LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **CHEM.,PHY.,STAT., COMP.SCI.& COMP.APP.**

THIRDSEMESTER – APRIL 2018

MT 3206- APPLIED MATHEMATICS

Date: 04-05-2018   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART – A

Answer ALL questions. $(10 \times 2 = 20)$

1. Integrate $x^{7/2}$ with respect to x.

2. Define Average Cost.

3. State any two rules of vector differentiation.

4. If $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$, find $\nabla\vec{r}$.

5. Define partial differential equation.

6. Write the degree of the following differential equation

    i) $\frac{d^2y}{dt^2} - (\frac{dy}{dt})^2 + 7y = 0$ ii)$(\frac{d^2y}{dt^2})^3 + (\frac{dy}{dt})^4 = 0$

7. Prove that $L\{1\} = \frac{1}{s}$if $s > 0$.

8. Find $L(sinat)$.

9. Find $L^{-1}\left(\frac{1}{(s+3)}\right)$.

10. Define Spearman's rank correlation coefficient.

PART – B

Answer any FIVE questions. $(5 \times 8 = 40)$

11. If demand function is $y = 32 - 4x - x^2$, find the consumer surplus if $x_0 = 1$.

12. Write any five property of integral calculus.

13. Find the divergence and curl of the vector point function $xy^2\vec{i} + 2xy^2\vec{j} - 3yz^2\vec{k}$.

14. Prove that $\nabla(r^n) = n(n+1)r^{n-1}$. where $r = |\vec{r}|, \vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$.

15. Find the Laplace transform of $e^{-3t}sin^2t$.

16. Find $L^{-1}\left(\frac{1}{s(s+1)(s+2)}\right)$

17. Calculate the coefficient of correlation.

X	1	2	3	4	5
Y	10	20	30	50	40

18. In certain chemical reaction the rate of conversion of a substance at a time t is propotional to the quantity of substance still untransformed at that time t. At end of one hour 60 grams remain and at the end of 4hrs 21 grams remain. How many grams of substances got wasted?

PART – C

Answer any TWO questions. $(2 \times 20 = 40)$

19. (a) If the marginal revenue function is $R'(x) = 12 - 8x + x^2$, determine the revenue and demand function.

 (b) Determine consumer surplus and producer surplus under pure competition for the demand function $y = 16 - x^2$ and supply function $y = 4 + x$, where p is the price and x is quantity.

$(8+12)$

20. Evaluate $\iint \vec{F}.\vec{n} \, ds$ where $\vec{F} = (x + y)\vec{i} - x\vec{j} + z\vec{k}$ and S is the surface of the cube bounded by $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$.

21. (a) Solve $y'' - 3y + 2y = e^{2t}$. given that $y(0) = -3, y'(0) = 5$ using laplace transform.

 (b) Find $L(e^{2t} \cos 5 t)$. $(12+8)$

22. Calculate the standard deviation, coefficient of variation and variance for the following data:

Roll. No.	5	15	25	35	45	55
Marks	10	20	30	50	40	30

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