

DiplETE – ET/CS (Current & New Scheme)

Time: 3 Hours

December - 2016

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 time constant of the charging of capacitor circuit is defined as the time taken for the voltage to rise to _____ of its final steady value.
(A) 0 (B) 1
(C) 0.632 (D) None of these
- b. The total power consumed by a purely inductive circuit is _____.
(A) 1 (B) 0
(C) 0.5 (D) 2
- c. The Power factor for an capacitive circuit is always _____.
(A) Leading (B) Laging
(C) Zero (D) One
- d. A 6 pole, lap wound armature has 840 conductors and flux per pole of 0.018 wb. The emf generated will be _____ when machine is running at 600 rpm.
(A) 151.2v (B) 202.4v
(C) 98.6v (D) 132.5v
- e. The induced emf in the primary of transformer acts in _____ to the voltage applied across the primary winding.
(A) Same direction
(B) opposition
(C) Neither opposition nor same direction
(D) None of these
- f. The depletion region in a semi conductor consists of _____.
(A) Positive Carrier
(B) Negative Carrier
(C) Depleted of Charge Carrier
(D) Both Positive and Negative Carrier

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- g. An Ideal diode has _____ forward resistance.
 (A) Zero (B) Infinite
 (C) Neither Zero nor Infinite (D) None of these
- h. A diode with $V_F = 0.7\text{v}$ is connected as a Half Wave Rectifier. The load resistance is 500 ohms and rms AC input is 22V. The peak diode reverse voltage is _____
 (A) 25v (B) 31.1v
 (C) 0 (D) 52.3v
- i. Which biasing gives the excellent stability of Q – point _____?
 (A) Base Bias (B) Collector to base bias
 (C) Voltage Divider (D) None of these
- j. At Half Power points, the gain falls by _____.
 (A) 0 db (B) 1 db
 (C) 3 db (D) None of these

PART A

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

- Q.2** a. State and explain Coloumb's law of Electrostatics. (8)
- b. Define MMF, Magnetic field strength and reluctance. Give the relation among all three. (8)
- Q.3** a. A reactor having negligible resistance and an inductance of 0.1 H is connected in series with a resistor of 15 ohms. The circuit is connected across a 230 V, 50 Hz, single phase ac supply. Find the (8)
 (i) current flowing in the circuit, (ii) power factor of the circuit,
 (iii) voltage across the reactor, and (iv) voltage across the resistor.
- b. A capacitor of 100 microfarad is connected across a 200V, 50 Hz single phase supply. Calculate
 (i) the Reactance of the Capacitor (ii) rms value of current
 (iii) Maximum Current. (8)
- Q.4** a. Derive the EMF equation of Generator. Define Back EMF. (8)
- b. Explain how Speed of Shunt motors can be controlled by Armature control and Field control methods. (8)
- Q.5** a. A single phase transformer has 350 primary and 1050 secondary turns. The net cross sectional area of core is 55 cm^2 . If primary winding be connected to a 400V, 50 Hz single phase supply, calculate
 (i) Maximum value of flux density in the Core
 (ii) The voltage induced in the Secondary winding (8)

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- b. Discuss the principle of operation of 3 phase Induction Motor in detail with the constructional diagram. (8)

PART B**Answer at least TWO questions. Each question carries 16 marks.**

- Q.6** a. Explain and draw the Forward and Reverse Characteristics of PN Junction Diode. Compare it with ideal Diode Characteristics. (8)
- b. Compare among Conductors, Semi Conductors and Insulators on the basis of the Energy Band Diagram. What is forbidden Energy Gap? (8)
- Q.7** a. Explain the working of Half Wave Rectifier with a Reservoir Capacitor. Draw its neat Circuit Diagram. (8)
- b. Discuss the working of Zener Diode Voltage Regulator under No load and Full load conditions. Draw its Circuit Diagram. (8)
- Q.8** a. Explain the Input and Output Characteristics of BJT in CB Configuration. Define the term Amplification in detail. (8)
- b. Define Q- point. Draw the DC Load Line for CE Transistor Circuit. What is the Criteria of selection for the DC bias point? (8)
- Q.9** a. Describe the working of Series Voltage Negative Feedback Amplifier in detail. Derive the expression for the Voltage gain. (8)
- b. Explain the operation of BJT Phase Shift Oscillator. How Frequency of Oscillations is calculated? (8)