Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 10372

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2012.

Second Semester

GE 2151/185203 / EE 26 / 10133 EE 206 / 080280011 / EE 1153 —
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   State Kirchhoff's voltage and current law.

2.   State the different type of instruments based on their operating principles.

3.   What is the purpose of yoke in a dc machine?

4.   What are the types of transformers based on construction?

5.   Write the difference between the PN junction diode and zener diode.

6.   Give the biasing conditions for a transistor to operate as an amplifier.

7.   What are Universal Gates? Why do we call them so?

8.   What is a shift register? How is it classified?

9.   State the basic characteristic of an analog signal, with an example.

10. Give typical values of uplink frequency and downlink frequency in satellite communication.

11. (a) (i) Use mesh analysis to determine the three mesh currents in the circuit shown below. (10)
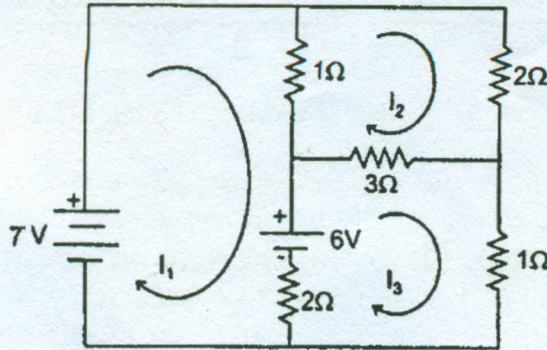
(ii) A series R-C circuit with R = 20 Ω and C = 127 μF has 160 V, 50 Hz supply connected to it. Find the impedance, current and power factor. (6)

Or

(b) (i) For the circuit shown below, calculate the line current, the power and the power factor. The value of R, L and C in each phase are 10Ω, 1 H and 100 μF respectively. (8)
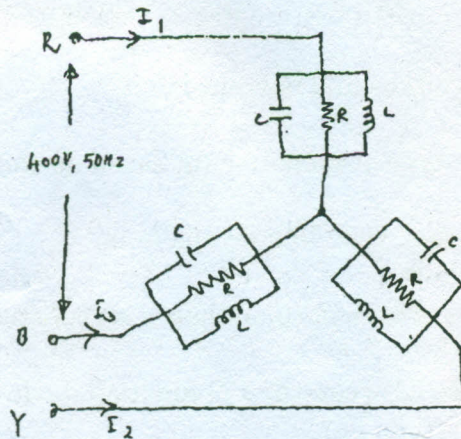
(ii) Explain the principle of operation of attraction-type and replusion-type of moving iron instruments with neat sketches. (8)

12. (a) (i) Draw the circuit diagram of the following three types of dc motors and write the relationships among the currents and voltages:

(1) Separately excited motor

(2) Series motor

(3) Shunt motor. (6)

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(ii) Explain the characteristics of a d.c. shunt motor. Sketch the graphical representation of the concerned characteristics. (6)

(iii) A DC motor connected to a 460 V supply has an armature resistance of 0.15 ohms. Calculate

    (1) the value of back emf when the armature current is 120 A

    (2) the value of armature current when the back emf is 447 V. (4)

Or

(b) (i) Explain the construction and working principle of capacitor start and capacitor run single phase induction motor. What are its advantages and practical applications? (8)

(ii) Explain the principle of operation of single phase transformer. (8)

13. (a) (i) Explain the mechanism of avalanche breakdown and Zener breakdown. (8)

(ii) With the help of relevant circuit and V-I characteristics, show how a zener diode is used as a voltage regulator. (8)

Or

(b) (i) Explain the operation of PNP transistor. (6)

(ii) With neat sketch explain the input and output characteristics of a transistor in CB configuration. Draw also the necessary circuit. (10)

14. (a) (i) Explain the working of clocked master slave JK flip flop with logic diagram. (8)

(ii) Show that NAND and NOR gates are universal building blocks. (8)

Or

(b) (i) Explain Successive-Approximation A/D conversion. (8)

(ii) Explain the operation of Asynchronous counter. (8)

15. (a) (i) What is meant by modulation and demodulation? (4)

(ii) Explain briefly the principle of modulating a carrier signal by amplitude modulation and also obtain the expression for power. (12)

Or

(b) (i) With a neat block diagram, explain the principle of operation of microwave communication. (8)

(ii) Draw the block diagram of optical fibre communication system and explain the function of each block. (8)