



C09-EC-306

3238

**BOARD DIPLOMA EXAMINATION, (C-09)
SEPTEMBER/OCTOBER - 2020
DECE—THIRD SEMESTER EXAMINATION**

CIRCUIT THEORY

Time : 3 hours]

Total Marks : 80

PART—A

3×10=30

- Instructions** : (1) Answer **all** questions.
(2) Each question carries **three** 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 RMS value and average value.
3. Define *Q*-factor of a capacitor circuit.
4. Define junction and loop.
5. Define transfer impedance.
6. Explain ideal voltage source.
7. Write the limitations of superposition theorem.
8. Write the principle of coupled circuits.

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[*Contd...*

9. Write current, voltage equations for transient R - C circuit.

10. What is linear wave shaping?

PART—B

10×5=50

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

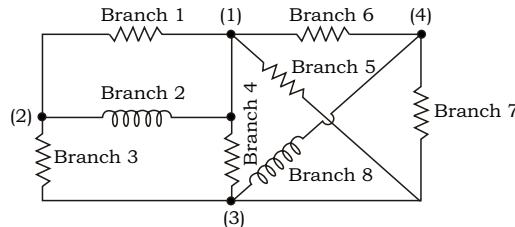
(2) Each question carries **ten** marks.

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

11. Draw V - I characteristics and calculate power of pure capacitor with AC source.

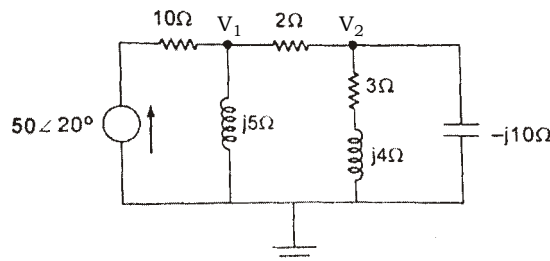
12. A coil having $L = 0.14$ H and $R = 9.43$ is connected across a 50 Hz, 230 V supply. Calculate X_L , Z , I , V_R and V_L .

13. (a) Determine the number of mesh current required to solve the given network shown below :



(b) Write the expressions to convert star to delta network.

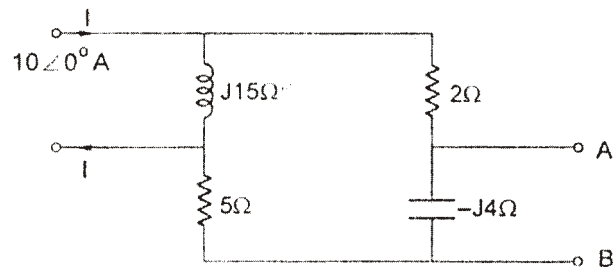
14. Find the current through $j5$ using nodal analysis :



15. (a) Write ^{*} the statements of Norton's theorem and superposition theorem. 5

(b) Write the advantages of reciprocity theorem and maximum power transfer theorem. 5

16. Draw the Norton's equivalent circuit for the following network :



17. Two coupled coils with $L_1 = 0.02$ H, $L_2 = 0.01$ H and $K = 0.5$ are connected in two different ways—series aiding, series opposing arrangement, then find equivalent inductance for series aiding and series opposing.

18. Explain how a low-pass R-C circuit works as an integrator.

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