

DipIETE – ET/CS {NEW SCHEME}

Time: 3 Hours

JUNE 2014

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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. The expression for the current flowing at any instant after the application of a constant voltage V to a circuit having a capacitance C in series with a resistance R is given by.....

(A) $i = \frac{R}{V} e^{-t/RC}$

(B) $i = \frac{R}{V} e^{t/RC}$

(C) $i = \frac{V}{R} e^{t/RC}$

(D) $i = \frac{V}{R} e^{-t/RC}$

- b. The expression for power for three phase star connected circuit in terms of line voltage V_L , line current I_L and power factor $\cos \phi$ is given by.....

(A) $\frac{\sqrt{3} \times V_L \times I_L}{\cos \phi}$

(B) $\frac{3 \times V_L \times I_L}{\cos \phi}$

(C) $\sqrt{3} \times V_L \times I_L \times \cos \phi$

(D) $3 \times V_L \times I_L \times \cos \phi$

- c. The emf generated by a given dc generator depends upon

(A) flux only

(B) speed only

(C) flux and speed

(D) terminal voltage

- d. In transformers power transferred from primary winding to secondary winding by

(A) mutual induction

(B) self induction

(C) static induction

(D) dynamic induction

- e. Three resistance of each R ohms are connected to form a triangle. the resistance between any two terminals will be
- (A) R ohms (B) $\frac{3}{2}$ R ohms
(C) $\frac{2}{3}$ R ohms (D) 3 R ohms
- f. As the temperature of semiconductor increases its:
- (A) Conductivity decreases (B) Conductivity increases
(C) Resistivity increases (D) Atomic number decreases
- g. The ripple factor of half wave rectifier
- (A) 1.21 (B) 1.12
(C) 0.48 (D) 2.5
- h. As compared to a CB amplifier, the CE amplifier has
- (A) lower input impedance (B) higher output impedance
(C) lower current amplification (D) higher current amplification
- i. The bandwidth of an amplifier with negative feedback
- (A) increases (B) decreases
(C) remains constant (D) none of these
- j. The base of the transistor is
- (A) heavily doped (B) moderately doped
(C) lightly doped (D) none of these

PART A

Answer at least TWO questions. Each question carries 16 marks.

- Q.2** a. State and explain Fleming's left hand rule. (4)
- b. Compare magnetic and electric circuit. (6)
- c. A coil consisting of 100 turns is placed in the magnetic field of 0.8 mWb. Calculate the average emf induced in the coil when it is moved in 0.08 s from the given field to the field of 0.3 mWb. (6)
- Q.3** a. State and explain Superposition theorem with example. (8)

- b. A capacitor of 100 μF is connected across a 200 V, 50 Hz single phase supply. Calculate:
(i) the reactance of the capacitor (ii) rms value of current
(iii) maximum current (3+3+2)

Q.4 a. Explain the principle of operation of a DC motor. (8)

- b. The armature of a 6 - pole dc shunt motor has a lap winding accommodated in 50 slots, each containing 24 conductors. If the useful flux per pole is 25 m Wb, calculate the total torque developed, when the armature current is 45 A. (8)

Q.5 a. Explain the basic principle of operation of single phase transformer. (8)

- b. A 3- phase induction motor runs at almost 1000 rpm at no load and 940 rpm at full load when supplied with power from a 50 Hz, 3- phase line. Calculate:
(i) number of poles (ii) slip at full load (4+4)

PART B

Answer at least TWO questions. Each question carries 16 marks.

Q.6 a. Explain Insulator, Semiconductor & conductor with help of energy band structure. (8)

- b. Explain DC load line analysis of a diode circuit with the help of suitable example. (8)

Q.7 a. Draw the circuit diagram of a bridge rectifier and explain its operation with the help of necessary wave form. (8)

- b. Draw and explain clamping circuit. (8)

Q.8 a. Sketch and explain the input and output characteristics of CE configurations of transistors. (8)

- b. With the help of circuit diagrams, explain working of voltage-divider biasing circuits. What are its advantages over other type of biasing method? (8)

Q.9 a. Explain working of single stage CE amplifier with the help its circuit diagram. (8)

- b. Draw circuit diagram of BJT phase shift oscillator and explain its working. (8)