Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – June / July 2021
II Semester

Class : I UG **Time : 3 Hours**
Major : Commerce / B.Com CA / B.Com PA **Max. Marks : 100**

18BCOI02 / 18BCCI02 / 18BCPI02 DSE – II Business Mathematics

Part A **10 x 1 = 10**
Choose the Correct Answer

1. The amount on Rs.4000 at 10% p.a. for 3 years is CO1 K2
   a. 1800 b.1500 c.1200 d. 7800

2. The bill of Rs.1500 at 3 months discounted at 4% p.a. then the cash value is CO1 K2
   a. 1485 b.1585 c.1500 d. 1600

3. A _____ matrix is a matrix in which the number of rows is equal to the number of columns. CO2 K2
   a. symmetric b. square c. triangular d. unit

4. [3,8,9,-2] is a row matrix of order CO4 K1
   a. 4 x 1 b. 1 x 4 c. 1 x 1 d. 1 x 2

5. Given $y = e^{-2x}$ then $\frac{dy}{dx} =$ CO2 K1
   a. $2e^{-2x}$ b. $-2e^{-2x}$ c. e^{-2x} d. -2

6. $\lim_{x\to\infty} (1+\frac{1}{x})^x$ = CO2 K2
   a. e b. 1 c. 0 d. x

7. If C is the cost of x items, the marginal cost is given by CO4 K5
   a. $\frac{dx}{dC}$ b. $\frac{C}{x}$ c. $\frac{x}{C}$ d. $\frac{dC}{dx}$

8. MR at x = 10 when the total revenue function $R = 1500x - 7.5x^2$ is CO4 K4
   a. 0 b. 1350
   c.14250 d. none of the above

9. The process of finding the integral of a function is called CO5 K2
   a. integral b. integration
   c. integrand d. none of the above

10. $\int e^{7x}\,dx =$ CO5 K1
   a. $7e^{7x}$ b. e^{7x} c. $\frac{e^{7x}}{7}$ d. $\frac{e^{x}}{7}$

Part B **5 x 6 = 30**

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. Find the period in which an amount gets DOUBLED at 12% per annum compound interest. CO1 K4

(or)

11.b. Mr. X borrows Rs.20,000 at 4 % compound interest and agrees to pay both the principal and the interest in 10 equal instalments at the end of each year. Find the amount of these instalments. CO2 K2

12.a. Verify that $B^T A^T = (AB)^T$ when $A = \begin{pmatrix} 1 & 1 & 2 \\ 2 & 1 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 \\ 2 & 0 \\ -1 & 1 \end{pmatrix}$. CO3 K6

(or)

12.b. Define the

i. existence of inverse of a matrix ii. cofactor of a matrix

iii. orthogonal matrix CO3 K3

13.a. Find $\lim_{x \to 3} \frac{x^2 - 5x + 6}{x^2 - 9}$. CO3 K3

(or)

13.b. Find the derivative of the function i) $y = (x^2 - 7)^2$ ii) $y = \frac{3x^4 - x^2 + 8}{x}$. CO3 K3

14.a. If the demand law is $x = \frac{20}{p+1}$, find the elasticity of demand at the point when p = 3. CO2 K5

(or)

14.b. The total cost function y for x units is given by $y = \frac{3x(x+7)}{x+5} + 5$. Show that the marginal cost decreases continuously as the output increases. CO4 K2

15.a. Evaluate $\int (x + \frac{1}{x})^2 dx$. CO5 K3

(or)

15.b. The marginal cost function for producing x units is y = 23 +16 x – 3 x^2 and the total cost for producing 1 units is 40. Obtain the total cost function and the average cost function. CO5 K3

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. A person has two daughters A and B aged 13 and 16 years. He has Rs.40,000 with him now but wants that both of them should get an equal amount when they are 20 years old.How he should divide the money if it were to be deposited in a bank giving 9% compound interest per annum? CO1 K2

(or)

16.b. i. Mr. X borrows Rs.1,716. He repays RRRs.250 at the end of each year. In how many years can he clear the debt if the rate of compound interest is 7.5% p.a? CO1 K1

ii. The bankers discount is 51 times the banker's gain. Find the term of the bill if interest is 8% p.a. CO1 K1

17.a. The data below in millions of rupees is on an economy of three industries A,B,C. CO3 K3

Producer	User			Final Demand	Total Output
	A	B	C		
A	8	10	10	4	32
B	8	20	6	6	40
C	6	10	8	4	28

Determine the output when the final demand changes to 14 for A, 28 for B and 14 for C.

(or)

17.b. Show that the matrix $A=\begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ satisfies the equation $A^3-6A^2+9A-4I=0$. Hence deduce the value of A^{-1}. CO2 K3

18.a. If y = ax^2+ bx show that $x^2\frac{d^2y}{dx^2}-2x\frac{dy}{dx}+2y=0$. CO3 K4

(or)

18.b. i. Differentiate $(3x^2+4x-5)^3$ with respect to x.

ii. Find $\lim_{x\to 0}\frac{\sqrt{1+x}-1}{x}$. CO3 K4

19.a. A steel plant produces X tons of steel per week at a total cost Rs. $(\frac{x^3}{3}-5x^2+99x+35)$. Find the output level at which the marginal cost attains its minimum. CO5 K4

(or)

19.b. Explain the uses of differentiation in business. CO4 K3

20.a. Solve $\int x^2e^x dx$ by integration by parts. CO5 K5

(or)

20.b. Find the consumer's and producer's surplus at equilibrium price if the demand function is D = $\frac{25}{4}-\frac{p}{8}$ and supply function is p = 5 + D. CO5 K6

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