

## GANPAT UNIVERSITY

BBA Examination April 2014

BBA (General/FS/MM), Semester 2 (CBCS)

Time: 3 Hours.

IIA04BUS : Business Statistics

Total Marks: 70

**Instructions:**

- (1) Use separate answer books for Section I and Section II.
- (2) Q1 in Section I and Q4 in Section II are compulsory.
- (3) Figures to the right indicate marks of each question.

**SECTION – I**

- Q1(A)** If  $P(A_1)=2P(A_2)=P(A_1/A_2)=0.4$  then find the probability that (i) Both  $A_1$  and  $A_2$  happen, (ii) Only  $A_2$  happen, (iii) At least one happens, (iv) Neither of  $A_1$  and  $A_2$  happen. (04)
- (B)** If A,B and C are three mutually exclusive and exhaustive events then examine the correctness of the following statement: (04)
- (i)  $P(A)=2/5$ ,  $P(B)=3/7$ ,  $P(C)=3/35$ ; (ii)  $P(A)=2/3$ ,  $P(B)=3/5$ ,  $P(C)=1/9$   
 (iii)  $P(A)=0.27$ ,  $P(B)=0.52$ ,  $P(C)=0.21$ ; (iv)  $P(A)=0.42$ ,  $P(B)=0.60$ ,  $P(C)=-0.02$
- (C)** The probability distribution of demand of a commodity is given below: (03)

Demand(x)	5	6	7	8	9	10
Probability(p(x))	0.05	0.1	0.3	0.4	0.1	0.05

Find the expected demand and its variance.

- Q2(A)** There are 6 black and some white balls in an urn. The probability of drawing 2 black balls from it is  $1/3$ . Find the number of white balls in the urn. (04)
- (B)** For a Poisson variate  $P(1)=P(2)$ , find the value of  $P(0)$ . (04)
- (C)** Write the statement of multiplication theorem of probability. (02)
- (D)** What are the mean and variance of Binomial and Poisson Distribution? (02)

**OR**

- Q2(A)** Three dice are thrown simultaneously, find the probability of getting total at least 16. (04)
- (B)** The Standard deviation of a Poisson variate is 0.8, Find its mean,  $P(0)$  and  $P(1)$ . (04)
- (C)** Define: Equally Likely Events, Independent Events (02)
- (D)** For a Binomial Distribution mean=12 and variance=8 then find n and p. (02)

- Q3(A)** The probability that A speaks the truth is 0.6 and the probability that B speaks truth is 0.7. They both agree about a statement. Find the probability that the statement is true. (04)
- (B)** The probability distribution of random variable x is as follows: (04)

$x_i$	0	1	2	3	4	5	6	7	Total
$p(x_i)$	0	1/10	2/10	2/10	3/10	1/100	2/100	17/100	1

Find the mean and variance of x.

- (C)** There are two coins. On one face of each coin 1 is written and on the other face 2 is written. The coins are tossed simultaneously. Find the expected value of the total on the coins. (04)

**OR**

- Q3(A)** The probability that a patient will get reaction of a particular injection is 0.001, 2000 patients are given that injection. Find the probabilities that (i) 3 patients will get reaction, (ii) more than 2 patients will get reaction. (04)
- (B)** The daily profit of a business man is Rs.120 and Standard Deviation of the profit is Rs.15. Find the number of days out of 365 days on which his profit will be less than Rs.100. (04)
- (C)** A person throws an unbiased die and he gets the amount in rupees equal to the square of the face value obtained. Find the mathematical expectation of his amount. (04)

**SECTION – II**

- Q4(A)** From a factory producing piston rings, samples of 200 rings are taken daily. The record of defective rings is given below. Draw an appropriate control chart and report on the state of control. (06)

Date	1	2	3	4	5	6	8	10	11	12	14	15	18	19	21
Defective Rings	18	10	20	20	26	20	26	12	15	17	31	34	32	13	10

- (B)** For studying a characteristics the observations of a population are 10,12, 20, 22, 26. How many random samples of size 2, without replacement can be taken from it? Making a list of all the samples verify the following results: (05)

$$(i) E(\bar{y}) = \bar{Y} , (ii) V(\bar{y}) = \left(\frac{N-n}{N}\right) \frac{S^2}{n} , (iii) E(s^2) = S^2$$

- Q5(A)** Explain np chart and obtain its control limits. (06)

- (B)** Explain Simple Random Sampling. (06)

**OR**

- Q5(A)** A population is divided in three strata. The information regarding them is as follows: (06)

Stratum	Number of units in the stratum	Stratum size	Stratum Variance
1	60	8	12
2	30	6	10
3	10	9	4.5

If 10,6, 3 units are taken respectively from these strata. Find the variance of stratified mean. Also find the population mean.

- (B)** Construct  $\bar{X}$  and R charts from the following data and state your conclusions: (06)

Sr.No.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2
R	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.5	2.0

[For  $n=5, A_2=0.577, D_3=0, D_4=2.115$ ]

- Q6(A)** (i) The upper control limit of p chart is \_\_\_\_\_. (02)

(ii) In R chart, If  $UCL=5.4778, CL=2.59$  then  $LCL=_____$ .

- (B)** The mean of random sample of 1000 units is 17.6 and the mean of another random sample of 800 units is 18. Can it be concluded that both the samples come from the same population with S.D.=2.6. (05)

- (C)** In a large consignment of apples, 64 fruits out of a sample of 400 fruits are found to be bad. Test the hypothesis that the population proportion of bad apples in the consignment is 20%. (Use 1% of level of significance) (05)

**OR**

- Q6(A)** (i) \_\_\_\_\_ chart is used for controlling number of defects in a Radio set. (02)

(ii) \_\_\_\_\_ chart is used for the variability in the process.

- (B)** The information regarding marks of boys and girls of a college is given below. (05)

Sample	Mean	S.D.	Sample Size
Boys	83	10	121
Girls	81	12	81

Test whether the difference in standard deviation is significant or not.

- (C)** A sample of 200 villages of a district A gave average population of 485 people with S.D. of 50 people. Another sample of 200 villages of another district B gave average population of 510 people with S.D. of 40 people. Is the difference between the means significant? (05)

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