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**PBG-010-001307** Seat No. _____

# B. B. A. (Sem. III) Examination

**November / December - 2018**

## Statistics

***(Business Statistics)***

***(Old Course)***

**Faculty Code : 010**

**Subject Code : 001307**

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

**1** (a) Define the following terms : **7**

(1) Probability

(2) Independent events

(3) Mutually exclusive event

(b) Three person A, B, C appear in an interview for three vacancies in the same post. The probability of A's selection is 1/6, that of B's selection is 1/5, that of C's selection is 1/4. What is probability that at least one of them will be selected? **7**

**OR**

**1** (a) State and prove the addition theorem of probability. **7**

(b) In an examination, 30% of the student failed in Mathematics, 20% failed in Statistics and 10% have failed in both. A student is selected at random. What is the probability that the student has failed in Mathematics if it is known that he has failed in Statistics? **7**

**2** (a) State the properties of Normal Distribution. **7**

(b) Find the value of p and calculate mean and variance of random variable X from the following probability distribution : **7**

| $x$ : | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| $P(x)$ : | 3/8 | $p$ | 1/16 | 1/16 | $p$ |

**OR**

2 (a) The income of a group of 10,000 persons was found to be normally distributed with mean of Rs. 750 and standard deviation Rs. 50. What was the lowest income among the richest 250 persons? 7

$\left[Given\ P(-\infty < Z < 0) = 0.5,\ P(Z > 1.96) = 0.025\right]$

(b) There are 4 red balls and 2 black balls in a box and 2 balls are taken at random from it. A person receives Rs. 4 for each black ball and losses Rs. 2 for each red ball. Find expected amount received by the person. 7

3 (a) State the properties of Binomial distribution. 7

(b) From the past experience in a certain manufacturing plant, there are on the average 4 industrial accidents occurs per month. Find the probability that in a given year there will be less than 4 accidents using Poisson distribution. $\left(Given\ e^{-4} = 0.0183\right)$ 7

**OR**

3 (a) The incidence of Dengue fever in India was such that person had 25% chance of suffering from it. What is the probability that out of 5 persons, 3 or more will contact the disease? 7

(b) The number of errors in Auditing per year follows Poisson distribution with mean 3. Out of 1000 Audit find approximately number of Audit with 7

(1) no errors in a year.

(2) more than 3 errors in a year. $\left(Given\ e^{-3} = 0.0497\right)$

4 (a) What is sampling? Explain simple random sampling. 7

(b) State the advantages and limitation of sampling. 7

**OR**

4 (a) Give the difference between sample survey and population survey. 7

(b) Write short note on Stratified random sampling 7

**5** A magazine vendor estimates the probability of the demand of the magazine as follows : **14**

| Demand of Magazine | 1 | 2 | 3 |
|---|---|---|---|
| Probability | 0.3 | 0.4 | 0.3 |

Each copy of the magazine costs him Rs. 12 and its selling price Rs. 14. The unsold copies of the magazine can be returned at Rs. 10 per copy. How many copies of the magazines should be purchase daily to maximize the profit? Also calculate EVPI and EOL.

**OR**

**5** (a) Select the best act from the given payoff table using **7**

(i) Maximax criterion,

(ii) Maximin principle

(iii) Hurwicz principle taking $\propto = 0.6$.

| *State of* | *Act* | | | |
|---|---|---|---|---|
| *Nature* | $A_1$ | $A_2$ | $A_3$ | $A_4$ |
| $S_1$ | 12 | 15 | 9 | 10 |
| $S_2$ | 10 | 14 | 11 | 16 |
| $S_3$ | 8 | 7 | 7 | 18 |

(b) Write short note on : **7**

(i) EMV Criterion

(ii) EOL Criterion