

Carmel College of Arts, Science and Commerce for Women,

Nuvem – Goa.

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Semester – II of B.Com Course Name: Commercial Arithmetic - II

Total Marks: 40 Date: 14/07/2021 Duration: 2 hours Total number of pages : 2

I. Answer any five of the following **(2 x 5 = 10)**

1) Find the equation of the line passing through (1,0) and having -3 as its slope.

2) Determine the limit

$$\lim_{x \rightarrow 2} \frac{x^2 - 5x + 6}{x - 2}$$

3) Discuss the continuity of the following function at $x = 3$

$$f(x) = \frac{x^2 - 16}{x - 4} \quad \text{when } x \neq 4$$
$$= 5 \quad \text{when } x = 4$$

4) Which of the following lines is perpendicular to $6x + 3y = 11$

i) $6x - 12y = 0$

ii) $-12x + 6y = 4$

5) If $f(x,y) = 2xy + 36x^2 + 9e^y$ find $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$

6) Integrate $\int (x^3 + 12x^2 + \frac{3}{x}) dx$

7) Which of the following relations from $A = \{1,2,3,4\}$ to $B = \{a,b,c,d\}$ are functions? Justify your answers.

i. $R_1 = \{(1,a)(2,a)(3,c)\}$

ii. $R_2 = \{(1,a),(2,b),(3,a),(4,c)\}$

8) Ramesh bought a box of Cadbury 5 star chocolates from Suresh at 20% discount. If the original price of the box was Rs 150, how much did Ramesh buy it for?

II. Answer any six of the following **(6 x 5 = 30)**

1) Find the derivative of the function $f(x) = (2x^2 + 3)^4 + 2e^{(3 \log(4x^2))} + 4^x$

2) Find the equation of the following lines. Hence find their point of intersection.

i. The line passing through the points (0,3) and (1,6)

ii. The line having 3 as its x intercept and -2 as its y intercept.

3) Maximize $z = 2x + 8y$, subject to

$$4x + 3y \leq 12$$

$$9x + 3y \leq 18$$

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

4) Discuss the continuity of f if

$$f(x) = 2x^2 + 12 \quad \text{when } 2 \leq x \leq 4$$

$$= 15x - 16 \quad \text{when } 4 < x \leq 6$$

$$= \frac{x^2 - 36}{x - 6} \quad \text{when } 6 < x < 10$$

5) If the cost function is $C(x) = x^3 - 8x - 4$ and the marginal revenue function is

$$MR(x) = 2e^x + 3x^2 + 31^x, \text{ find}$$

i. The average cost when $x = 2$

ii. The marginal cost when $x = 2$

iii. The revenue when $x = 2$

6) Integrate

i) $\int \frac{x^2 - 2x + 1}{x^2} dx$

ii) $\int (3x + e^{7x} + \frac{1}{(3x+4)^7}) dx$

7) In a group of 700 people, 30% are less than 20 years old 50% are less than 50 years old while 50% are more than 50 years old. Find the number of people that are

- i. Below 20
- ii. Between 20 and 50
- iii. Above 50

8) Compute the range of the following functions

- i. $f(x) = x^2 + 8$ when $-2 < x < 5$
- ii. $f(x) = -3x + 2$ when $-1 < x < 4$
- iii. $f(x) = -x^2$ when $-3 < x < -1$