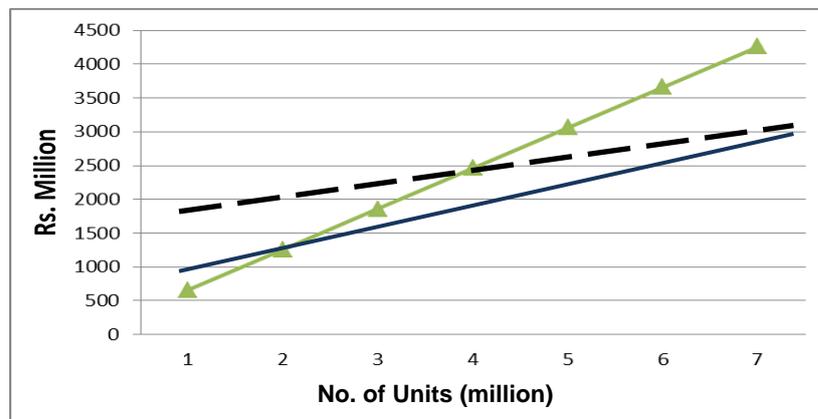


(E) The difference between the compound interest (compounded annually) and the simple interest on a certain sum of money invested for 2 years at 4% per annum is Rs.1/-. The sum invested (in Rs.) is:

- (1) 0.0016 (2) 51 (3) 345 (4) 625

(F) A bottle manufacturing factory has 3 production lines **A**, **B** and **C**. The total cost of production against the number of units produced by each of the 3 production lines is given below. If the production line **A** has the lowest fixed cost and the production line **B** has the highest fixed cost, the number of units (in million) where both line **A** and line **B** will have the same total production cost is:



- (1) 2,500 (2) 2 (3) 7 (4) 4

(G) The demand function of a laptop manufacturing factory is given below:

$$2P = \frac{(100 - x)}{2}$$

Where, “x” is the number of laptops demanded and, “P” is the selling price of a laptop (in thousands).

The number of laptops to be sold to maximize the total revenue is:

- (1) 100 (2) 25 (3) 50 (4) 200

(H) A company has estimated that the purchase of a new machine after 5 years will cost Rs.76,250/-. In order to buy a new machine at the end of the 5th year, the management wishes to start building up a fund for the amount required. If the fund is created in a bank which pays 9% interest compounded annually, how much should the company set aside every year? (to the nearest integer)

- (1) Rs.12,742/-. (2) Rs.15,250/-. (3) Rs.10,517/-. (4) Rs.10,000/-.

(I) If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, inverse of the matrix A is given by:

- (1) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (2) $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ (3) $\begin{pmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{pmatrix}$ (4) $\begin{pmatrix} 4 & -2 \\ -3 & 1 \end{pmatrix}$

(J) In order to conduct a salary survey of a company, firstly, the employees of the company were divided into 3 sub sets as skilled, semi-skilled and unskilled.

The possible sampling method used for the survey could be:

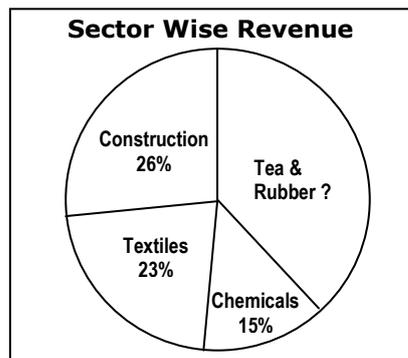
- (1) Stratified Sampling. (2) Cluster Sampling.
 (3) Systematic Sampling. (4) Random Sampling.

(K) $\frac{2}{3}$ of the jewels manufactured by **XX Jewelries Ltd.** are manufactured with the aid of machines (M) and the rest is handmade (H). 10% of the machine manufactured ones are defective and 95% of the handmade ones are in good quality.

The percentage of jewels manufactured by **XX Jewelries Ltd.** which is defective is:

- (1) 1% (2) 8.3% (3) 6% (4) 83.3%

(L) **PMS Group** is diversified into 4 main sectors as Tea & Rubber, Chemicals, Textiles and Construction. The percentage share of revenue from the Construction, Textiles and Chemicals are given in the chart below:



The angle which represents Tea and Rubber in the pie chart is:
 (to the nearest number)

- (1) 96° (2) 130° (3) 136° (4) 36°

(M) The demand for a product at different prices is given below:

Price (Rs.)	08 - 18	19 - 28	29 - 35	36 - 38	39 - 48
Demand (units in thousands)	16	14	12	7	9

The range of the above data is:

- (1) 40 (2) 41 (3) 20 (4) 7

(c) **DBO PLC** plans to invest in a 4 year project which requires an initial investment of Rs.11 million. The expected revenue in the first year is Rs.5 million. It is expected that revenue will increase by 20% a year thereafter. The operating cost per year is 35% of the revenue. If the required rate of return of the company is 12% per annum,

(i) Calculate the Net Present Value (NPV) of the project.

(ii) State whether **DBO PLC** should invest in this project. (07 marks)

You may use the following discounting factors at 12%.

Year	1	2	3	4	5
Discounting Factor @ 12%	0.893	0.797	0.712	0.636	0.567

(d) (i) Write the expansion of $(a + b)^3$ using binomial theorem.

(ii) Using the result of (i) above, write the expansion of $(2x + 5y)^3$. (06 marks)

(e) A manufacturing plant has the capacity of manufacturing a maximum of 10,000 units per week. The weekly cost function (C) of the plant is given by:

$$C = 75,000 + 100x - 0.3x^2 + 0.0004x^3$$

Where, x is the number of units manufactured.

The demand function (D) of a unit manufactured is given by,

$$D = 200 - 0.005x$$

Find the marginal cost, marginal revenue and marginal profit functions.

(Assume that the company sells all units manufactured.) (06 marks)

(Total 30 marks)

03. (a) A teacher wants to investigate the relationship between marks obtained by students for MCQs (Part **A**) and Essay Questions (Part **B**) of a Business Mathematics paper.

The following table shows the marks obtained by 5 students for part **A** and part **B** of the last Business Mathematics paper:

Marks - part A (x)	Marks - part B (y)
65	75
80	78
72	65
95	75
55	68

Using the information given above:

- (i) Find the equation of regression line given by $y = a + bx$.
- (ii) Find the expected marks for part **B**, if a student scores 85 for part **A**.
(12 marks)

You may use the following formula,

$$a = \bar{y} - b\bar{x}$$
$$b = \frac{n\sum xy - (\sum x)(\sum y)}{n\sum x^2 - (\sum x)^2}$$

- (b) The marks obtained by 250 students for the Business Mathematics paper are shown below:

Marks(x)	$0 < x \leq 10$	$10 < x \leq 20$	$20 < x \leq 30$	$30 < x \leq 40$	$40 < x \leq 50$	$50 < x \leq 60$	$60 < x \leq 70$	$70 < x \leq 80$	$80 < x \leq 90$	$90 < x \leq 100$
No. of Students	0	15	24	41	45	39	35	26	14	11

- (i) Draw the cumulative frequency curve (more than) on a graph paper for the above data.
- (ii) If 50% of the students who scored the highest marks are considered "pass", what is the cut-off pass mark?
(08 marks)
(Total 20 marks)

SECTION - C

Answer **any** two (02) questions only from this Section
20 marks

- 04.** (a) The annual fixed cost of a car manufacturing company is Rs.1,650 million. The variable cost of manufacturing a motor car is Rs.4 million. The maximum production capacity of the plant is 700 cars per annum and the selling price of a car is Rs.7 million.

Draw the graphs representing the total cost function and the total revenue function on a graph paper and find the break-even number of cars per annum using the graph.

(Note: select the number of units ranging from 200 to 700 units) (06 marks)

- (b) A bank called applications for the post of the Regional Manager. There were 10 external applicants (7 males and 3 females) and 5 internal applicants (2 males and 3 females).

Find the probability that the Regional Manager appointed is an external female candidate.
(04 marks)
(Total 10 marks)

05. (a) The ratio between female and male workers in a garment factory is 4 : 5. There are 800 female workers in the factory.

(i) Find the total number of workers in the garment factory.

(ii) The management of the garment factory intends to increase the female machine operators by a certain number. With the proposed increase, the female to male ratio of the factory will become 6 : 5.

Find the proposed number of female workers to be recruited to the factory.
(05 marks)

(b) The following table shows the prices and quantities of four products **A**, **B**, **C** and **D** which relate to years 2011 and 2012.

Item	Year 2011		Year 2012	
	Unit price p_o (Rs.)	quantity q_o	Unit price p_n (Rs.)	quantity q_n
A	30	6	45	5
B	60	15	70	10
C	50	12	65	13
D	25	5	20	4

Calculate Paasche's Price Index and Laspeyre's Price Index for the year 2012 considering the year 2011 as the base year.
(05 marks)
(Total 10 marks)

06. (a) The following table provides the age distribution of people in a small village who cast their vote in a recent provincial council election.

Age Group	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Number of Voters	5	7	5	5	8	4	2

Using the above data, compute:

(i) Mean,

(ii) Standard Deviation,

of voters' age.

(06 marks)

(b) **Sandun** invested **half** of his savings in a bond that paid simple interest for 2 years and received Rs.550,000/- as interest. He invested the remaining half in another bond that paid interest compounded annually, for the same 2 years at the same rate of interest and received Rs.605,000/- as interest:

Compute the interest rate at which he invested his money in the two bonds.

(04 marks)

(Total 10 marks)