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

Question Paper Code : Q 2713

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Annual Pattern — First Year

Mechanical Engineering

EE 1 X 02 — BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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

(Regulation 2004)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The circuit, consisting of resistors 5 Ω and 8 Ω in series, is connected across 100 V, DC supply. Find the voltage across each resistor.

2. A Series RLC circuit consists of R = 10 Ω, L = 50 mH and C = 100 μF, is energized with 200 V, 50 Hz Ac supply. Find the circuit current at resonance.

3. Draw the mechanical characteristics of DC shunt and series motor on the same graph.

4. Draw the equivalent circuit of two winding transformer referred to primary side with its parameters filled.

5. Name any four types of single phase induction motors based on its stating methods.

6. Why almost all large size Synchronous machines are constructed with rotating field system type?

7. Compare BJT with JFET.

8. What is dark current in photo diode?

9. What is modulation? State its types.

10. What is Doppler effect?

PART B — (5 × 16 = 80 marks)

11. (a) (i) State and explain Kirchhoff's laws with suitable example. (8)

(ii) Find the Average and RMS value of the voltage wave shown in Fig. 11(b). (8)

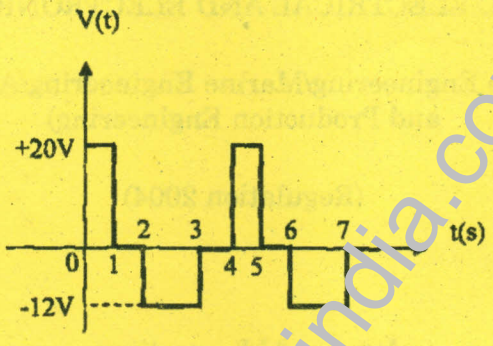

Fig. 11(b)

Or

(b) (i) A coil of resistance 10 Ω and inductance 0.1 H is connected in series with a 150 μF capacitor across 200 V, 50 Hz supply. Calculate (1) Impedance (2) Current (3) Power factor. (8)

(ii) With neat diagram, explain the principle, construction and operation of Megger. (8)

12. (a) (i) Name the different parts of a DC machine. Name the materials used in the construction of each of these parts and list their main functions. (8)

(ii) What are the methods of speed control of DC motors? Explain any one in brief. (8)

Or

(b) (i) Explain briefly the principle and working of 1-phase two winding transformer. (8)

(ii) Explain how the equivalent circuit parameters of 1-phase two winding transformer are determined form OC and SC test readings. (8)

13. (a) (i) Using double revolving field theory, explain why a single-phase induction motor is not self starting. (8)

(ii) Develop an approximate equivalent circuit for a 3-phase Induction motor. (8)

Or

(b) (i) A 3-phase, 16-pole, star-connected, Alternator has 240 stator slots with 8 conductors per slot and the conductor of each phase are connected in series. The coil span is 144 electrical degrees. Determine the induced emf per phase if the machine speed is at 375 rpm and the flux per pole is 0.061 Wb distributed sinusoidally in the air gap. (8)

(ii) Explain with circuit any one method of starting a 3-phase synchronous motor. (8)

14. (a) (i) What is transducer? Discuss the working principle of capacitive transducer. (8)

(ii) Explain the working principle of SCR and obtain its VI characteristics. (8)

Or

(b) (i) Explain with neat diagram the principle and operation of centre–tap full-wave rectifier. (10)

(ii) State the function of following circuits (1) Choppers (2) Inverters (3) Voltage controllers. (6)

15. (a) (i) Write down the comparison between Amplitude modulation and Frequency modulation. (4)

(ii) With block diagram explain the principle of satellite communication. State its advantages and disadvantages. (12)

Or

(b) (i) With a neat diagram explain the conceptual view of ISDN connection feature. (8)

(ii) Explain the principle of operation of mobile phones. (8)

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