3214

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2013

DAEI—THIRD SEMESTER EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : 3 hours]   [*Total Marks* : 80

PART—A

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. State the Kirchhoff's laws.

2. State the superposition theorem.

3. Explain the term 'phase difference'.

4. Define *Q* factor.

5. Define the resonance in series *R-L-C* circuit.

6. Explain different losses in DC machine.

7. Define the back e.m.f.

8. State the torque equation of DC motor.

9. Explain the autotransformer.

10. State the e.m.f. equation of alternator.

PART—B

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.

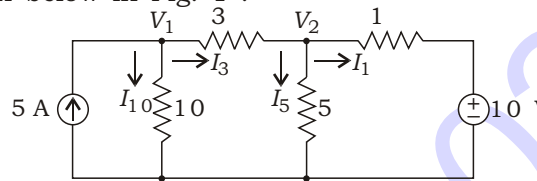**11.** Write the node voltage equation and determine the currents in each branch in the network shown below in Fig. 1 :

Fig. 1

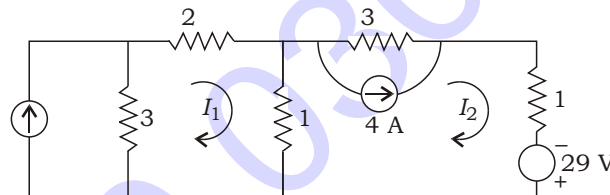**12.** Write and solve the equations for the loop currents in the network shown below in Fig. 2 :

Fig. 2

13. A coil of resistance 50   and inductance 100 mH is connected in series with a 200 F capacitor across a 220 V, 50 Hz supply. Calculate the *(a)* inductive reactance, *(b)* capacitive reactance, *(c)* impedance of the whole circuit, *(d)* current and *(e)* power factor.

14. The voltage of 20 V, 5 kHz is applied to the circuit shown below in Fig. 3. Determine the total current, the phase angle and the total impedance in the circuit :
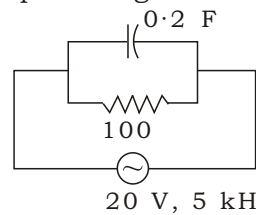

Fig. 3

15. Explain the construction of DC machine with neat diagram.

16. A 230 V DC shunt generator has a full-load current of 150 A. Its armature resistance is 0·1   and the field resistance is 230 . The stray losses are 1500 W. Find the *(a)* prime mover output in kW, when the generator is on full load and *(b)* full-load efficiency.

17. Explain the working principle of a transformer with a neat sketch.

18. Explain the construction and working principle of a 3-phase induction motor.

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