

DiplETE – ET/CS (Current & New Scheme)

Time: 3 Hours

June 2019

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. Oscillators employ
(A) no feedback (B) negative feedback
(C) positive feedback (D) either negative or positive feedback
- b. While calculating R_{th} in Thevenin's theorem and Norton equivalent
(A) Only current sources are made dead
(B) Only voltage sources are made dead
(C) All voltages & current sources are made dead
(D) All independent sources are made dead
- c. One of the common application of Zener diode is a
(A) Rectifier (B) simple voltage reference source
(C) Clipper (D) emitter follower
- d. A star connected load has each element of value 3 Ohms, then the equivalent branch elements of delta circuit will be
(A) 1 Ohms (B) 3 Ohms
(C) 6 Ohms (D) 9 Ohms
- e. The difference between the synchronous speed and the actual speed of an induction motor is called
(A) Regulation (B) Back lash
(C) Slip (D) Lag
- f. The speed of a DC motor may be varied by varying
(A) field current (B) applied voltage
(C) Resistance in series with armature (D) any of these
- g. A zener diode is operated in
(A) Breakdown region (B) forward region
(C) Cut-off region (D) none of these
- h. The number of diodes needed for a bridge rectifier is
(A) Six (B) Four
(C) Two (D) One

- i. Whenever a conductor cuts magnetic flux, an emf is induced in that conductor; the above statement is based on
 (A) Faraday's law (B) Joule's law
 (C) Weber and Ewing's theory (D) Coulomb's law
- j. In case of DC series motor after saturation of magnetic core the relation between torque and armature current is
 (A) $T \propto I_a$ (B) $T \propto I_a^2$
 (C) $T \propto I_a$ (D) T is constant

PART- A

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

- Q.2** a. State and explain lenz's law and faraday's law of electromagnetic induction. (8)
 b. Describe qualitatively and quantitatively the force between long parallel current carrying conductors. (8)
- Q.3** a. State and explain Thevenin's theorem with suitable example. (8)
 b. Draw and Explain AC equivalent circuit of a diode. (8)
- Q.4** a. Derive EMF equation of DC motor. (8)
 b. A 6-pole, lap wound armature has 840 conductors and flux per pole of 0.018 wb. Calculate the EMF generated when the machine is running at 600rpm. (8)
- Q.5** a. Derive the EMF equation of a single phase transformer. What is the voltage transformation ratio? (8)
 b. A single phase transformer has 350 primary and 1050 secondary turns. The net cross-section area of the core is 55 cm^2 . If the primary winding be connected to a 400V, 50Hz, single phase supply, calculate:
 (i) The maximum value of the flux density in the core
 (ii) The voltage induced in the secondary winding (8)

PART- B

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

- Q.6** a. Discuss the process of doping in a switching diode. What is reverse recovery time? (8)
 b. Distinguish between avalanche and zener breakdown in p-n junction diode. (8)
- Q.7** a. With the help of neat diagram, explain zener diode voltage regulator. (8)
 b. Sketch circuit diagram and input-output waveforms of a negative series clipper circuit and positive shunt clipper circuits. (8)
- Q.8** a. How BJT works as a switching device? (8)
 b. Why we need biasing in transistors. Which biasing is considered to be the best biasing circuit and why? Draw a Circuit and illustrate your Answer. (8)
- Q.9** a. Explain half power points. (8)
 b. What are the advantages of negative feedback on an amplifier? (8)