**Reg. No. \_\_\_\_\_\_\_\_**

**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination - June 2011**

**Subject Title: MULTIPLE INTEGRALS, DIFFERENTIAL EQUATIONS AND**

**LAPLACE TRANSFORMS Time: 3 hours**

**Subject Code: MA245 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. Evaluate .

2. Evaluate .

3. The value of ( ½ ) = \_\_\_\_\_\_\_\_\_

4. Write the integral  in beta notation.

5. Solve (D2 – 2D + 1) y = 0.

6. Find the particular integral of (D + 3)2y = e2x

7. Prove that f = 3y4z2i + 4x3z2j – 3x2y2k is solenoidal.

8. State Stoke’s theorem .

9. Find L(sin2t) .

10. State initial value theorem.

**PART – B (5 x 3 = 15 MARKS)**

11. Change the order of integration in .

12. Evaluate.

13. Find the particular integral of (D2 + 4)y = sin2x.

14. Find if = x2 + y2 + z2 at (1, -1, 1).

15. Evaluate L(e-2t sint).

**PART – C (5 x 15 = 75 MARKS)**

16. a. Find the area bounded by y = x and y = x2. (7)

b. Change the order of integration in and then evaluate it. (8)

(OR)

17. Find by triple integration the volume of the sphere without transformation.

18. Prove that .

(OR)

19. a. Evaluate . (8)

b. Show that . (7)

20. a. Solve . (8)

b. Solve . (7)

[P.T.O]

(OR)

21. Using variation of parameters, solve .

22. Verify Gauss divergence theorem for taken over the cube bounded by planes x = 0 , x = 1, y = 0, y = 1, z = 0 and z = 1.

(OR)

23. a. Find the angle between the surfaces at the point (6,4,3). (7)

b. Show that is irrotational and hence find its scalar potential. (8)

24. a. Find the value of . (7)

b. Using convolution theorem, find . (8)

(OR)

25. Solve y″ + y = sint , using Laplace Transform techniques.