4242

BOARD DIPLOMA EXAMINATION, (C–14)
SEPTEMBER/OCTOBER - 2020
DCE—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) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Perform the following operations in polar form :

(a) $A + B$

(b) $A - B$

where $A = (6 + j8)$ and $B = (3 + j4)$.

2. Define bandwidth of a resonant circuit.

3. State Fleming's right-hand rule.

4. Explain the need of starter in a DC motor.

5. List the merits of 3-phase system over single-phase.

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6. Give the relation between line voltage, phase voltage and line current, phase current in delta configuration.

7. Define coefficient of coupling and give the expression.

8. State the voltage transformation ratio of a transformer and the working principle of transformer.

9. Write any three applications of universal motor.

10. Define synchronous speed and write formula for it.

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PART—B 10×5=50

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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. When a resistance of 8 , inductance of 0·1 H and capacitance of 120 F are connected in series across 230 V, 50 Hz supply, calculate *(a)* impedance, *(b)* total current, *(c)* power factor and *(d)* voltage across resistor, capacitor and inductor. Also find power dissipated in the circuit.

12. *(a)* Derive the equation for resonant frequency single-phase AC parallel circuit. 5

(b) A coil of resistance 40 ohms and inductance of 0·75 henry is connected in series with a capacitor of *C* farads. The circuit is connected across 250 V, 50 Hz AC supply. Calculate the value of capacitance at resonant condition. 5

13. *(a)* Explain the significance of back EMF. 5

(b) Explain the power stages of DC motor. 5

14. Draw a neat sketch of 3-point starter and explain its working.

15. Explain the principle of operation of hydroelectric power station with a neat sketch.

16. *(a)* Derive the e.m.f. equation of a single-phase transformer.　5

     (b) Define efficiency and regulation of a transformer.　5

17. Explain the construction and working of an autotransformer.

18. Explain the working principle of capacitor start single-phase induction motor and write its applications.

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