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**Question Paper Code : 11433**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Second Semester

GE 2151/EE 26/EE 1153/10133 EE 206/080280011 – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Civil, Aeronautical, Automobile, Marine, Mechanical, Production, Chemical, Petroleum Engineering and to Biotechnology, Polymer, Textile, Textile(Fashion), Plastic Technology, Environmental Engineering, Geoinformatics Engineering, Industrial Engineering, Industrial Engineering and Management, Manufacturing Engineering, Material Science and Engineering, Mechanical and Automation Engineering, Mechatronics Engineering, Petrochemical Engineering, Chemical and Electrochemical Engineering, Petrochemical Technology, Pharmaceutical Technology and Textile Chemistry)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

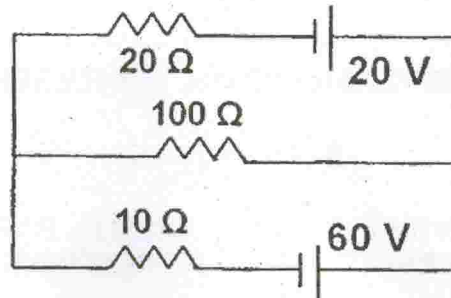
Answer ALL questions.

PART A – (10 × 2 = 20 marks)

1. Define RMS value.
2. What are the advantages of electromechanical measuring instruments?
3. What is back emf?
4. Define : Transformation ratio of a transformer.
5. What is meant by zener effect?
6. State what is 'Early Effect' in transistors.
7. Write the truth table of an Exclusive-OR gate.
8. Mention two types of D/A converters.
9. State any two differences between analog and digital signals.
10. State the functions of a satellite transponder.

PART B — (5 × 16 = 80 marks)

11. (a) (i) For the circuit shown below, find the current through each of the three resistors. (10)



- (ii) A coil of resistance  $5.94 \Omega$  and inductance of  $0.35 \text{ H}$  is connected in series with a capacitance of  $35 \mu\text{F}$  across a  $200 \text{ V}$ ,  $50 \text{ Hz}$  supply. Find the impedance ( $Z$ ), current and the phase difference between voltage and current ( $\phi$ ). (6)

Or

- (b) (i) With a neat diagram explain the construction and principle of operation of a moving iron attraction type instrument. (10)
- (ii) Three inductive coils, each with a resistance of  $15 \Omega$  and an inductance of  $0.03 \text{ H}$  are connected in star to a three phase  $400 \text{ V}$ ,  $50 \text{ Hz}$  supply. Calculate the phase current, line current and power absorbed. (6)
12. (a) (i) Derive the emf equation of a DC generator. (8)
- (ii) A short-shunt cumulative compound DC generator supplies  $7.5 \text{ kW}$  at  $230 \text{ V}$ . The shunt field, series field and armature resistances are  $100$ ,  $0.3$  and  $0.4 \text{ ohms}$  respectively. Calculate the induced emf and the load resistance. (4)
- (iii) A  $30 \text{ kW}$ ,  $300 \text{ V}$ , DC shunt generator has armature and field resistances of  $0.05 \text{ ohm}$  and  $100 \text{ ohm}$  respectively. Calculate the total power developed by the armature when it delivers full output power. (4)

Or

- (b) (i) A single phase  $2200/250 \text{ V}$ ,  $50 \text{ Hz}$  transformer has a net core area of  $36 \text{ cm}^2$  and maximum flux density of  $6 \text{ Wb/m}^2$ . Calculate the number of primary and secondary turns. (4)
- (ii) With the help of neat sketches, explain the construction and operating principle of split - phase induction motors. (12)

13. (a) (i) With the help of V-I characteristics describe the working principle of zener diode. What is its symbol? Mention also the special properties of zener diode when compared to ordinary diode. (8)
- (ii) What is the half - wave rectifier? Sketch its circuit. Discuss the operation of half - wave rectifier with help of necessary waveforms. (8)

Or

- (b) (i) Explain in brief the input and output characteristics of CE configuration of a NPN transistor. (10)
- (ii) Compare the performance of a transistor in three different configurations. (6)
14. (a) (i) Simplify the following Boolean expressions : (8)
- (1)  $xy + x'z + yz$
- (2)  $(A'+B+C') \cdot (A+B+C) \cdot (C+D) \cdot (C+D+E)$
- (ii) Explain the working of JK flip flop with its logic diagram. (8)

Or

- (b) (i) Draw the logic diagram of a 4 - bit binary ripple counter and explain its working. (8)
- (ii) Explain with the neat sketch the working of Binary Ladder Network for Digital to Analog conversion. (8)
15. (a) (i) Explain frequency modulation. Obtain the mathematical representation of frequency modulated wave. (8)
- (ii) What is meant by amplitude modulation? Explain also the connected terms 'Modulation Index', 'AM Wave Equation' and 'Spectrum'. (8)

Or

- (b) With the help of block diagrams describe the working of
- (i) a typical TV transmitter (8)
- (ii) a typical TV receiver. (8)