

F.Y.B.COM SEMESTER END EXAMINATION APRIL 2018 (REGULAR/REPEAT)

SUB: COMMERCIAL ARITHMATICS – II (AS PER CBCS)

SEMESTER: II

CLASS: F.Y. B.COM

DURATION: 2HRS

MAX. MARKS: 80

Instructions: 1. All questions are compulsory however internal choice is available.

2. Use of calculator is strictly forbidden.

3. Figures to the right indicate marks allotted.

4. There are 4 main questions each carrying 20 marks.

5. You may answer randomly but every main question attempted should be answered serially.

Q.1) Attempt the following:

(4 x 5 = 20)

- a) Find the length of all sides of triangle PQR where $P = (2, -3)$, $Q = (5, 7)$ and $R = (-2, 0)$.
- b) If $A = \{1, 2, 3, 4\}$, $B = \{0, 1, 2, \dots, 20\}$ and R is relation from A to B such that $R = \{(a, b) / a \in A, b \in B \text{ and } aRb \text{ if } a^2 = b\}$. State the type of correspondence. Is it a function? If yes, into or onto function?
- c) Find $\frac{dy}{dx}$ for following functions: i) $y = 2x^3 - 5x + 99$ ii) $y = (x - 4)(x^3 + 7)$
- d) If $z = 7x^2 - xy - y^5$, find $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y}$.

OR

Q.1) Attempt the following:

(4 x 5 = 20)

- p) Using distance formula check whether ABC is right-angled triangle or not; where $A = (3, -3)$, $B = (3, 3)$ and $C = (0, 5)$.
- q) If $f(x) = 7x - x^4 + 4e^x$, then find $f(0)$, $f'(0)$ and $f''(0)$.
- r) If $f(x) = x^2$ and $g(x) = 4x$, then find $(f \circ g)(x)$ and $(g \circ f)(x)$.
- s) If $u = 5xy^2 - 3x + 7y^3$, find $(y \frac{\partial u}{\partial x})(x \frac{\partial u}{\partial y})$.

Q.2) Attempt the following:

(4 x 5 = 20)

- a) If $A = (-2, 3)$, $B = (3, 1)$. Then find equation of line parallel to AB and passing through $(1, -2)$.
- b) Find $\lim_{x \rightarrow 1} \left(\frac{3x^2 + 4x - 7}{x^3 - 2x + 1} \right)$.
- c) Find maximum value of the function $f(x) = 200x - x^2 - 15$.
- d) The ratio of two numbers is 5:6. On adding 3 to each of these numbers, the ratio becomes 6:7. Find the numbers.

OR

Q.II) Attempt the following:

(4 x 5 = 20)

- p) Check whether the lines $5x - 5y + 3 = 0$ and $3y - 6x + 1 = 0$ are perpendicular to each other or not.
- q) Check whether the limit of $f(x)$ exists at $x = 4$, where $f(x) = \begin{cases} 2 - x^2, & x \leq 4 \\ x^2 - 16, & 4 < x \end{cases}$
- r) If $f(x) = 5 + 3x - 3x^2$, find the extreme value/s of $f(x)$.
- s) Monthly incomes of two persons A and B are in the ratio of 4:7 and their expenses are in the ratio 6:11. If each of them saves ₹430 per month, find their monthly income.

Q.3) Attempt the following:

(4 x 5 = 20)

- a) Solve the following LPP by graphical method.

$$\text{Maximize } z = 10x + 3y$$

$$\text{subject to } x + 2y \leq 8$$

$$3x + y \leq 9$$

$$x \leq 2$$

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

- b) Find $\frac{d^2y}{dx^2}$ where $y = \log(x) - 3x + 2x^5 - 1$.
- c) The supply function is $p = 3x^2 + 1$. Find the producer's surplus at $x = 2$.
- d) Find the following: (i) 20% of 1 hour 15 minutes
(ii) the number whose 6% is 96.

OR

Q.III) Attempt the following:

(4 x 5 = 20)

- p) Solve the following LPP by graphical method.

$$\text{Minimize } z = 6x + 7y$$

$$\text{subject to } 2x + 3y \geq 12$$

$$2x + y \leq 8$$

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

- q) If $f(x) = x - 3x^3 + e^x$, then find $f(-1)$ and $f'(2)$.
- r) If the demand function is $p = 14x - 1$. Find the consumer's surplus at $x = 3$.
- s) 40% of a number added to 42 gives the number. Find the number.

Q.4) Attempt the following:

(4 x 5 = 20)

- a) If A is (2, 4) and B is (5, -2), find mid-point of AB and slope of AB.

b) Find average cost and marginal cost at $x = 3$ if total cost function is $C = 8 - 2x + 3x^2$.

c) Find $\int_0^2 (x+3)^2 dx$.

d) 500 pairs of shoes each priced at ₹180 were sold in a clearance sale for ₹82,500. Find the rate of discount allowed.

OR

Q.IV) Attempt the following:

(4 x 5 = 20)

p) If the lines $3x + 2y + 1 = 0$ and $2kx + 3y - 5 = 0$ are parallel to each other then find the value of k .

q) If the total cost function is $C = 4x + x^2 - 1$, then find the marginal cost at $x = 30$.

r) Integrate the function $f(x)$ between 0 and 1 where $f(x) = \frac{x - 3 + 5x^4}{x^2}$.

s) A trader sold an article at the net selling price of ₹20,000 after giving a 20% discount on its list price. Find the list price.

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ALL THE BEST

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