

**Jagan Institute of Management Studies**  
**End-Term Examination, December 2017 – January 2018**  
**Trimester II – PGDM (IB) 2017-19**

***Quantitative Techniques II***  
***ET\_IB\_QT-II\_3012***

Time: 3 Hrs.

M. Marks: 70

**INSTRUCTIONS: Attempt any SEVEN questions. All questions carry equal marks.**

- Q 1** In order to understand level of satisfaction from after sales service an automobile company determined to collect primary data from consumers by questionnaire survey method. The company has its products in four segments i.e. small size vehicles, mid segment vehicles, SUV's and transportation vehicles. As the company is second largest automobile seller of the region it is nearly impossible to collect information from census in given time. If you are working as a marketing manager for the company and the job of collecting data is assigned to your team. Which method of sampling would you prefer and why? Discuss the advantages and limitations of the particular method you selected in detail along with the method of applying particular sampling technique. **10**
- Q 2 a)** Give a brief discussion on application of probability in business decision making along with conditional probability. **4**
- b)** A is one of the five horses entered for a race, and is to be ridden by one of the two jockeys B and C; it is 3 to 1 that B rides A, in which case all the horses are equally likely to win, if C rides A, his chance is doubled. What are the odds in favor of his winning? **6**
- Q 3 a)** Give a brief discussion on application of Byes' theorem in positively diagnosed test results of rare diseases. **3**
- b)** A factory has two machines A and B. Past records show that machine A produces 30% of the total output and machine B the remaining 70%. Machine A produces 5% defective articles and machine B produces 1% of defective items. An item is selected at random and found to be defective. What is the probability that it was produced (i) by machine A (ii) by machine B? **7**
- Q 4 a)** Give a brief note on application of Binomial distribution in business decision making. **3**

- b) In incidence of occupational disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of six workers, 4 or more will contract the disease? **7**
- Q 5** a) Give a brief note on application of Poisson distribution in business decision making. **3**
- b) One fifth percent of the blades produced by a blade manufacturing factory turn out to be defective. The blades are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 100000 packets. ( $e^{-0.02} = 0.9802$ ). **7**
- Q 6** The mean and standard deviation of the wages of 6,000 workers engaged in a factory are Rs 1200 and Rs 400 respectively. Assuming that the distribution to be normal estimate;
- Percentage of workers getting wages above Rs 1600.
  - Number of workers getting wages between Rs 600 and Rs 900.
  - Number of workers getting wages between Rs 1100 and Rs 1500. **10**
- Q 7** To test the IQ level of boys and girls of a certain university a sample of 83 boys and 95 girls were taken for an IQ test. The average marks girls scored were 29.91 with a standard deviation of 11.56 marks and boy secured 30.92 marks on an average with standard deviation of 7.81 marks, Is the difference amongst the mean scores is significant enough to believe that boys are having a better IQ in the university. Test your hypothesis at 5% level of significance. **10**
- Q 8** A sleeping drug and a control preparation were tested in turn on 10 patients in a hospital and gave the following results.
- | No. of hours sleep |      |         | No. of hours sleep |      |         |
|--------------------|------|---------|--------------------|------|---------|
| Patients           | Drug | Control | Patients           | Drug | Control |
| 1                  | 10.6 | 8.6     | 6                  | 10.2 | 9.0     |
| 2                  | 7.5  | 7.3     | 7                  | 7.1  | 6.5     |
| 3                  | 9.0  | 9.4     | 8                  | 9.7  | 7.9     |
| 4                  | 5.4  | 5.1     | 9                  | 8.4  | 8.7     |
| 5                  | 6.1  | 5.4     | 10                 | 7.9  | 6.9     |
- Whether the drug has any greater effect than the neutral control preparation? Test your hypothesis at 5% level of significance. **10**
- Q 9** A product is tested on three age groups (20 y – 30 y, 30 y – 40 y and 40 y – 50 y). It is found that out of total, 65 respondents liked the product

and shown the willingness to buy it of which 30 belongs to an age group of 30y - 40y and 15 belong to 40y – 50y age group. 10 respondents from each 20y – 30y and 30y – 40y age group didn't like the product and were not willing to buy it. If there are 100 respondents in total test the hypothesis that liking and disliking of product is independent of age group.

Test the hypothesis at a 5% level of significance.

**10**

**Q 10**

The price of a certain commodity was ascertained in each of the three towns A, B and C in four quarters of the year. The prices are given below. Is the variation in prices between different towns and in different seasons significant? Use a 5% level of significance to test the hypothesis.

Quarters	A	B	C
I	60	50	60
II	50	40	65
III	45	35	45
IV	65	45	60

**10**

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