**SAINTGITS COLLEGE OF APPLIED SCIENCES, PATHAMUTTOM P.O, KOTTAYAM**

**SECOND INTERNAL EXAM [MARCH-2016]**

**B.A CORPORATE ECONOMICS**

**MATHEMATICS FOR ECONOMICS**

Time: 3 hours Maximum: 80 Marks

**Section A**

*Answer* ***all*** *questions. Each question carries* ***1 mark****.*

1. Find the derivative of x logx

2. Write the quotient rule of differentiation.

3. State Eulers theorem.

4. What you mean by homogeneous function.

 5. Find $\frac{∂z}{∂x}$ if z=$\frac{x}{y}$

6. Define marginal revenue.

 7. Define profit function.

 8. Find the derivative of $4x^{-2}+\frac{3}{\sqrt{x}}-2logx$

 9. If f(x , y)=x3y2,find $\frac{∂f}{∂y}$.

 10. What you mean by total derivative of a function

(10 x 1= 10 )

**Section B**

*Answer any* ***eight*** *questions. Each question carries* ***2 marks***

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11. Find the derivative of (2x-1)(x+2)

12. If y=$e^{-3x}$, find y2..

13. Differentiate $\frac{a^{x}}{x^{2}}$

14. A production function is given as X=a$L^{p}K^{q}$ where x is the quantity of production. Find marginal productivity with respect to L and K.

15. Find the first order derivative of z=x2+6xy+y2.

16. Define price elasticity of demand and price elasticity of supply.

17. If the marginal revenue is 25 and elasticity of demand with respect to price is 2, find the average revenue.

18. Differentiate $\frac{1}{\sqrt{3x+2}}$

19. Find the derivative of $\frac{x}{x+1}$

20 .Given cost function of a product is TC=2q+200 and the revenue function is TR=3q2+4q-2.Find the profit function and profit when 5 units are produced.

21. Define monotonic increasing function.

22. Find $\frac{∂^{2}z}{∂x^{2}}$ if z=x2+y2-2xy+8x+9y+3

**(5×2=10)**

**Section C**

*Answer any* ***six*** *questions. Each question carries* ***4 marks****.*

23. Verify Euler’s theorem for the function u=8x3+2x2y+3x2y+y3

24. If z=ax2+2hxy+by2, show that $\frac{∂^{2}f}{∂x∂y}$=$\frac{∂^{2}f}{∂y∂x}$

25. If z=$\frac{2x+4y}{7x+8y }$ find $\frac{∂z}{∂x}$ and $\frac{∂z}{∂y}$

26 Find the maximum and minimum values of the function x3-2x2-4x-1

27. If y=x$e^{x}$ prove that y2-2y1+y=0

28. A company has examined the cost structure and has determined that c-total cost ,R-total revenue and x-the number of units produced are related as C=100+.015x2 and R=3x.Find the production rate x that will maximize profits of the company. Find out that profit.

29. If $y=xlogx $show that x2y2-xy1+y=0

30. Assume a monopolist has *MC* = 10 and no fixed costs. The monopolist faces a demand curve of *P* = 100 - 2*Q* . The government imposes a tax of 10 dollars for every unit sold. Find the equilibrium quantity and price.

31. A text book publisher finds that production costs to each book are Rs.25 and fixed cost are Rs. 15000.If each book can be sold for Rs.46 find i) Cost function ii) Revenue function iii)Breakeven point

 **(5×4=20)**

**Section D**

*Answer any* ***two*** *questions. Each question carries* ***15 marks****.*

32. If z=$\frac{x^{2}y^{2}}{x+y}$ show that x$\frac{∂z}{∂x}$+y$\frac{∂z}{∂y}$=3z

33. Find the derivatives of (1)$sin^{-1}(x^{2}+y^{2})$

 (2)(3x2+1)(4x+$\frac{1}{x}$)

 (3)$\frac{x^{2}+3}{x^{2}-3}$

 34. (1)If pq=200 represents the demand law ,prove that n=1 all through.

 (2) If R=pq show that $\frac{dR}{dq}$=p (1- $\frac{ 1}{n}$)

 35 .If u=$sin^{-1}\frac{x^{2}+y^{2}}{x+y}$ show that x$\frac{∂u}{∂x}$+y$\frac{∂u}{∂y}$=tan u

**(1×15=15)**