॥ विद्या सर्वस्य भूषणम् ॥

## PRABODHAN EDUCATION SOCIETY'S
## Vidya Prabodhini College of Commerce, Education, Computer & Management
### Vidyanagar, Alto-Parvari, Goa
### SEMESTER END EXAMINATION – OCTOBER 2016 (Regular/Repeat)

**Sub**: STATISTICAL TECHNIQUES - I  **Semester**: III

**M. Marks**: 80  **M. Time**: 2 hrs.

INSTRUCTIONS: 1. All questions are compulsory however internal choice is available.
2. Use of calculator is allowed.
3. Figures to the right indicate marks allotted.
4. There are 5 main questions each carrying 16 marks.
5. You may answer randomly but every main question attempted should be answered serially.

**Q.1) Attempt the following.**

a) Explain the functions of statistics. (3)

b) Prepare a frequency distribution for the following data giving the heights of 30 students.(6)

| 121 | 133 | 137 | 127 | 132 | 134 | 131 | 126 | 124 | 135 |
| 139 | 127 | 137 | 130 | 133 | 144 | 131 | 132 | 127 | 140 |
| 126 | 134 | 128 | 142 | 143 | 123 | 125 | 136 | 129 | 132 |

Take the class intervals as 120 – 125, 125 – 130, ….. Also write less than cumulative frequency.

c) Draw a frequency curve for the following data. (7)

| Age (in years) | 20 -25 | 25 - 30 | 30 - 35 | 35 - 40 | 40 - 45 | 45 - 50 |
|---|---|---|---|---|---|---|
| No. of workers | 05 | 25 | 20 | 22 | 18 | 10 |

**OR**

**Q.I) Attempt the following.**

x) State limitations of statistics. (3)

y) The following table is the distribution of marks of 100 students of a class. Prepare a cumulative frequency table and answer the questions given below: (6)

| Marks | Number of students |
|---|---|
| 0 -10 | 14 |
| 10 – 20 | 13 |
| 20 – 30 | 28 |
| 30 – 40 | 20 |
| 40 - 50 | 25 |

Page 1 of 4

1) How many students have scored less than 40 marks?
2) How many students have got at least 30 marks?
3) If the minimum marks for passing is 20, how many students have failed in the examination?
4) How many students have got marks between 10 and 40?

z) Draw a pie diagram to represent the following data: (7)

| Items | Rs. (in lakhs) |
|-------|----------------|
| A | 35 |
| B | 28 |
| C | 19 |
| D | 8 |
| E | 10 |
| Total | 100 |

## Q.2) Attempt the following.

a) Write a short note on bar diagram. List different bar diagrams. (3)

b) The following is the distribution of heights of the students in a class. Calculate the value of mode. (6)

| Height (in cms) | 100 - 110 | 110 - 120 | 120 – 130 | 130 - 140 | 140 – 150 |
|-----------------|-----------|-----------|-----------|-----------|-----------|
| No. of students | 5 | 8 | 12 | 10 | 7 |

c) The mean of 20 observations was found to be 16.5. it was later discovered that one observation was wrongly copied as 12 instead of 21. Find the correct mean. (7)

### OR

## Q.II) Attempt the following.

x) Distinguish between frequency polygon and frequency curve. (3)

y) Calculate the least and highest quartile from the following data. (6)

| Class interval | 0 - 10 | 10 - 20 | 20 - 30 | 30 - 40 | 40 - 50 |
|----------------|--------|---------|---------|---------|---------|
| Frequency | 5 | 8 | 12 | 7 | 5 |

z) The average age of 50 persons is 40 years. Among these, the average age of 30 persons is 30 years. What is the average age of remaining persons? (7)

## Q.3) Attempt the following.

a) Write the merits of Arithmetic Mean. (3)

b) If the median of the following distribution is 35, find the missing frequency. (6)

| Class intervals | 0 - 25 | 25 - 50 | 50 - 75 | 75 – 100 |
|-----------------|--------|---------|---------|----------|
| Frequency | 12 | 10 | -- | 3 |

c) Calculate mean deviation from mode for the following data. (7)

| Production | 100 - 120 | 120 – 140 | 140 – 160 | 160 - 180 | 180 – 200 |
|---|---|---|---|---|---|
| No. of units | 10 | 42 | 55 | 38 | 10 |

**OR**

## Q.III) Attempt the following.

x) Write the merits of Median. (3)

y) Calculate $P_{32}$ for the following data. (6)

| Advertising Expenditure (in '000) | 2 – 3 | 3 - 4 | 4 - 5 | 5 - 6 | 6 – 7 |
|---|---|---|---|---|---|
| No. of companies | 10 | 15 | 30 | 25 | 12 |

z) Calculate standard deviation using following data. (7)

| Classes | 10 - 20 | 20 – 30 | 30 - 40 | 40 - 50 | 50 - 60 |
|---|---|---|---|---|---|
| Frequency | 8 | 12 | 25 | 18 | 13 |

## Q.4) Attempt the following.

a) Write a short note on skewness. (3)

b) For the following data construct chain base index numbers. (6)

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| Daily wages | 200 | 240 | 260 | 280 | 350 | 370 | 400 |

c) Calculate Fisher's price index number for the data given below. (7)

| Commodity | Base Year Price | Base Year Quantity | Current Year Price | Current Year Quantity |
|---|---|---|---|---|
| Rice | 4 | 15 | 5 | 20 |
| Wheat | 8 | 20 | 12 | 18 |
| Sugar | 6 | 25 | 8 | 20 |
| Oil | 14 | 10 | 21 | 10 |

**OR**

## Q.IV) Attempt the following.

x) State different measures of variation. (3)

y) For the following data construct index numbers taking the base year as 2007. (6)

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|
| Price (in '000 Rs.) | 18 | 16 | 19 | 20 | 23 | 25 | 25 | 28 |

z) Calculate Lespeyre's quantity index number for the data given below. (7)

| Commodity | Base Year | | Current Year | |
|---|---|---|---|---|
| | Price | Quantity | Price | Quantity |
| A | 6 | 50 | 10 | 56 |
| B | 2 | 100 | 2 | 120 |
| C | 4 | 60 | 6 | 60 |
| D | 10 | 40 | 12 | 36 |

## Q.5) Attempt the following.

a) Write the different components of time series. (3)

b) Compute three yearly moving averages trend from the following data. (6)

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Production (in lakhs rupees) | 12 | 15 | 13 | 16 | 20 | 18 | 21 | 23 | 22 | 26 |

c) Compute trend line by using Least square method for the following data. (7)

| Year | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| Production | 10 | 15 | 18 | 25 | 30 |

### OR

## Q.V) Attempt the following.

x) Write short note on kurtosis. (3)

y) Find five yearly moving average trend from the following data. (6)

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Trend Value | 98 | 105 | 103 | 100 | 107 | 106 | 103 | 102 | 112 |

z) Draw the trend line by the method of semi-averages for the following data, and estimate the sales in the year 2008. (7)

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Sales (in '000 Rs.) | 16 | 17 | 23 | 21 | 18 | 25 |