ANNA UNIVERSITY – 2006

B.E/B.TECH III SEMESTER DEGREE EXAMINATION

MATHEMATICS-III

(INFORMATION TECHNOLOGY)

TIME-3HOUR
MARK-100

ANSWER ALL QUESTIONS

PART A (10 * 2 = 20)

1. Form a partial differential equation by eliminating the arbitrary function f from .

2. Find the complete integral of q = 2px.

3. Find the half range sine series for f(x) = 2 in 0 < x < 4.

4. If the cosine series for f(x) = x sin x for 0 < x < p is given by show that

5. Classify the partial differential equation

6. The steady state temperature distribution is considered in a square plate with sides x = 0, y = 0, x = a and y = a. The edge y = 0 is kept at a constant temperature T and the other three edges are insulated. The same state is continued subsequently. Express the problem mathematically.

7. Find the Laplace transform of

8. Verify the initial value theorem for f(t) = 5 + 4 cos 2t.

9. If Fourier transform of f(x) is F(s), prove that the Fourier transform of f(x) cos ax is .

10. Find the Fourier cosine integral representation of .

PART B (5 * 16 = 80)

11. (i) Expand in Fourier series of periodicity 2p of .

(ii) Find the half-range cosine series for the function and hence deduce the sum of the series

12. (a) (i) Find the complete solution and singular solution of z = px + qy + p2– q2.

(ii) Find the general solution of

(OR)

(b) (i) Solve:

(ii) Solve : .

13. (a) A taut string of length L is fastened at both ends. The midpoint of the string is taken to a height of b and then released from rest in this position. Find the displacement of the string at any time t. (

(OR)

(b) A rod 30 cm long, has its ends A and B at 20ºC and 80ºC respectively, until steady state conditions prevail. The temperature at the end B is then suddenly reduced to 60º C and at the end A is raised to 40º C and maintained so. Find the resulting temperature u (x,t).

14. (a) (i) Find the Laplace transform of the function and extending periodically with period 2p.

(ii)Apply the Convolution theorem to find

(OR)

(b) (i) Solve by using Laplace transform technique, , given that y(0) = 2 and .

(ii) Find the inverse Laplace transform of

15. (a) (i) Find the Fourier transform of .

Hence evaluate the following integral:
(ii)
(iii)

(OR)

(b) (i) Find the Fourier sine and cosine transform of .

Hence find the value of the following integrals:
(ii) .
(iii)