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C09-EC–306

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BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2021

DECE - THIRD SEMESTER EXAMINATION

CIRCUIT THEORY

Time : 3 hours] [*Total Marks* : 80

PART—A

4×5=20

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **four** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define the term resonance.

2. Define selectivity.

3. Define Half power frequencies.

4. State Kirchhoff's current law and voltage law.

5. Define driving point admittance and transfer impedance.

6. State Thevenin's theorem.

7. State maximum power transfer theorem.

8. Define critical coupling.

9. Mention the time constants of RC and RL circuits.

10. Draw a Low pass RC circuit.

PART—B

15×4=60

Instructions : (1) Answer *any* **four** questions.

(2) Each question carries **fifteen** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. Find $Z_1 + Z_2$

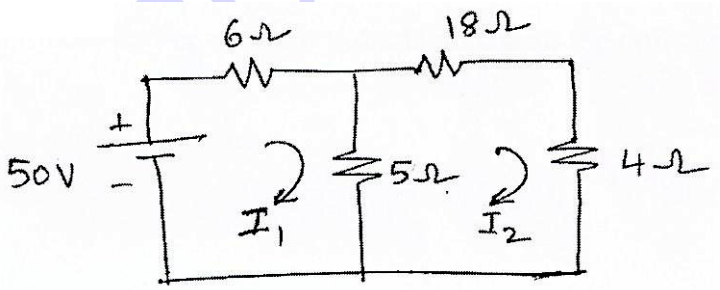
(a) $Z_1 = (2 + j3)\Omega$ and $Z_2 = (5 + j5)\Omega$

(b) $Z_1 = (3 + j4)\Omega$ and $Z_2 = (8 - j8)\Omega$

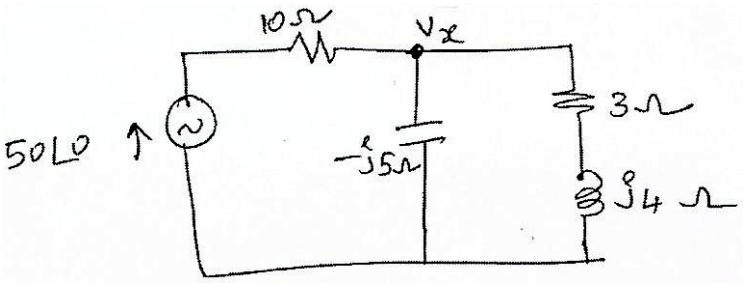
(c) $Z_1 = (4 + j4)\Omega$ and $Z_2 = (6 - j4)\Omega$

12. Distinguish between series and parallel resonance.

13. Determine the currents I_1 and I_2 using mesh analysis :



14. Determine the voltage V_x using nodal analysis.



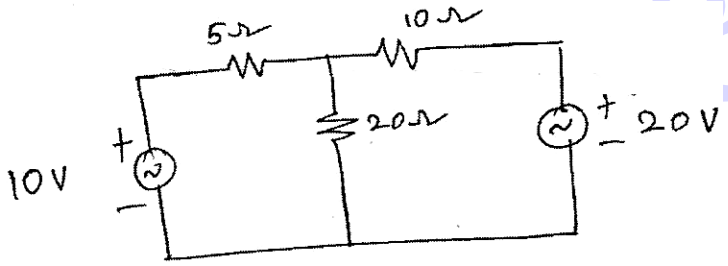
15. List the advantages and limitations of the following :

(a) Thevenin's theorem

(b) Norton's theorem

(c) Maximum power transfer theorem

16. Determine the current through 5Ω resistor in the circuit using super position theorem.



17. Explain how a high pass RC circuit works as a differentiator.

18. Two identical coils with L = 0·04 H have a coupling coefficient K = 0·6. Find M and the two equivalent inductances with the coils connected in series aiding and series opposing.

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