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.

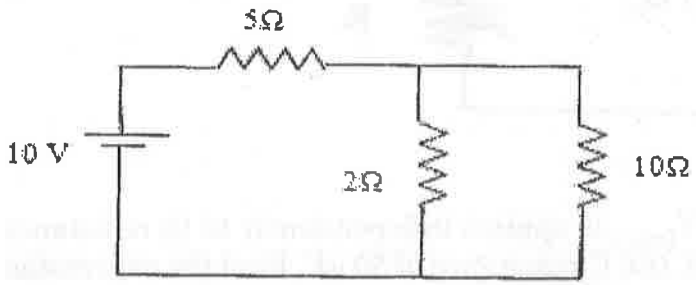

Fig. 1

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)**

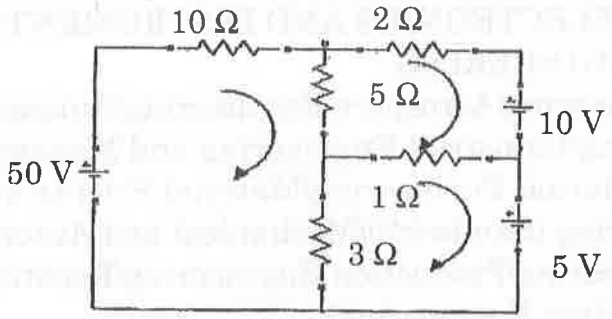

Fig. 11 (a)

(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)**

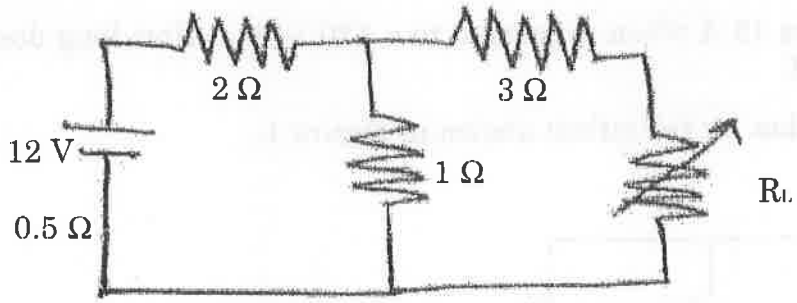

Fig. 11 (b)

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.

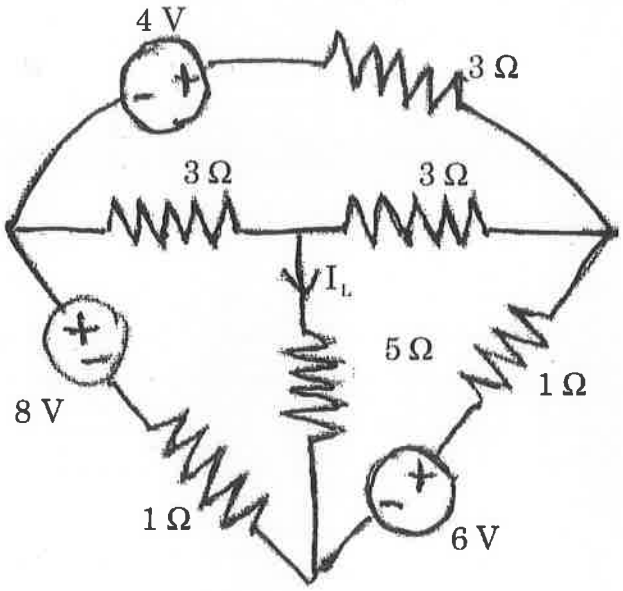

Fig. 16 (a)

(OR)

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

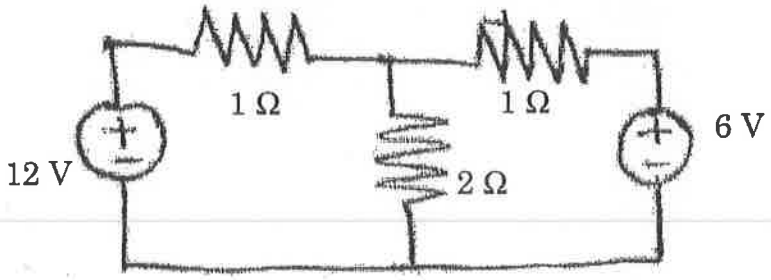

Fig. 16 (b)