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C23-EE–303

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BOARD DIPLOMA EXAMINATION, (C-23)

MARCH/APRIL—2026

DEEE – THIRD SEMESTER EXAMINATION

AC CIRCUITS AND TRANSFORMERS

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 *(a)* time period *(b)* RMS value.

2. Define *(a)* phase difference *(b)* cycle.

3. Perform the following operation and put the result in a polar form *(i)* $A - B$ when $A = (4 - j6)$, $B = (6 + j8)$.

4. Define resonance in an A.C circuit.

5. An A.C circuit consists of a pure resistance of 50 Ω and is connected across an A.C supply of 230 V, 50 Hz. Calculate *(a)* power *(b)* equation for voltage and current.

6. List the advantages of poly phase over single-phase system.

7. Define polyphase and draw 3ϕ waveforms.

8. Define all day efficiency of a transformer.

9. List the applications of a transformer.

10. Write the conditions for parallel operations of a 3ϕ transformer.

PART—B

10×5=50

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. A coil with resistance 50 Ω and inductance 0.1 H is connected in series with a capacitor of 150 μF across a 200 V, 50 Hz supply. Calculate *(i)* current, *(ii)* power factor; *(iii)* power, *(iv)* voltage across the coil and capacitor.

12. Explain the method of solving two branch parallel AC circuits by using J-notation method.

13. Derive the relation between line and phase value of current and voltage in 3ϕ balanced star connected system.

14. A 3ϕ 400 V, 50 Hz, 100 HP delta connected induction motor is working at full load. Two watt meters are used for measurement of power. Calculate the watt-meter readings if the efficiency of motor is 82% and power factor is 0.8 lag.

15. Derive the condition for maximum efficiency in a transformer.

16. Derive the e.m.f equation of a transformer.

17. Briefly explain off-load tap changing and on-load tap changing of transformer.

18. Explain any two methods of cooling a power transformer with a neat sketch.

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