

SUDHARSAN COLLEGE OF ARTS AND SCIENCE
Perumanadu, Pudukottai-622 104.
Model Exam – March – 2018
ODE , PDE , LAPLACE TRANSFORMS AND VECTOR
CALCULUS

Class : I B.Sc (Physics)

Sub Code: 16SACMM3

Time : 3 Hours

Marks : 75

Part – A

(10x2=20)

Answer ALL questions.

1. Evaluate : $p^2 - 5p + 6 = 0$.
2. Evaluate : $x^2 = (1 + p^2)$.
3. Evaluate : $y^2 = (1 + p^2)$.
4. Evaluate : $(y \cos x + 1) dx + \sin x dy = 0$
5. What is the Clairaut's equation?
6. Solve $pe^y = qe^x$.
7. Evaluate $L(t^2 + 2t + 3)$.
8. Prove that $L(\cos at) = \frac{s}{s^2 + a^2}$.
9. State Stoke's Theorem.
10. State Gauss Divergence Theorem.

Part – B

(5x5=25)

Answer ALL questions.

11. (a) Solve $(D^2 - 2D + 2)y = e^x \sin x$.
 (Or)
 (b) Solve $(D^2 - 3D + 2)y = \sin 3x$
12. (a) Evaluate : $x^2 p^2 + xyp - 6y^2 = 0$
 (Or)
 (b) Evaluate : $xyp^2 + (y^2 - x^2)p - xy = 0$

13. (a) Evaluate : $(a^2 - 2xy - y^2) dx - (x+y)^2 dy = 0$

(Or)

(b) Evaluate : $y(xy + 2x^2 y^2) dx + x(xy - x^2 y^2) dy = 0$

14. (a) Evaluate $L^{-1} \left[\frac{s^2 - s + 2}{s(s-3)(s+2)} \right]$

(Or)

(b) Evaluate $L^{-1} \left[\frac{s}{(s^2 + a^2)^2} \right]$

15. (a) Evaluate : $(D^2 + 5D + 6)y = e^x$

(Or)

(b) Solve $2p + 3q = 1$

Part – C

(3x10=30)

Answer Any THREE questions only.

16. Evaluate : $y = xp + x(1 + p^2)^{1/2}$
17. Evaluate : $(D^2 - 4D + 3)y = \sin 3x \cos 2x$
18. Evaluate : $(D^2 + 4D + 5)y = e^x + x^3 + \cos 2x$
19. Solve the equation using Laplace transforms
 $\frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} - 3y = \sin t$, given that $y = \frac{dy}{dt} = 0$, when $t = 0$
20. Solve $(y^2 + z^2)p - xyz + xz = 0$.

***** ALL THE BEST *****