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Question Paper Code: **22118**

**B.E./B.Tech.Degree Examinations, April/May 2011
Regulations 2008**

Second Semester

Common to Civil, Aeronautical, Automobile, Marine, Mechanical, Production,
Chemical, Petroleum Engineering and to Biotechnology, Polymer, Textile,
Textile(Fashion), Rubber and Plastics Technology

GE2151 Basic Electrical and Electronics Engineering

Time: Three Hours

Maximum: 100 marks

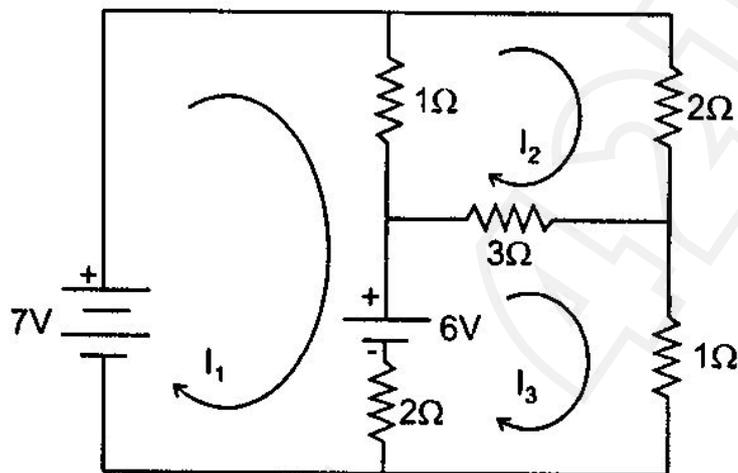
Answer ALL Questions

Part A - (10 x 2 = 20 marks)

1. Define : Power factor.
2. What are the advantages of electromechanical measuring instruments?
3. What is back emf?
4. What are the types of transformers based on construction?
5. State the advantages of bridge rectifier.
6. State what is 'Early Effect' in transistors.
7. Name four different flip flops commonly available.
8. What is a decade counter?
9. Define the term 'Demodulation'.
10. Sketch the block diagram of basic communication system.

Part B - (5 x 16 = 80 marks)

11. (a) (i) Use mesh analysis to determine the three mesh currents in the circuit shown below. (10)



- (ii) A series R-C circuit with $R = 20 \Omega$ and $C = 127 \mu\text{F}$ has 160 V, 50 Hz supply connected to it. Find the impedance, current and power factor. (6)

OR

11. (b) (i) With the help of a neat diagram, explain the construction and working of a permanent magnet moving coil (PMMC) type instrument. (8)
- (ii) Three similar coils connected in star, take a power of 1.5 kW at a power factor of 0.2 lagging from a 3 phase, 400 V, 50 Hz supply. Calculate the resistance and inductance of each coil. (8)

12. (a) (i) Derive the emf equation of a DC generator. (8)
- (ii) A short-shunt cumulative compound DC generator supplies 7.5 kW at 230 V. The shunt field, series field and armature resistances are 100, 0.3 and 0.4 ohms respectively. Calculate the induced emf and the load resistance. (4)
- (iii) A 30 kW, 300 V, DC shunt generator has armature and field resistances of 0.05 ohm and 100 ohm respectively. Calculate the total power developed by the armature when it delivers full output power. (4)

OR

12. (b) (i) A single phase 2200/250 V, 50 Hz transformer has a net core area of 36 cm^2 and maximum flux density of 6 Wb/m^2 . Calculate the number of primary and secondary turns. (4)
- (ii) With the help of neat sketches, explain the construction and operating principle of split-phase induction motors. (12)

13. (a) (i) With the help of V-I characteristics describe the working principle of zener diode. What is its symbol? Mention also the special properties of zener diode when compared to ordinary diode. (8)
- (ii) What is a half-wave rectifier? Sketch its circuit. Discuss the operation of half-wave rectifier with help of necessary waveforms. (8)

OR

13. (b) (i) Draw the three configurations of a bipolar junction transistor. (6)
- (ii) For the common emitter configuration, draw the circuit and explain the input and output characteristics. (8)
14. (a) (i) Draw and explain the circuit diagram of AND, OR, NOT and NAND gates with suitable truth tables. (8)
- (ii) Draw the logic diagram and explain the working of a half adder. (8)

OR

14. (b) (i) Draw the logic diagram of a 4-bit binary ripple counter and explain its working. (8)
- (ii) Explain with the neat sketch the working of Binary Ladder Network for Digital to Analog conversion. (8)
15. (a) (i) Explain briefly the need for modulation. What difficulties will be faced if unmodulated signals are transmitted? How modulation overcomes them? (8)
- (ii) Sketch the circuit of a simple transistor AM modulator and explain its working. (8)

OR

15. (b) With the help of block diagrams describe the working of
- (i) a typical TV transmitter. (8)
- (ii) a typical TV receiver. (8)