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J 3713

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2009.

Annual Pattern — First Year

(Regulation 2004)

Mechanical Engineering

EE 1X 02 — BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Automobile Engineering/Marine Engineering/Aeronautical Engineering
and Production Engineering)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The circuit, consisting of resistors 5Ω and 8Ω in parallel, is connected across 100 V, DC supply. Find the current through each resistor.
2. An alternating current is given by the expression $i = 50 \sin 628 t$. Determine its RMS and Average value.
3. Why is the armature core, of DC machines made of silicon content steel stampings?
4. Enumerate the various kinds of Transformer.
5. Which type of induction motor would you use for the following applications?
 - (a) Ceiling fan
 - (b) Food processors and mixers.
6. Define the term voltage regulation of Alternator.
7. Distinguish between active and passive transducer.
8. What is the function of chopper and inverter circuits?

9. Give the comparison between Amplitude modulation and Frequency modulation.
10. What is interlaced scanning in TV system? State its advantage.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Formulate the kirchoff's voltage law equation for the circuit shown in fig Q11a. Determine the current through 3 ohm and 6 ohm resistors. (8)

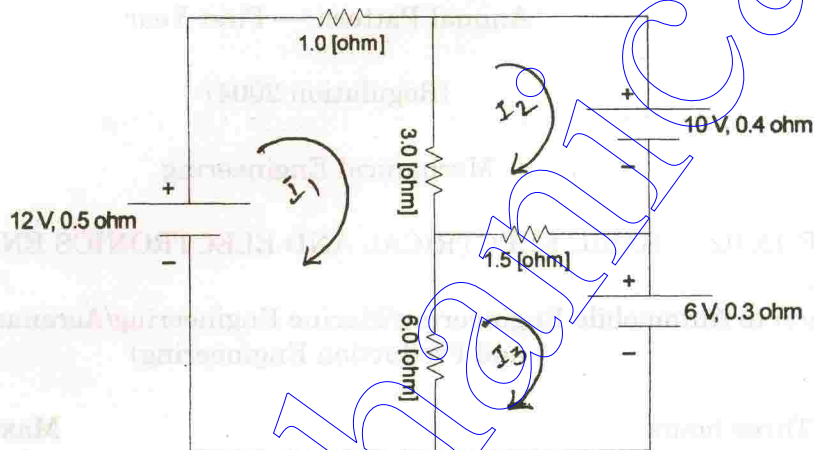


Fig Q. No. 11(a)

- (ii) When the series RLC circuit is said to be in resonance? Derive its resonance frequency. (8)
- Or
- (b) (i) A coil of resistance 10Ω and inductance 0.1 H is connected in series with a $150 \mu\text{F}$ capacitor across 200 V , 50 Hz supply. Calculate circuit impedance, current and power factor. (8)
- (ii) Name the instrument used for measuring the electrical power consumed during a specific period. Discuss how the instrument functions. (8)
12. (a) (i) What are the different types of DC generator? Sketch their load characteristics in the same graph. (6)
- (ii) What are the factors controlling the DC motor speed? Discuss the various speed control methods used for DC series motors. (10)

Or

- (b) Draw the circuit diagrams for conducting OC and SC tests on a 1-phase Transformer. Also explain how the efficiency and voltage regulation can be estimated by these tests. (16)

13. (a) (i) 'A 1-phase Induction motor is not self-starting' – Explain this statement using the double revolving field theory. (8)
- (ii) Describe with necessary diagrams the constructional details of a 3-phase wound rotor Induction motor. (8)

Or

- (b) (i) Starting from fundamentals, develop an expression for emf induced in an Alternator. (8)
- (ii) What are the different methods of starting of a 3-phase Synchronous motor? Explain any one method in brief. (8)
14. (a) (i) What is transducer? Discuss the working principle of inductive transducer. (8)
- (ii) With the help of neat sketches and characteristic curves, explain the operation of the junction FET. (8)

Or

- (b) (i) With the help of output characteristics, explain how a phototransistor responds to the incident light. (8)
- (ii) Explain with neat diagram, the principle and operation of full-wave bridge rectifier. (8)
15. (a) (i) Discuss different modes of data transmission. (6)
- (ii) With block diagram explain the principle of Microwave communication. State its applications. (10)

Or

- (b) (i) With neat diagram explain the conceptual view of ISDN connection feature. (10)
- (ii) Explain the principle of operation of mobile phones. (6)