

**Subject: FUNDAMENTALS OF ELECTRICAL & ELECTRONICS
ENGINEERING**

Time: 3 Hours

JUNE 2011

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions, selecting at least TWO questions from each part. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. Whenever a conductor cuts magnetic flux, an emf is induced in that conductor, the above statement is due to
- (A) Faradays law (B) Joules law
(C) Weber and Ewings theory (D) Coulombs law
- b. Resistance of a wire is r ohms. The wire is stretched to double its length then its resistance in ohms is
- (A) $r/2$ (B) $4r$
(C) $2r$ (D) $r/4$
- c. The equation of a 25 cycle current sine wave having rms value of 30 amperes will be
- (A) $-30 \sin 25t$ (B) $30 \sin 50t$
(C) $42.4 \sin 25 \pi t$ (D) $42.4 \sin 50\pi t$
- d. Which DC motor has approximately constant speed?
- (A) Series motor (B) Shunt motor
(C) Compound motor (D) All of the above
- e. A step up transformer increases
- (A) power (B) power factor
(C) voltage (D) frequency

- f. In p-n junction, the region containing the uncompensated acceptors and donor ions is called
- (A) transition zone (B) depletion region
(C) neutral region (D) active region
- g. Which of the following diode is designed to operate in the breakdown region?
- (A) Varactor diode (B) Tunnel diode
(C) Zener diode (D) None of the above
- h. In pnp transistor, with normal bias the emitter junction
- (A) is always reverse biased (B) offers very high resistance
(C) offers a low resistance (D) remains open
- i. Which of the following bipolar junction transistor configuration provide the best power gain
- (A) CE (B) CB
(C) CC (D) None of the above
- j. A phase shift oscillator consists of three _____
- (A) RC circuits (B) RL circuits
(C) LC circuits (D) RLC circuits

PART A

Answer atleast TWO questions. Each question carries 16 marks.

- Q.2** a. State and Explain Faraday Laws of Electromagnetic Induction? (8)
- b. What is the relation between magnetic flux density and field Intensity? Explain it. (8)
- Q.3** a. Give the relationship between the phase values and line values of current and voltage in star connected circuits. The $10\ \Omega$ resistors are connected in a star across 400V, 3 phase lines calculate the line and phase currents and the power taken from the mains. (8)
- b. State and explain Thevenin's theorem. (8)
- Q.4** a. What are the different methods of speed control of D.C shunt motors? Explain in brief. (8)
- b. A 6-pole, wave wound shunt generator has 1200 conductors. The useful flux per pole is $0.02\ \text{wb}$, the armature resistance $0.4\ \text{ohm}$ and the speed 400rpm . If the shunt resistance is 220ohm , calculate the maximum current which the generator can deliver to an external load if the terminal voltage is not to fall below 440V. (8)

- Q.5** a. Explain the working principle of operation of single phase transformer. (8)
- b. A single phase transformer has a net core area of 60 cm^2 . The primary with 400 turns is connected to a 500 V supply. Estimate the flux density in the core and the no load Secondary terminal voltage. The number of turns in the secondary is 1000. The frequency of supply is 50 Hz. (8)

PART B
Answer atleast TWO questions. Each question carries 16 marks.

- Q.6** a. What are the different types of semiconductor? Explain n-type and p-type semiconductor with the help of energy band diagram. (10)
- b. Write a short note on p-n junction. (6)
- Q.7** a. Differentiate between clipping and clamping circuit? Explain any two clipping circuit with the help of waveforms. (9)
- b. With the help of neat diagram, explain Zener diode voltage regulator. (7)
- Q.8** Explain voltage-divider biasing technique and obtain its DC load line. (16)
- Q.9** a. Write a short note on BJT phase shift oscillator. (8)
- b. Discuss the advantages and disadvantages of negative feedback amplifier. (8)