

Total No. of Questions : 4]

SEAT No. :

P3367

[Total No. of Pages : 3

[4864]-2003

M.Com. (Semester - II)

**BUSINESS STATISTICS**

**(2013 Pattern) (Credit System)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of statistical tables and calculator is allowed.*
- 4) *Symbols have their usual meanings.*

**SECTION - I**

**Q1)** Attempt any **two** of the following : **[14]**

a) A student is to answer 6 multiple choice questions. Each with 4 alternatives. He answers them on pure guesses. Write down probability mass function of number of correct answers. Also state its mean and variance. **[7]**

b) Find mean and variance of a continuous random variable X whose probability density function is given by : **[7]**

$$f(x) = 3x^2 \quad \text{if } 0 \leq x \leq 1$$
$$= 0 \quad \text{otherwise.}$$

c) Let X be a discrete random variable with p.m.f. **[7]**

$$P(X=x) = 1/n \quad X= 1,2,3,\dots,n$$
$$= 0 \quad \text{otherwise}$$

Show that :

i)  $E(X) = \frac{n+1}{2}$

ii)  $V(X) = \frac{n^2-1}{12}$

Also find  $E(2X)$  and  $V(2X-3)$ .

**P.T.O.**

**Q2) Attempt any two of the following : [14]**

- a) i) The average number of misprints per page of a book is 1.5. Assuming the distribution of number of misprints be Poisson, Find : [4]

The probability that the book is free from misprints.  
 Number of book containing more than one misprint in a book of 900 pages. [Given  $e^{-1.5} = 0.22313$ ]

- ii) A sample of 400 people is found to have mean weight of 50.47 kg can it be regarded as a sample from large population with mean weight of 52 kg and standard deviation 1.2 kg. [3]

- b) i) The following information is collected on two characters : [4]

	Cinegoers	Non-cinegoers
Literate	83	57
Illiterate	45	65

Based on this information can you conclude that there is no association between habit of watching cinema going and literacy? Use 5% L.O.S.

Given  $\chi_1^2 = 3.81$ ,  $\chi_2^2 = 5.99$ ,  $\chi_3^2 = 7.81$

- ii) A random variable X has following probability distribution : [3]

X	1	2	3	4	5
P(X=x)	5K	8k	15k	7k	5k

Find :

- (1) K
- (2)  $P(1 < X \leq 3)$
- (3)  $P(X \geq 4)$

- c) i) In a shooting competition, the probability of man hitting a target is  $\frac{1}{5}$ . If he hits the target for 5 times, what is the probability of hitting

target, [4]

- 1) only two times?
- 2) at least two times?

- ii) Let  $X \rightarrow B(n,p)$ . If  $E(X) = 4$ ,  $\text{Var}(X) = 3$ , find n and p. Also find  $P(X=0)$ . [3]

**Q3)** Attempt the following : **[14]**

- a) Marks scored by candidates are normally distributed. 44% of the candidates obtained marks below 55 and 6% of the candidates scored marks above 80. Find the mean and variance of marks. **[7]**

OR

- b) An IQ test was administered to 5 persons before and after they were trained. The results are given below : **[7]**

Candidates	A	B	C	D	E
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is change in IQ before and after the training programme (take  $\alpha = 0.05$ ).

- c) A random sample of size  $n_1 = 15$  from a normal population has standard deviation 5.2 and mean 81. A second random sample of size  $n_2 = 16$  has standard deviation 3.4 and mean 76. Test the hypothesis that  $\mu_1 = \mu_2$  against  $\mu_1 > \mu_2$ . **[7]**  
(Given  $t_{27} = 1.703$ ,  $t_{28} = 1.701$ ,  $t_{29} = 1.699$ )

OR

- d) If  $X$  is a normal variate with mean 30 and SD 5. Find **[7]**
- i)  $P(26 \leq X \leq 40)$
  - ii)  $P(X \geq 45)$
  - iii)  $P(X \leq 25)$
  - iv)  $P(X \geq 30)$
  - v)  $E(2X)$
  - vi)  $\text{Var}(2X)$
  - vii)  $\text{Var}(3X - 5)$

**Q4)** Attempt any two of the following : **[8]**

- a) Write probability mass function (p.m.f.) of Poisson distribution. Also write its three real life application. **[4]**
- b) Explain the procedure of Large Sample Test for equality of two population means. **[4]**
- c) Explain the concept of parameter and its estimate. Also define unbiased estimator. **[4]**

