrt{2\pi}}e^{-\frac{1}{2}\left(\frac{x-305}{75}\right)^2}$$

Find μ, σ &

What is the probability that the life of a bulb will be

i) Less than 230 hours

ii) between 436.25 and 473.75 hours.

Table value:

$Z=1.00\Rightarrow A=0.3413$

$Z=2.25\Rightarrow A=0.4878$

$Z=1.75\Rightarrow A=0.4599$

2. 10 observations of a population are divided into two strata as follows:

Stratum I	2	4	6	9	11	16
Stratum II	9	10	21	24	-	-

Sample of size 3 is taken from the first stratum and that of size 2 is taken from the second stratum, find $V\left(\bar{y}_{st}\right)$

Q-2 (A) Define the following terms in detail: **10 Marks**

1. Null Hypothesis & Alternative Hypothesis
2. Type I & Type II errors.

(B) Answer the Following: **10 Marks**

1. The following information is about the Marks of students of SY A and SY B Class.

	SY A	SY B
Mean Marks	68.85	68.55
Standard Deviation	3.48	3.40
Sample Size	900	1100

Do the data indicate that the Marks of students from SY A are on the average more than that of students from SY B.

2. In Ahmedabad 430 students out of a sample of 770 students watch IPL (Indian Premier League). Does this information support the hypothesis that the majority of students in Ahmedabad watch IPL?

Q-3 (A) Write differences between Large Sample Test & Small Sample Test and explain Paired t-test with necessary steps. **10 Marks**

(B) Answer the following: **10 Marks**

1. A sample from a normal population gave the following information
   $n = 20, \quad \sum x_i = 1020, \quad \sum x_i^2 = 52760.$
   Test the hypothesis that population mean is 54.
   $t_{t\ (19,\ 0.05)} = 2.093$
2. Is the difference in the performance of the following students significant?

A	B	C	D
300	350	500	320
300	350	400	250
320	250	300	400
380	100	550	330

$\mathbf{[F_{((3,12),0.05)} = 3.49]}$

Q-4 (A) Fit Poisson Distribution. **10 Marks**

x	0	1	2	3	4	5	6
f	10	30	25	18	7	6	4

$\left[e^{-2.16} = 0.1153\right] \left[\chi^2_{[3,0.05]} = 7.82\right]$

(B) Answer the following: **10 Marks**

1. From a population with median 6 following sample is drawn at random.
   13, 9, 15, 8, 10, 14, 18, 4, 12, 10, 7, 5
   Check whether the population median is 6 or not?

   (Critical value at 5% is 2)

2. Check randomness of following sample.
   P, P, P, N, N, P, P, N, P, P, N, N, P, N, N, N, N, N

   [Critical values of runs for $n_1 = 8$ & $n_2 = 10$ from Table-1 & Table-2: $(C_1 = 5 \ \& \ C_2 = 15)$]

SECTION – II

Q-5 Multiple Choice Questions: (Attempt Any 10) **10 Marks**

1. The degrees of freedom to test the independence of two attributes in $r \times c$ contingency table is
   $i)\ (r-1)(c-1)$
   $ii)\ (r-1)+(c-1)$
   $iii)\ (r-1)-(c-1)$
   $iv)\ (r-1)/(c-1)$
2. Degree of Freedom is the number of _____ observations of the variable.
   $i)$ *Dependent*
   $ii)$ *Independent*

3. Analysis of Variance can be useful in testing equality of Variances.
   $i)\ True$
   $ii)\ False$
4. Type I Error is also called _____.
   $i)\ Level\ of\ Significance$
   $ii)\ Critical\ Region$
5. Mean of Standard normal variate Z is _____.
   $i)$ 1 (One)
   $ii)$ 0 $(Zero)$
6. In Simple Random Sampling, the given population is _____
   $i)\ Homogeneous$
   $ii)\ Heterogeneous$
7. The main aim of a sample survey is to obtain reliable information about the population in less time and at a lower cost.
   $i)\ True$
   $ii)\ False$
8. Mean, Median & Mode in _____ distribution are equal.
   $i)\ Poisson$
   $ii)\ Binomial$
   $iii)\ Hypergeometric$
   $iv)\ Normal$
9. The tail of the normal curve do not meet 'x' *axis*
   $i)\ True$
   $ii)\ False$
10. Population characteristics under study is called _____.
    $i)\ Parameter$
    $ii)\ Sample$
11. Randomness of the sample can be tested by _____.
    $i)\ Run\ Test$
    $ii)\ Mann - Whitney\ Test$
    $iii)\ Chi - Square\ Test$
    $iv)\ Sign\ Test$
12. Non-parametric Test procedure is also known as _____.
    $i)\ Normal\ Test$
    $ii)\ Distribution\ Free\ Test$
    $iv)\ Specified\ Distribution\ Test$
13. The area of the curve for the values of Z between $-\infty\ and\ 0$ is
    $i)$ 0.5
    $ii)$ 1
14. Chi-Square is a _____ distribution.
    $i)\ Discrete$
    $ii)\ Continious$
15. In F-test, the numerator is _____ the denominator.
    $i)\ Less\ than$
    $ii)\ Greater\ than$
    $ii)\ Equal\ to$