D 4513

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Annual Pattern — First Year

(Regulation 2004)

Mechanical Engineering

EE 1 X 02 — BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. State Kirchoff's laws.

2. Define rms value.

3. Define voltage regulation of a transformer.

4. Why is a shunt motor called constant speed drive?

5. What is meant by synchronous speed?

6. What are the constructional differences between salient pole and cylindrical alternators?

7. What is a transducer?

8. What are minority and majority carriers in a semiconductor?

9. What are frequency synthesizers?

10. What is meant by modulation and demodulation?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Find the current I which flows through 10 Ω resistor in the circuit shown in Fig. 1. All resistances are in ohms. (8)

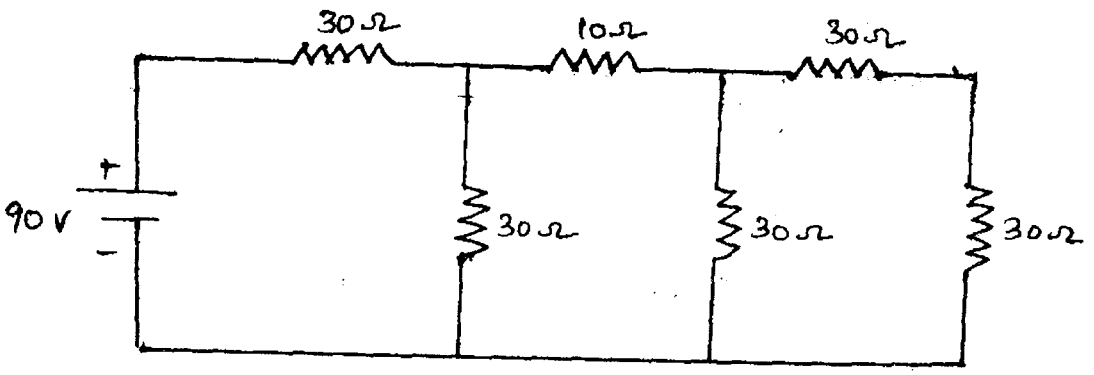

Fig. 1

(ii) A resistance of 20 ohm and an inductance of 0.2 H and a capacitance of 100 μF are connected in series across 220 V, 50 Hz main. Determine (1) impedance (2) current taken from mains (3) power and power factor of the circuit. (8)

Or

(b) What are the essentials of measuring instruments? Explain the construction and theory of operation of single phase induction type energymeter.

12. (a) (i) Derive the equation for induced emf of a dc machine.

(ii) Explain how voltage is built up in a self excited generator. Draw relevant figures.

Or

(b) Draw the circuit diagram and discuss the open circuit and short circuit tests on a transformer.

13. (a) Explain with the help of double field revolving theory, how starting torque is obtained in a split phase single phase induction motor.

Or

(b) Starting from first principle develop the equivalent circuit of a three phase induction motor.

14. (a) Draw the circuit diagram of a full wave bridge rectifier network supplying a resistive load. Explain the operation of the network with relevant waveforms. Also obtain the rectification efficiency.

Or

(b) Explain the output and input characteristics of a transistor in CB configuration.

15. (a) Draw the block diagram of a TV transmitter and TV receiver. Explain its working in brief.

Or

(b) (i) What are the different types of modulation?

(ii) Explain in brief AM transmitter using a block diagram.

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