Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics
FYBCOM, Semester II, Supplementary Examination, May/June 2019

Commercial Arithmetic-II

Time: 2 hours   Maximum Marks: 80

INSTRUCTIONS:

1. All questions are compulsory (internal choice is provided).

2. Figures to the right indicate full marks.

3. Non Programmable Calculator are allowed.

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1. Q.1 Attempt the following: [5X4]

   (a) If $A(7,5)$ and $B(x,0)$, find the possible values of x so that $l(AB) = 13$.

   (b) Differentiate $y = \frac{x+2}{x^2}$ with respect to x.

   (c) If $f(x) = x^2 - 5x + 6$, $x \in \mathbf{R}$. Find x if $f(x-1) = f(x+1)$.

   (d) Evaluate $\int 3^{5x+1}\, dx$

   (e) If 5 men or 9 women can finish a piece of work in 19 days, 3 men and 6 women will do the same work in how many days?

<div align="center">OR</div>

2. Q. I Attempt the following: [5X4]

   (v) Show that the lines with equations $2y = x + 1$ and $3x - 6y - 8 = 0$ are parallel.

   (w) Differentiate each of the following with respect to x:
   (i) $y = x^{-6} - \sqrt{x}$ (ii)$y = \frac{logx}{x}$.

   (x) If $f(x) = x^2 + 3x - 5$, $0 \le x \le 6$, find $f(0), f(2), f(4), f(7)$, whenever they exist.

   (y) Evaluate $\int (x^3 - e^x + 25)\, dx$.

   (z) If 10 people working 8 hours a day, can complete a task in 24 days, how many people working 10 hours a day would required to complete the same task in 16 days?

3. Q.2 Attempt the following: [5X4]

   (a) Find $lim_{x \to 0} \frac{e^x - 1}{6x}$.

   (b) If the total cost function is given by $C = x^2 + 2x + 3$, find the average cost and marginal cost when $x = 3$.

   (c) Maximize z =40x+37y
   subject to : 2x+3y $\le$ 60, 10x+3y $\le$ 180, x $\ge$ 0, y $\ge$ 0.

(d) For the function $f(x, y) = 2x^2 + 2xy + y^2$. Find f_{xx} and f_{yy} at $(1, 2)$.

(e) A person buys an article for ₹360. For what price should he sell it to gain 15%.

OR

4. Q. II Attempt the following: [5X4]

(v) If f is continuous at $x = 0$, where

$$f(x) = \begin{cases} 3x + a + b, & x > 0 \\ x + 4 - b & x < 0 \\ 1 & x = 0 \end{cases}$$

find a and b.

(w) The demand function for a commodity is given by $p = 20 - 2D^2$. Find (i) the total revenue function, (ii) the marginal revenue function, (iii) marginal revenue when $D = 2$.

(x) A company produces soft drinks that have a contract which requires that a minimum of 80 units of the chemical A and 60 units of the chemical B to be present in each bottle of the drink. The chemicals are available in a prepared mix from to two suppliers S and T. Supplier S has a mix of 4 units of A and 2 units of B that cost Rs. 10. Supplier T has a mix of 1 unit of A and 1 unit of B that costs Rs. 4. Give the mathematical formulation for this LPP to minimize the cost.

(y) For $f(x, y) = x^2 + 3y$, find $f(x, y)$, when (i)$x = 2$ (ii)$y = 1$ (iii) $(x, y) = (2, 1)$.

(z) A shopkeeper marks his goods 20% above cost price, but allows 30% discount for cash. Find his net loss percent.

5. Q.3 Attempt the following: [5X4]

(a) The present age of two brothers are in ratio 3:4. five years ago their ages were in the ratio 5:7. find their present ages.

(b) Find the equation of a line passing through the points A (2,3) and B (-5,0).

(c) If the marginal revenue function for a certain product is $MR = 4x^3 + 6x^2 + 10x + 1$. Find the Revenue function and Average Revenue function when $x = 15$.

(d) If firm produces an output of x tons at a total cost $C = x^3 - 4x^2 + 7x$. Find the output at which the average cost is the least.

(e) AB is the diameter of a circle with center C. If A= (1,-2) and C= (-3,4), find the coordinates of B.

OR

6. Q. III Attempt the following: [5X4]

   (v) If 3A=5B, 2B=7C, find A:C.

   (w) Find the equation of the line through (3,1) and parallel to the line with equation $2x - y = 4$.

   (x) If the marginal cost $MC = 3x^2 + 4x + 5$, find the cost function, if the fixed cost is 150.

   (y) Find the values of x, for which the following function $f(x) = x^3 - 75x + 10$ is increasing, decreasing.

   (z) Show that points A (2,2), B(3,4) and C(4,1) are the vertices of a right angled triangle.

7. Q.4 Attempt the following: [5X4]

   (a) The sum of 15% of a positive number and 10% of the same number is 70. Find the number?

   (b) If the distance between two points (5,a) and (8,4) is 5,find the value of a.

   (c) Evaluate $\int_0^6 (x + 2)(x - 1)\, dx$.

   (d) If the demand function for a certain commodity is $p = 24 - 4x$ find the demand consumers surplus at $x = 5$.

   (e) Find $\frac{d^2y}{dx^2}$ for $y = 7x^5 - 4x^2 + 6$

OR

8. Q. IV Attempt the following: [5X4]

   (v) In order to pass in an exam a student is required to get 975 marks out of the aggregate marks. Piya got 870 marks and was declared failed by 7%. What are the maximum aggregate marks a student can get in the examination?

   (w) Find the equation of the line passing through the point (1, 2) and perpendicular to a line $2x - y - 7 = 0$.

   (x) The marginal revenue of selling x items is $MR = x^2 + x - 1$,find the total revenue and average revenue at $x = 6$.

   (y) f the supply function for a certain commodity is $p = 16x + 4$ find the producer's surplus at $x = 1$.

   (z) Divide 70 into two parts so that the sum of their squares is minimum.

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End of exam

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