Roll.No. | 25UBHCT1002

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Com.Honours - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - I
25UBHCT1002 - Business Mathematics

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Show that (f ∘ g) ∘ h=f ∘ (g ∘ h)for the function f(x)=2x,g(x)=3x-1 and h(x)=x^2+3.
2. Show that the middle term in the expansion of $(1+x)^{2n}$ is $\frac{(1.3.5...(2n-1)2^n x^n)}{n!}$
3. For the demand function y=550-3x-6x^2 where x is the quantity demanded and y is the price per unit, find the average revenue and marginal revenue. Show also the marginal revenue and elasticity of demand are related by $\frac{dR}{dx}$ = y $\left[1 + (\text{elasticity of dem})^{-1}\right]$
4. A person borrows Rs.2,500 at 10% simple interest for 2 years. He immediately lends this money out at compound interest at the same rate and for the same time. What is the gain at the end of 2 years?
5. The ratio of the prices of two houses was 16:23. Two years later, when their prices of the first has reason by 10% and that of the second by Rs.477, the ratio of their prices becomes 11:20. Find the original prices of the two houses.
6. In an examination, 30% of the students have failed in mathematics, 20% have failed in chemistry and 10% failed in both mathematics and chemistry. A student is selected at random
   (i) What is the probability that the students has failed in mathematics if it is known that he has failed in chemistry.
   (ii) What is the probability that the student has failed either in mathematics or chemistry?
7. Different the following with respect to x : $\sqrt[4]{\frac{(x^3(2x^2-3)}{(1-2x)^2)}}$

Contd...

8. A company set aside for a reserve fund The sum of rupees Rs.20,000 annually to enable it to pay off a debenture issue of Rs.2,39,000 at the end of 10 years. Assuming that the reserve accumulates at 4% p.a. compounded, find the surplus after paying off the debenture issue.

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Out of 880 boys in a school 224 played cricket, 240 played hockey and 336 played basketball; Of the total 64 played both basketball and hockey, 80 played cricket and basketball and 40 played cricket and hockey. 24 played all the three games. How many did not play any of the games and how many played only one game?

10. The value of diamond various as the square of its weights. A diamond is broken into 5 pieces, the weights of which are in the ratio 1:2:3:4:5. If the resulting loss be Rs.85,000, find the value of the original diamond. Also calculate the value of the diamond whose weight is twice that of the original diamond.

11. Two posts were offered to a man. In one the starting salary was Rs.120 per month and the annual increment was Rs.8; in the other the starting salary was Rs.85 but the annual increment was Rs.12. The man decided to accept that post which would give him more total earnings in the first twenty years of his service. Which post was acceptable to him? Justify your answer.

12. Given two matrices A and B where A $= \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and B $= \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$

    Verify that AB=BA=6I. Using this result solve the set of linear equations,
    $x - y = 3; 2x + 3y + 4z = 17; y + 2z = 7$

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Let the cost function of a firm be given by the following equation:
    $C(x) = 300x - 10x^2 + \frac{1}{3}x^3$ where $C(x)$ stands for cost function and x for output. Calculate:
    (i) Output at which marginal cost is minimum.
    (ii) Output at which average cost is minimum.
    (iii) Output at which average cost is equal to marginal cost.

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