

G 6809

(Pages : 3)

Reg. No. 10001005

Name. Alen

**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**First and Second Semester**

**EN 010 108—BASIC ELECTRICAL ENGINEERING**

(2010 admissions—Regular)

(Common to all Branches)

Time : Three Hours

Maximum : 100 Marks

**Part A**

Answer all questions.

Each question carries 3 marks.

1. Define the terms mmf, reluctance, permeability and flux density in magnetic circuits.
2. State and explain Faraday's laws of electromagnetic Induction.
3. What is the need for starter in a DC machine ?
4. What are the various methods to measure three-phase power ? What is the equation for 3-phase power ?
5. Explain the need for high voltage transmission.

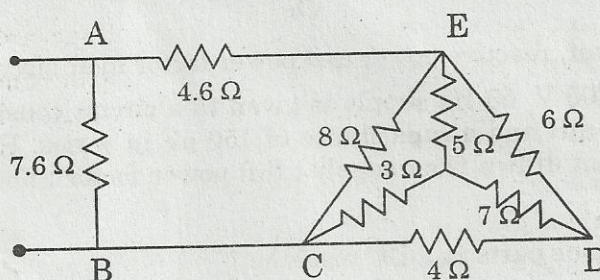
(5 × 3 = 15 marks)

**Part B**

Answer all questions.

Each question carries 5 marks.

6. Find the resistance between AB in the circuit shown below.



7. Define rms value, average value, form factor, peak factor and frequency of a sinusoidal alternating current.
8. Describe the various types of DC machines.
9. Explain briefly the generation of three-phase voltage.
10. What are the various non-conventional energy sources available ? List their advantages.

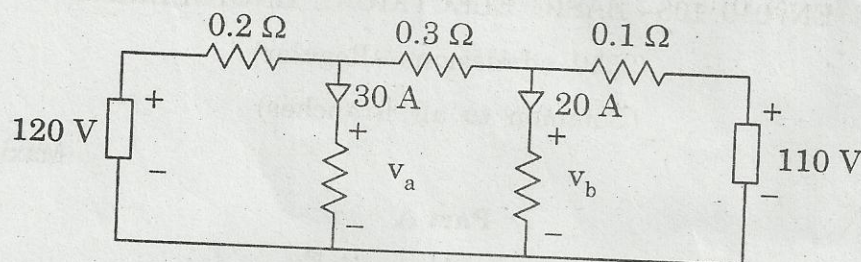
(5 × 5 = 25 marks)

Turn over

## Part C

Answer all questions.  
Each question carries 12 marks.

11. (a) Find the currents  $I_1$ ,  $I_2$  and  $I_3$  and the voltages  $V_a$  and  $V_b$  in the given circuit below.



- (b) State and explain Kirchhoff's laws.

Or

12. (a) Compare electric and magnetic circuits.

- (b) A coil of 300 turns and resistance of  $10\ \Omega$  is wound uniformly over a steel ring of mean circumference 30 cm. and cross-sectional area  $9\text{ cm}^2$ . It is connected to a 20 V DC supply. If  $\mu_r = 1500$ , find (i) MMF ; (ii) reluctance ; and (iii) magnetising force.

13. (a) Define self inductance, mutual inductance and coupling coefficient.

- (b) Two coils A and B have self-inductances of  $120\ \mu\text{H}$  and  $300\ \mu\text{H}$  respectively. When a current of 3A through coil A is reversed, the deflection in a flux meter connected across B is  $600\ \mu\text{Wb}$  turns. Calculate (i) M ; (ii) emf in coil B if the flux is reversed in 0.1 sec. ; and (iii) coupling coefficient.

Or

14. (a) Define active power, reactive power and power factor in ac circuits.

- (b) A single-phase, 200 V, 50 Hz supply is given to a circuit consisting of a resistance of  $20\ \Omega$ , inductance of 20 mH and a capacitance of  $150\ \mu\text{F}$  in series. Find (i) the impedance of the circuit ; (ii) current drawn from supply ; (iii) power factor ; and (iv) power drawn from the supply.

15. (a) What are the various parts in a DC machine ?

- (b) Explain the principle of operation of a DC motor.

Or

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

- (b) Explain the various types of transformers and their applications.

17. (a) Obtain the relation between line and phase voltages and currents in star and delta systems.

- (b) A balanced star connected load of  $(8 + j6)\ \Omega$  per phase is connected to a 3-phase, 230 V supply. Find the line current, power and power factor.

Or

18. (a) What are the various types of induction motors ? Compare their characteristics. List their applications.
- (b) What are the various starting methods for single-phase induction motors ?
19. (a) Compare underground and overhead transmission systems.
- (b) With a neat block schematic diagram, explain hydroelectric power generation.

Or

20. (a) What types of conductor materials are used for distribution of electric power ?
- (b) Draw and explain a one line diagram of typical power system.

(5 × 12 = 60 marks)