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DATE:25-04-2018

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

 **B.Sc. MATHEMATICS-IV SEMESTER**

 **SEMESTER EXAMINATION: APRIL 2018**

 **MT 412: Mathematics-IV**

**Time: 3 hrs. Maximum Marks: 100**

(For supplementary candidates)

Do not write the register number on the question paper

Please attach the question paper along with the answer script.

**This paper contains threeprinted pages and seven parts.**

1. **ANSWER ANY EIGHT OF THE FOLLOWING** $\left(8×2=16\right)$
2. Find the complementary function of $y^{'''}-7y^{'}-6y=e^{3x}$
3. Find PI of.
4. Solve
5. Evaluate.
6. Prove that 
7. Determine the constant in the Fourier series expansion ofin
8. Find $L\left[sin^{3}t\right]$
9. Find.
10. Define a Normal subgroup and give an example for it.
11. Show that every quotient group of an abelian group is abelian.
12. Define an isomorphism of group and give an example for it.
13. Using the bisection method find the root of the equation that lies between 2 and 3 up to two stages
14. **ANSWER ANY FOUR OF THE FOLLOWING** $\left(4×6=24\right)$

1. Solve 
2. Solve: .
3. Solve  by the method of variation of parameter.
4. Solve by finding a part of the C.F: .
5. Solve  by verifying the integrability condition.
6. **ANSWER ANY TWO OF THE FOLLOWING** $\left(2×6=12\right)$
7. Derive .
8. Prove that i)  ii) 
9. Show that 
10. **ANSWER ANY TWO OF THE FOLLOWING** $\left(2×6=12\right)$
11. Obtain the Fourier series for the expansion of  and hence deduce 
12. Obtain the Fourier series expansion of in 
13. Find the sine and cosine series of the function in $0<x<π$
14. **ANSWER ANY TWO OF THE FOLLOWING** $\left(2×6=12\right)$
15. If  then prove that  and hence evaluate 
16. Prove that. Hence evaluate.
17. Solve  given  using Laplace transform.
18. **ANSWER ANY THREE OF THE FOLLOWING** $\left(3×6=18\right)$
19. Define a normal subgroup and hence prove that the product of any two normal subgroups of a group is a subgroup.
20. Letbe a subgroup andbe a normal subgroup of the group. Then is normal in.
21. Let $f:G\rightarrow G'$ be a homomorphism of groups with kernel . Then prove that *f* is

One - One if and only if $K=\{e\}$ where  is the identity of G.

1. State and prove Fundamental theorem on homomorphism of groups.
2. **ANSWER ANY ONE OF THE FOLLOWING.** $\left(1×6=6\right)$
3. Solve by Gauss-Seidel Method: 
4. By using Regula – falsi method find the root correct to 3 decimal places of the equation , that lies between 2 and 3.

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