

2/H-76 (v) (a) (Syllabus-2015)

2 0 1 6

(April)

COMMERCE

(Honours)

(Fundamental Mathematics)

Marks : 75

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Answer any five questions

1. (a) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, then show that $A - A^T$ is a skew-symmetric matrix. 4

- (b) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then show that $A^2 - 5A + 7I_2 = 0$. 4

- (c) Using elementary row operations, find the inverse of the following matrix : 7

$$\begin{bmatrix} 2 & 3 & 1 \\ 3 & 4 & 1 \\ 3 & 7 & 2 \end{bmatrix}$$

(2)

2. (a) Find the domain and range of the following functions : $3+3=6$

(i) $f(x) = \frac{3+2x}{x}$ (ii) $f(x) = \log(1+x)$

- (b) A shopkeeper selling pencils charges ₹ 5 per pencil for purchase of 7 or less pencils and charges ₹ 4 per pencil for purchase of more than 7 pencils. Find the cost function $C(x)$, where $C(x)$ represents cost of buying x pencils. 4

- (c) Suppose a variable y changes linearly with respect to x . If $y=5$, when $x=1$ and $y=9$, when $x=3$, then express y as a linear function of x . 5

3. (a) Evaluate the following limits (any two) : $3 \times 2 = 6$

(i) $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x - 3}$ (ii) $\lim_{x \rightarrow \infty} \frac{x^2 + 3x - 7}{3x^2 + 4x - 2}$

(iii) $\lim_{x \rightarrow 5} \frac{\sqrt{x+9} - 2}{x - 5}$

- (b) Show that the following function is continuous at $x=3$: 6

$$f(x) = \begin{cases} \frac{3x+7}{2}, & x < 3 \\ 8, & x = 3 \\ \frac{8(x+2)}{5}, & x > 3 \end{cases}$$

(3)

- (c) Show that the following limit does not exist : 3

$$\lim_{x \rightarrow 2} \frac{|x-2|}{x-2}$$

4. (a) Find the respective first-order derivatives of the following functions (any two) : $4 \times 2 = 8$

(i) $f(x) = \frac{x^2 + 2}{7x + 1}$

(ii) $f(x) = e^{x^5 + 2x^2 + 7}$

(iii) $f(x) = \sqrt{5x^3 + e^{2x}}$

- (b) The demand function is given by $x = 10 + 2p - p^2$, where p = price per unit output and x = output. Find the point elasticity of demand at the point where $p=3$. Is the demand elastic at the given point? $6 + 1 = 7$

5. (a) The cost and demand functions are $C = x^2 + x + 6$ and $p = 13 - 2x$ respectively, where C = cost, x = output and p = price per unit output. Find the profit function and the values of p and x which maximize the profit. $1 + 8 = 9$

D16/1480

(Turn Over)

(4)

- (b) The demand function is given by $p = 180 - 3x$, where p = price per unit output and x = output. Find the revenue function and hence, find the output which maximizes the revenue. 1+5=6

6. (a) Find the effective rate of interest equivalent to the nominal rate of 11% compounded quarterly. 3

- (b) How long does it take for a principal to triple in value if money is worth 15% compounded annually? 5

- (c) A machine, the life of which is estimated to be 12 years, costs ₹ 45,000. If it is sold as scrap for ₹ 5,500, then find the rate of depreciation (using reducing balance method of depreciation). 7

7. (a) A person borrows ₹ 50,000 from a bank which charges interest of 12% per annum. He is required to pay in 24 monthly payment beginning at the end of the first month. What is the monthly payment required? 8

- (b) Find the present value of a sequence of annual payments of ₹ 3,000 each, the first being made at the end of 4 years and the last at the end of 11 years, if the money is worth 9% effective. 7

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2/H-76 (v) (a) (Syllabus-2015)

2/H-76 (vi) (Syllabus-2015)

2016

(April)

COMMERCE

(Honours)

(Indian Financial System)

Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Describe the structure of Indian financial system and highlight the changes in the structure in the post-reform period. 10+5=15

Or

Explain the role of Indian financial system in the economic development of the country. 15

2. Define money market. List out various money market instruments and discuss the features of any two instruments of money market. 3+2+10=15

D16/1482

(Turn Over)