



C16-EE-303

6239

BOARD DIPLOMA EXAMINATION, (C-16)
JANUARY/FEBRUARY—2022
DEEE - THIRD SEMESTER EXAMINATION
ELECTRICAL CIRCUITS

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. Classify the resistance into low, medium and high values, give examples for each.
2. Define active and passive elements with example.
3. State Kirchhoff's laws.
4. State Thevenin's theorem.
- * 5. Define (a) Time period, (b) Peak factor and (c) Instantaneous value.
6. Show that the average power consumed in a pure capacitor is zero.
7. Define Q factor of series resonant circuit.

8. Why a parallel resonant circuit is called as rejector circuit?
9. List the advantages of polyphase system over a 1- ϕ system.
10. State the relation between line and phase values voltage and current of delta connected network.

PART—B

- Instructions :**
- (1) Answer *any five* questions.
 - (2) Each question carries **ten** marks.
 - (3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. Explain the construction and working of basic potentiometer with a neat sketch. 10
12. Develop transformation formulae for Star- Delta transformation. 10
13. (a) State Superposition theorem and Maximum Power Transfer theorem. 5
 (b) A balanced star connected load of $(4 + 3j)\ \Omega$ per phase is connected to a balanced 3 phase 400 V supply. If the phase current is 12 A, find (i) Total active power and (ii) reactive power. 5
14. (a) Convert the following rectangular to polar **OR** polar to rectangular form : 4
 (i) $3 - 6j$
 (ii) $100\angle 45^\circ$
 (b) Find the following parameters of a voltage $V = 200\sin 314t$: 6
 (i) Frequency
 (ii) Form factor
 (iii) Peak factor

15. An inductive coil having a resistance of 15Ω takes a current of 4 A when connected to a 100 V, 60 Hz supply. If the coil is connected to a 100 V, 50 Hz supply, calculate (a) The current, (b) power and (c) power factor. Draw the vector diagram for the 50Hz condition. 10
16. A $5\mu\text{F}$ condenser is connected in series with a coil has an inductance of 50 mH. Determine the frequency of resonance, the resistance of the coil if a 50 V source operating at resonance frequency causes a circuit current of 10 mA. What is the Q factor and power loss of the coil? Also calculate the voltage across the capacitor and the coil at resonance. 10
17. Two impedances $Z_1 = (5 + 10j)\Omega$ and $Z_2 = (10 - 15j)\Omega$ are connected in parallel. If the total current supplied to the combination is 20 A, find (a) voltage applied, (b) power factor and (c) power dissipated in each branch. 10
18. (a) A balanced 3-phase delta connected load of 80 kW at a power factor of 0.8 leading is connected across a 400 V, 50 Hz supply. Find the circuit constants of load per phase. 6
- (b) The power input to a 3-phase induction motor is read by two wattmeters. The readings are 860 W and 240 W. What is the power factor of the motor? 4
