

Total No. of Questions : 7]

[Total No. of Printed Pages : 7

**[3969]-104**

**F. Y. B. Com. Examination - 2011**

**MATHEMATICS AND STATISTICS**

**(New 2008 Pattern)**

**Time : 3 Hours]**

**[Max. Marks : 80**

**Instructions :**

- (1) All the questions are compulsory.
  - (2) Figures to the right indicate full marks.
  - (3) Use of logarithmic table and calculator is allowed.
  - (4) Both the sections should be written in the same answer-book.
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**SECTION - I**

**Q.1) Attempt any four of the following :**

**[2×4=08]**

- (a) What is 'Stock Exchange' ?
- (b) Find rate of simple interest at which principal of Rs. 3,000 earns an interest of Rs. 2,600 in 5 years.
- (c) Explain Cartesian Product with an illustration.
- (d) If  $A = \begin{bmatrix} 2 & 3 & 5 \\ -1 & 6 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 5 & -2 & 3 \\ 2 & -1 & 6 \end{bmatrix}$ ,  
find  $A + B$ .
- (e) If  $f(x) = x^2 - 5x + 6$ , find  $f(-3)$ .
- (f) Shade region defined by an inequality  $3x + 4y \geq 24$ .

**Q.2) Attempt any three of the following :**

**[5×3=15]**

- (a) Find determinant of the matrix :

$$A = \begin{bmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{bmatrix}$$

- (b) Which is the better investment, 8% at 80 or 15% at 120 ? Justify.  
(Face Value Rs. 100)
- (c) Find equated monthly instalment on a loan of Rs. 1,00,000 to be repaid in 10 years at 15% p.a. Interest is charged on the loan outstanding at the beginning of each year.  
[Given  $(1.15)^{10} = 4.04557$ ]
- (d) Using Matrix Inverse Method, find solution for the following system of equations :

$$5x - 2y = -1$$

$$x + 3y = 10$$

- (e) What sum will amount to Rs. 848 in 8 months at 9% p.a. simple interest ?

**Q.3) Attempt any three of the following :**

**[5×3=15]**

- (a) Find compound interest on Rs. 4,000 for the 5th year when the rate of interest is 8% p.a.
- (b) If  $y = x^2 \cdot e^x$ , find  $\frac{dy}{dx}$ .

(c) Evaluate :

(i)  $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$

(ii)  $\lim_{x \rightarrow 2} \frac{x^2 - 18x + 32}{x - 2}$

(d) Solve the following Linear Programming Problem (L.P.P.) by Graphical Method :

Maximize  $Z = 200x + 300y$

Subject to  $3x + 2y \leq 240$

$$2x + 4y \leq 280$$

$$x \geq 0, y \geq 0$$

(e) A company manufactures two types of presentation goods 'A' and 'B'. Each unit of 'A' requires 4 gms of silver and 1 gm of gold; while that of 'B' requires 1 gm of silver and 3 gms of gold. The availability of silver and gold per day is 120 gms and 100 gms respectively. The manufacturing cost per unit of type A is Rs. 920 and that of type 'B' is Rs. 1,600. Formulate a Linear Programming Problem to minimize cost.

## SECTION - II

**Q.4) Attempt any two of the following :**

**[2x2=04]**

(a) State difference between Inclusive and Exclusive Classification.

(b) Compute Median for the following series of observation :

52, 45, 60, 53, 48, 65, 42, 45, 60

- (c) Obtain less than cumulative frequency distribution for the following data :

Class	100-150	150-200	200-250	250-300	300-350
Frequency	12	15	08	03	01

- (d) Define the term 'Correlation' with example.

**Q.5) Attempt any three of the following :**

**[5x3=15]**

- (a) Explain Procedure of Stratified Random Sampling.
- (b) What is an Index Number ? Explain Method of Construction of Family Budget Index Number.
- (c) Write merits and demerits of Arithmetic Mean.
- (d) Draw histogram and find mode graphically for the frequency distribution of marks of 40 students :

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	05	08	15	05	04	03

- (e) Compute range and coefficient of range for the data given below :

8, 12, 10, 18, 28, 17, 20, 22, 12

Also find new range and coefficient of range when each observation is doubled.

**Q.6)** Attempt **any three** of the following :

**[5x3=15]**

- (a) Answer questions using the following frequency distribution of 100 companies :

<b>Profit (00,000 Rs)</b>	<b>No. of Companies</b>
0-100	09
100-200	15
200-300	18
300-400	21
400-500	—
500-600	14
600-700	05

- (i) State Type of Classification.  
(ii) Find Missing Frequency.  
(iii) Find Class-mark of Fifth Class.  
(iv) Identify Median Class  
(v) Find Class Width of Third Class.

- (b) Obtain line of regression of y on x for the data given below :

<b>x</b>	06	02	10	04	08
<b>y</b>	09	11	05	08	07

Also estimate y when  $x = 5$ .

- (c) Find Standard Deviation and Coefficient of Variation for the following data :

6, 4, 5, 3, 12, 10

- (d) Given :  $\Sigma p_1 q_0 = 175$ ,  $\Sigma p_0 q_0 = 91$ ,  $\Sigma p_1 q_1 = 190$ ,  $\Sigma p_0 q_1 = 100$ . Find Laspeyre's, Paasche's and Fisher's Price Index Number.
- (e) Ranks obtained by 6 students in Statistics and Accountancy are given below :

<b>Ranks in Statistics</b>	5	6	4	3	2	1
<b>Ranks in Accountancy</b>	6	2	1	4	3	5

Compute Spearman's Rank Correlation Coefficient.

**Q.7) Attempt any one of the following :**

**[8x1=08]**

- (a) Following are the values of import and export of finished goods in suitable units :

<b>Export</b>	10	11	14	14	20	22	16	12	18	13
<b>Import</b>	12	14	15	16	21	26	21	15	16	14

Calculate Karl-Pearson's Correlation Coefficient between Export and Import Values.

- (b) (i) Find variance for the following frequency distribution :

<b>Class</b>	5-15	15-25	25-35	35-45	45-55
<b>Frequency</b>	05	15	12	18	08

- (ii) Following is the frequency distribution of sale of companies.  
Find mode :

Sale (00,000 Rs.)	0-20	20-40	40-60	60-80	80-100
No. of Companies	05	18	20	12	05

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