

Special
 FYBCOM Semester End Assessment (Regular/Repeat)

June 2023

Course Title: COMMERCIAL ARITHMETIC - II

Course Code: UCAC102

Category: Core Course

Semester: II

Duration: 2 hrs

Max Marks: 80

Instructions:

1. The question paper contains 4 questions spread across 2 pages.
2. All questions are compulsory however internal choice is available.
3. You may answer randomly but every main question attempted should be answered serially.
4. Figures to the right in brackets indicate maximum marks.
5. Use of calculator is strictly forbidden.

Q1. Attempt the following.

(4 x 5 = 20)

- a. Show that (4, 7), (6, 5) and (2, 1) are the vertices of a right angled triangle.
- b. $f(x) = 3x^2 - x + 2$; $0 \leq x \leq 3$. Find $f(1)$, $f(2)$, $f(-1)$ and $f(3)$ if they exist.
- c. Integrate the following functions w.r.t x: (i) $f(x) = (x - 7)(x + 1)$ (ii) $f(x) = \frac{3x^3 - 4x^2}{x^3}$
- d. Two numbers are in the ratio 7:6. If 20 is subtracted from both the numbers, the ratio becomes 5:4. Find the numbers.

OR

Q1. Attempt the following.

(4 x 5 = 20)

- p. Find the co-ordinates of point P which divides the line segment AB in the ratio 5:2, where $A = (-4, 3)$, $B = (6, -1)$.
- q. If $f(x) = \frac{x^2 - 2}{x + 1}$. Find $f(0)$, $f(1)$ and $f(-2)$.
- r. Evaluate: (i) $\int (2x - 1)^2 dx$ (ii) $\int (4x^5 - 6x + x^{-2}) dx$
- s. In a village having 1500 people, the ratio between number of males and females is 3:2. Find the number of males and females.

Q2. Attempt the following.

(4 x 5 = 20)

- a. If $AB = 5$ units, where $A = (1, 3)$ and $B = (K, 7)$. Find the value/s of K.
- b. Evaluate $\lim_{x \rightarrow 1} \left(\frac{3x^2 - x - 2}{5x^2 - 5} \right)$.
- c. Find $\int_1^3 (x^2 - x)(2x + 5) dx$
- d. A father is three times as old as his son today. Before 10 years, he was five times older than his son. How old is the father.

OR

QII. Attempt the following.

(4 x 5 = 20)

- p. Show that the points (2, 2), (-2, 4) and (2, 6) are the vertices of an isosceles triangle.
- q. Evaluate $\lim_{x \rightarrow 2} \left(\frac{2x^2 - 2x + 4}{x^3 - 5x^2 + 12} \right)$.
- r. Evaluate $\int_0^2 \frac{x^2 - 5x + 6}{x - 3} dx$
- s. Monthly incomes of two persons A and B are in the ratio of 2:3 and their expenses are in the ratio 3:5. If each of them saves ₹500 per month, find their monthly income.

Q3. Attempt the following.

(4 x 5 =20)

- a. Find the equation of a line passing through the point (-5, 1) and parallel to the line $2x - 3y + 8 = 0$.
- b. Check the continuity of the function at $x = 2$ where $f(x) = \begin{cases} x^2 & x < 2 \\ 5 & x = 2 \\ 2x & x > 2 \end{cases}$
- c. Find $\frac{dy}{dx}$ for (i) $y = (x^2 - 5)(x + 7)$ (ii) $y = 5x^2 \log(x)$
- d. Find the following: (i) 20% of Rs. 50 and 40 paise. (ii) The number whose 12% is 24.

OR

QIII. Attempt the following.

(4 x 5 =20)

- p. Find the equation of a line which has y-intercept as - 1 and is perpendicular to the line $4x - y + 7 = 0$.
- q. Examine the continuity of function $f(x)$ at $x = 1$, where $f(x) = \begin{cases} \frac{3x^2 - 6x + 3}{x^2 + 5x - 6} & x \neq 1 \\ 1 & x = 1 \end{cases}$
- r. Differentiate with respect to x: (i) $y = 5x^{-7} + \sqrt[5]{x} - 8^x + 2$ (ii) $y = x^4 + 5x^{-2} - e^x$
- s. A manufacturer sold a watch for a net selling price of Rs. 9025 after giving a 5% discount on the list price. What was the list price?

Q4. Attempt the following.

(4 x 5 =20)

- a. A furniture seller makes tables and chairs only. There is space in his godown to store 80 units only. He has a capital of ₹ 18000. A table costs ₹ 400 and a chair cost ₹ 300. He earns a profit of ₹ 100 on each table and ₹ 80 on each chair. Formulate the above problem in the form of LPP to maximise his profit.
- b. Find second order derivative of the function $f(x) = 5x^{-4} - 4^x + \log(x) + 9x$
- c. The total cost for daily production is $C = 4 - x + x^2$. Find the average cost and marginal cost at $x = 2$.
- d. The marginal cost of production is $MC = 20 - 4x + x^2$, where x is the number of units produced. The fixed cost of production is ₹ 80. Find the cost function.

OR

QIV. Attempt the following.

(4 x 5 =20)

- p. Minimize $z = 2x - y$, subject to the constraints $x + y \leq 5$ and $x + 2y \leq 8$; where $x, y \geq 0$
- q. If $y = \frac{3x^6 + x^{-4} - 7x}{x^3}$, find $\frac{d^2y}{dx^2}$.
- r. If the demand function is given by $D = 3 + p + 2p^2$, where p is price, then find demand when price is 2 and marginal demand when price is 3.
- s. Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ if $z = x^2 + xy + y^2$.

***** All The Best *****

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