15U504 (Pages:2) Name: ……

Reg. No……..

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, OCTOBER 2017

(CUCBCSS-UG)

CC15U MAT5 B08-DIFFERENTIAL EQUATIONS

(Mathematics - Core Course)

(2015-Admission Regular)

Time: Three Hours Maximum: 120 Marks

Section A

Answer ***all*** questions. Each question carries 1 mark.

1. What is the general form of a separable equation?
2. Is the equation linear or nonlinear?
3. What is the order of ?
4. Show that is exact.
5. Write the D.E whose general solution is .
6. Find the Laplace Transform of the function
7. Define unit step function
8. Check whether and are linearly independent or not
9. Find if
10. Check whether the function even or odd
11. What is
12. What is the fundamental period of ?

(marks)

Section B

Answer any ***ten*** questions. Each question carries 4 marks.

13. Solve
14. Evaluate ‘b’ for which the equation is exact.
15. Solve , and give an interval in which the solution exist.
16. Find the Wronskian of and
17. Verify Abel’s Theorem for the solution and of the differential equation
18. Find the Laplace transform of unit step function
19. Find the Laplace transform of the function
20. If then prove that
21. Let where . Find the 2 periodic even extension of
22. Find the Fourier series for the given function ,

23. Transform the given equation into a system of first order equations

24. Using the method of separation of variables replace the PDE , by a pair of ODE

25. Determine whether is periodic or not. If yes what is its fundamental period?

26. Show that the sum of two odd function is odd and product of two odd functions is even

(marks)

Section C

Answer any ***six*** questions. Each question Carries 7marks.

27. Solve

28. State and prove Abel's Theorem

29. Show that and form a fundamental set of solutions of

30. Find the general solution of

31. Find

32. Find using convolution property.

33. Show that and are solutions of

34. Solve the boundary value problem y'(0)=0 ,

35. Find solutions of the following equation by separating variables

(marks)

Section D

Answer any ***two*** questions. Each question Carries 13 marks.

36. Find the general solution of the differential equation

37. Solve the DE

38. Find Fourier series for the extended function , and deduce that

(marks)