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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.

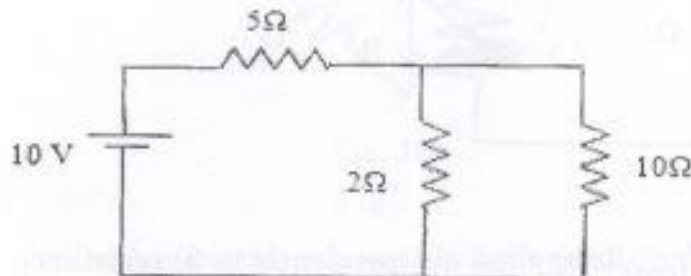


Fig. 1

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)

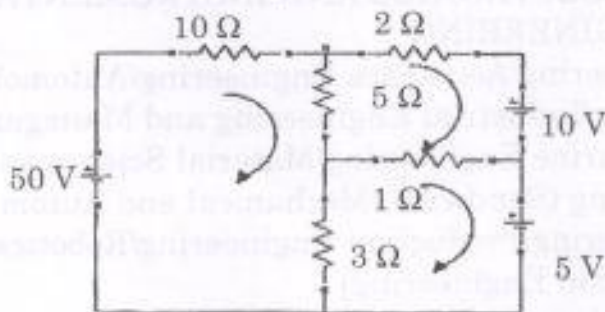


Fig. 11 (a)

(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)

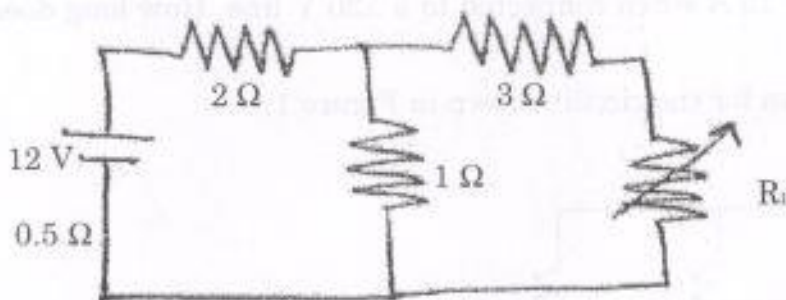


Fig. 11 (b)

12. a) A 50 Hz, A.C. voltage of $150 V_{(rms)}$ is applied independently to (i) resistance of 10Ω (ii) Inductance of $0.2 H$, (iii) Capacitance of $50 \mu F$. 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.

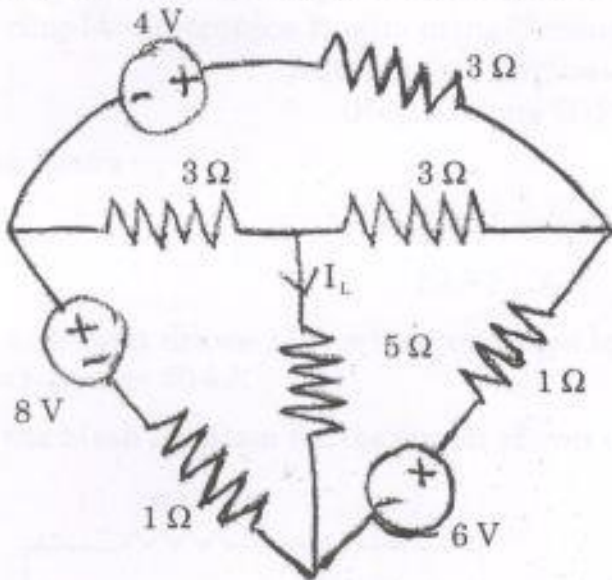


Fig. 16 (a)

(OR)

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

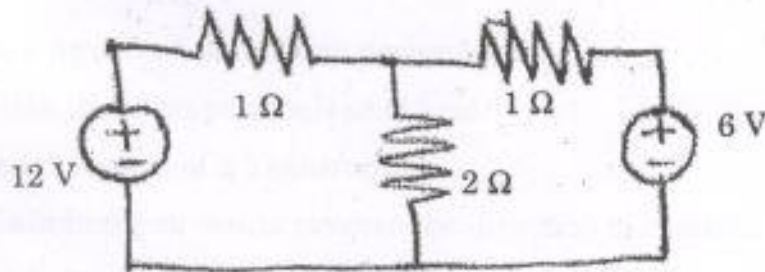


Fig. 16 (b)