

0104

B.B.A. IST SEMESTER EXAMINATION, 2019

Paper – IV

BUSINESS MATHEMATICS

Time: Three Hours

Maximum Marks: 80

PART – A (खण्ड – अ)

[Marks: 20]

Answer all questions (50 words each).

All questions carry equal marks.

सभी प्रश्न अनिवार्य हैं। प्रत्येक प्रश्न का उत्तर 50 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – B (खण्ड – ब)

[Marks: 40]

Answer five questions (250 words each).

Selecting one from each unit. All questions carry equal marks.

प्रत्येक इकाई से एक-एक प्रश्न चुनते हुए, कुल पाँच प्रश्न कीजिए।

प्रत्येक प्रश्न का उत्तर 250 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – C (खण्ड – स)

[Marks: 20]

Answer any two questions (300 words each).

All questions carry equal marks.

कोई दो प्रश्न कीजिए। प्रत्येक प्रश्न का उत्तर 300 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – A

- Q.1 (i) Define supply and demand functions with examples.
- (ii) In how many ways a chairman and a vice chairman of a board of 7 members can occupy their seats.
- (iii) Write the formula for sum of a series in A. P.
- (iv) Define Geometric Progression.
- (v) What principle will amount to 1035 ₹ in $2\frac{1}{2}$ years at 6% simple interest?
- (vi) Define effective interest rate.
- (vii) If $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$
then find the value of $2A + 3B$.
- (viii) If $A = \begin{bmatrix} 1 & i \\ -i & 1 \end{bmatrix}$ & $B = \begin{bmatrix} i & -1 \\ -1 & -i \end{bmatrix}$
then compute BA .
- (ix) Differentiate $(17x^2 + 5x + 1)e^x$ with respect to x .
- (x) Define Maxima and Minima.

PART – B

UNIT – I

- Q.2 Assume that for a closed economy-

$$E = C + I + G$$

Where E is total expenditure, C is expenditure on consumption goods, I is expenditure on investment goods and G is government spending. For equilibrium, we must have $E \equiv Y$, where Y is total income received.

For a certain economy it is given that-

$$C = 15 + 0.9 Y, I = 20 + 0.05 Y \text{ and } G = 25$$

Find the equilibrium of Y , C and I and I . How will these change if there is no government spending?

- Q.3 How many arrangement can be made with the letter of the word “MATHEMATICS” and in how many of them vowel occurs together.

UNIT -II

Q.4 The sum of an infinite series in G. P. is 57 and the sum of their cubes is 9747. Find the series.

Q.5 If a, b, c are in A. P., show that-

(a) $\frac{1}{bc}, \frac{1}{ca}, \frac{1}{ab}$ are in A. P.

(b) $\frac{1}{\sqrt{b}+\sqrt{c}}, \frac{1}{\sqrt{c}+\sqrt{a}}, \frac{1}{\sqrt{a}+\sqrt{b}}$ are also in A. P.

UNIT -III

Q.6 When a boy is born, 50,000 ₹ is placed to his credit in an amount that pays at the rate 6%.

(i) Compounded annually

(ii) Compounded quarterly

(iii) Compounded monthly

If the amount is not disturbed what amount will there be to his credit on his 20th birthday.

Q.7 Find the amount of an annuity of 7,000 ₹ payable at the end of each year for 7 years, if money is worth 6% per annum compounded annually.

UNIT -IV

Q.8 Verify that

$$B' A' = (AB)'$$

When $A = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 0 \\ -1 & 1 \end{bmatrix}$

Assuming that result is generally true, prove that

$$(A' B') = BA$$

Q.9 Obtain the inverse of the matrix.

$$\begin{bmatrix} 2 & 4 & -1 \\ 3 & 1 & 2 \\ 1 & 3 & -3 \end{bmatrix}$$

Hence solve the following system of equations.

$$2x + 4y - z = 9$$

$$3x + y + 2z = 7$$

$$x + 3y - 3z = 4$$

UNIT -V

Q.10 If $y = \frac{\log X}{x}$

Show that- $\frac{d^2y}{dx^2} = \frac{2 \text{Log } x - 3}{x^2}$

Q.11 A company charges 550 ₹ for a transistor set on orders of 50 or less sets. The charge is reduced by 5 ₹ per set for each set ordered in excess of 50. Find the largest sign order company should allow so as to receive a maximum revenue.

PART - C

Q.12 A profit making company wants to launch a new product. It observes that the fixed cost of the new product is 35,000 ₹ and the variable cost per unit is 5,00 ₹ . The revenue function for the sale of x units is given by-

$$500x - 100x^2$$

Find the-

- (i) Profit function
- (ii) Break even values and
- (iii) The values of x that result in a loss

Q.13 If a, b, c be the sums of p, q, r terms, respectively of an A. P. Show that -

$$\frac{a(q-r)}{p} + \frac{b(r-p)}{q} + \frac{c(p-q)}{r} = 0$$

Q.14 Find the effective rate equivalent to the nominal rate of 7% converted -

- (i) Quarterly
- (ii) Monthly
- (iii) Continuously

Q.15 A company produces three products every day. Their total production on a certain day is 45 tonnes. It is found that the production of the third product exceeds the production of the first product by 8 tonnes, while the total production of the first and third product is twice the production of the second product. Determine the production level of each product using Cramer's rule.

Q.16 If $y = \sqrt{\frac{1-x}{1+x}}$

Prove that- $(1 - x^2) \frac{dy}{dx} + y = 0$
