Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 90065

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Second Semester

Mechanical Engineering

BE 8253 – BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING

(Common to Aeronautical Engineering/Aerospace Engineering/Automobile Engineering/Industrial Engineering/Industrial Engineering and Management/ Manufacturing Engineering/Marine Engineering/Material Science and Engineering/Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/Mechatronics Engineering/Production Engineering/Robotics and Automation Engineering)

(Regulations 2017)

Time : Three Hours — Maximum : 100 Marks

Answer ALL questions

PART – A — **(10×2=20 Marks)**

1. A stove element draws 15 A when connected to a 120 V line. How long does it take to consume 30 kJ.
2. Write the Mesh equation for the circuit shown in Figure 1.

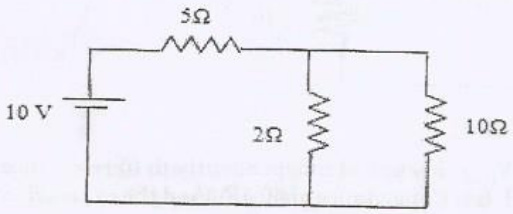

Fig. 1

3. Define Apparent power and power factor.
4. Explain the concept of balanced load.
5. Name the parts of a Transformer.
6. Explain how you would reverse the direction of rotation of a D.C. shunt motor.
7. What is intrinsic semiconductor ?
8. Define the term drift current.

9. What are the desirable features of a transducer ?

10. List the classifications of instruments.

PART – B (5×13=65 Marks)

11. a) Using mesh analysis, determine the current through 1Ω resistor in the given circuit shown in Figure 11.a. (13)

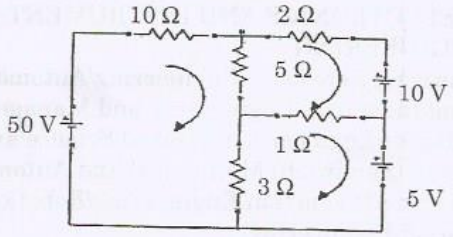

Fig. 11 (a)

(OR)

b) Find the value of R_L at which maximum power is transferred to R_L and hence the maximum power transferred to R_L in the circuit shown in Figure 11.b. (13)

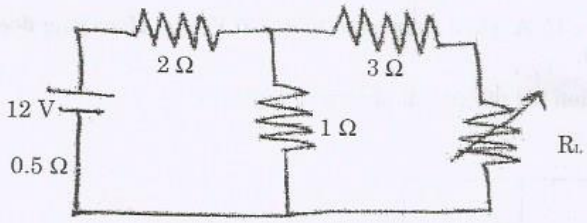

Fig. 11 (b)

12. a) A 50 Hz, A.C. voltage of 150 $V_{(rms)}$ is applied independently to (i) resistance of 10 Ω (ii) Inductance of 0.2 H, (iii) Capacitance of 50 μF. Find the expression for the instantaneous current and draw the phasor diagram in each case. (13)

(OR)

b) Explain three phase circuits in star and delta connection with necessary phasor diagrams and equations. (13)

13. a) Derive the EMF equation of a D.C. generator and explain the working principle of DC generator. (13)

(OR)

b) Discuss the principle of operation of a three phase Induction motor. (13)

14. a) Explain the mechanism of avalanche breakdown and zener breakdown. **(13)**

(OR)

b) Discuss using a neat diagram, the principle and working of NPN transistor in CE configuration. **(13)**

15. a) Explain with a neat sketch, the working of dynamometer type wattmeter. **(13)**

(OR)

b) Explain with necessary diagram, the working principle of a digital storage oscilloscope. Discuss its advantages over analog CRO. **(9+4)**

PART – C **(1×15=15 Marks)**

16. a) Determine the current I_L in the circuit shown in Figure 16.a.

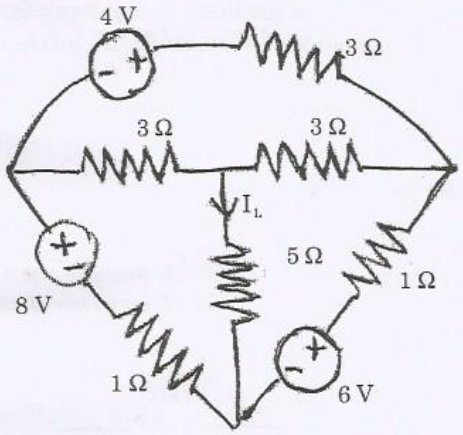

Fig. 16 (a)

(OR)

b) Determine the current through the 2 ohm resistor in the following network shown in Figure 16. b using Thevenin's theorem.

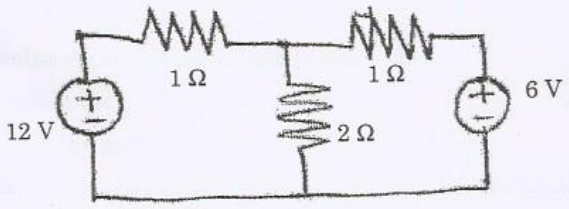

Fig. 16 (b)