



C14-EC-306

4242

BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2016
DECE—THIRD SEMESTER EXAMINATION
ELECTRICAL TECHNOLOGY

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

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

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

1. The two vectors are $Z_1 = 10 \angle 4^\circ$ and $Z_2 = 10 \angle 53.13^\circ$. Perform (i) $Z_1 + Z_2$ and (ii) $Z_1 - Z_2$ and express in polar form.
2. Draw admittance triangle in parallel inductive circuit and write expression for power factor.
3. State the conditions required for parallel resonance.
4. State Fleming's right-hand rule.
5. Why commutator is required in d.c. machines?
6. What is phase sequence in three-phase circuit.
7. What is the need of conducting OC and SC tests in single-phase transformer?

8. List the applications of a three-phase transformer.
9. Define synchronous speed and write formula for it.
10. Why DC supply is required in an alternator?

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. (a) Draw a neat sketch showing the curve between current and frequency in series resonance and indicate bandwidth, resonant frequency, lower cut-off frequency and upper cut-off frequency. 4
- (b) An inductive circuit has a resistance of 2 Ω in series with an inductance of 0.015 H. If the circuit connected across 200 V, 50 Hz single-phase AC supply, find (i) current, (ii) power consumed and (iii) power factor. 6
12. A resistor of 6 Ω is connected in parallel with a capacitor of 398 μ F. If this circuit is connected across 240 V, 50 Hz, AC supply, calculate the (i) total conductance, (ii) total susceptance, (iii) total admittance, (iv) current drawn from the supply and (v) power factor of the circuit.
13. (a) Derive the expression for resonant frequency in series RLC circuits. 4
- (b) A circuit consists of resistor, an inductor and a capacitor in series. The supply voltage is 250 V, the current is 1A and the voltage across the capacitor is 500 V. Calculate the resistance, inductance and capacitance, if the resonant frequency is 50 Hz. 6
14. With a neat diagram, explain the working of a d.c. three-point starter.

15. With the neat sketches of circuit diagram and graph, explain speed control of DC shunt motor by armature voltage control method.
16. A 3-phase, 400-V, 50-Hz AC source supplies a 3-phase, delta connected balanced load $(3 - j4)$. Draw neat diagram and calculate (i) phase current, (ii) line current, (iii) power in each phase and (iv) total power drawn from the supply.
17. (a) Define coefficient of coupling. 2
(b) Derive the e.m.f. equation of a single-phase transformer. 8
18. With neat diagrams, explain the principle of operation of DC servo motor.
