**B.E / B.Tech DEGREE, AUGUST 2014**

COMMON TO ALL BRANCHES

Semester III

**MA6351 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

**QUESTION BANK**

(Regulation 2013)

**Unit I**

**PARTIAL DIFFERENTIAL EQUATIONS**

**PART A**

1. Form the PDE from
2. Find the Complete integral of
3. Form the PDE by eliminating the arbitrary function from
4. Solve
5. Form the PDE by eliminating the arbitrary constants and from
6. Solve the equation
7. Eliminate the arbitrary function from and form the PDE
8. Solve
9. Find the PDE of the family of spheres having their centre on the axis
10. Solve
11. Form the PDE by eliminating the arbitrary constants  **,** from the relation
12. Find the Particular integral of
13. Solve
14. Find the PDE of all planes cutting equal intercepts from the axis.
15. Find the complete integral of
16. Form the PDE by eliminating the arbitrary constant from
17. Form the PDE by eliminating the arbitrary constant from 
18. Form the PDE by eliminating the arbitrary function from
19. Solve
20. Find the P.I of )

**PART B**

1.(i) Form the PDE by eliminating the arbitrary function  from 

(ii) Solve + 4

2.(i)Solve the partial differential equation

(ii)Solve the equation 

3.(i) Solve 

(ii) Solve 

4.(i)Solve 

(ii)Solve 

5.(i)Solve 

(ii)Solve 

6.(i)Solve 

(ii)Solve 

7.(i)Solve 

(ii)Solve 

8.(i)Find the Singular integral of 

(ii) Form the PDE by eliminating the arbitrary function from the relation  9.(i) Solve 

(ii) Solve 

10.(i)Solve the partial differential equation 

(ii) Solve 

**UNIT II**

**FOURIER SERIES**

**PART A**

1. Find the co-efficient bn of the Fourier series for the function in (-2,2).

2. Find the Root Mean Square value of the function over the interval

3. Find the constant term in the expansion of as a Fourier series in the interval

.

4. State the Dirichlet’s conditions for Fourier series.

5. What is meant by Harmonic Analysis?.

6. State the sufficient condition for a function to be expressed as a Fourier series

7. Obtain the first term of the Fourier series for the function ,

8. Find the RMS value of 2 in.

9. Find the Root Mean Square value of in.

10. If the Fourier series corresponding to in is

Without finding the values of , , . Find the

value of

11. Does possess a Fourier expansion.

12. If is discontinuous at , what does its Fourier series represent at that point?

13. Determine in the Fourier series expansion of in with period .

14. If the Fourier series for the function

= sin is

15. If

50, if find the sum of the Fourier series of

16. If in the interval (0,4), then find the value of a2 in the Fourier series expansion.

17. What are the constant term and the coefficient of , in the Fourier series expansion of in ?

17. Determine the value of in the Fourier series expansion in .

18. Find in the expansion of in .

19. Find Fourier sine series for .

20. State Parseval’s identity for full range expansion of as Fourier series in .

**PART B**

1. (i)Expand as a full range Fourier series in the interval Hence deduce that = .

(ii)Find the half-range sine series of in the interval (0,4). Hence deduce the value of the series

2. (i) Obtain the sine series for

(ii) Find the Fourier series up to second harmonic for from the following values.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x: |  |  |  |  |  |  |  |
| y: | 1.0 | 1.4 | 1.9 | 1.7 | 1.5 | 1.2 | 1.0 |

3(i) Expand as Fourier series in and hence deduce that the sum of +….

(ii) Obtain the Fourier series for the function given by . Hence deduce that = .

4(i) Find the Fourier series of in and hence deduce that

(ii) Obtain the Fourier cosine series of

5.(i) Obtain the Fourier series of periodicity 3 for

(ii) Obtain the Fourier series of

6 (i) Find the Fourier series of .

(ii) Calculate the first 3 harmonics of the Fourier of from the following data

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 |
| y | 1.8 | 1.1 | 0.3 | 0.16 | 0.5 | 1.3 | 2.16 | 1.25 | 1.3 | 1.52 | 1.76 | 2.0 |

7.(i)Obtain the Fourier series of the periodic function defined by .   
 Deduce that .

(ii)Compute upto first harmonics of the Fourier series of given by the following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 |  |  |  |  |  | T |
| f(x) | 1.98 | 1.30 | 1.05 | 1.30 | -0.38 | -0.25 | 1.98 |

8.(i) Expand as a Fourier Series in and using this series find the root mean square value of in the interval.

(ii) Find the complex form of the Fourier series of in .

9.(i) Obtain the half range cosine series for in

(ii) Find the Fourier series as far as the second harmonic to represent the function with the

period 6, given in the following table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
|  | 9 | 18 | 24 | 28 | 26 | 20 |

10(i) Find the Fourier series expansion of in (-).

(ii) Find the Fourier series expansion of .

Also deduce +++… to