

DiplETE – ET/CS (Current & New Scheme)

Time: 3 Hours

DECEMBER 2018

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. While comparing magnetic and electric circuits, the flux of magnetic circuit is compared with which parameter of electric circuit?
(A) Current (B) Current density
(C) Conductivity (D) E.M.F
- b. The speed of a dc motor is
(A) Always constant
(B) Directly proportional to back e.m.f
(C) Directly proportional to flux
(D) Inversely proportional to the product of back e.m.f. and flux
- c. Silicon doped with Gallium is
(A) Intrinsic semi conductor (B) Pure conductor
(C) P-type Semi conductor (D) N-type Semi conductor
- d. In a reverse biased P-N junction, the current through the junction increases abruptly at
(A) Zero Voltage (B) 1.2 V
(C) 0.72 V (D) Breakdown voltage
- e. Largest current flow of a bipolar transistor occurs
(A) In emitter (B) In base
(C) In collector (D) Through emitter-collector
- f. In High frequency region, an amplifier behaves like a
(A) Band pass filter (B) Low pass filter
(C) High pass filter (D) None of these
- g. The function of a starter in a dc motor is to
(A) control its speed
(B) avoid sparking
(C) reduce the starting current to safe values.
(D) minimize the armature reaction effect.

- h. A 3-phase induction motor is operating at a light load, its slip is approximately.
 (A) 1.5% (B) 3%
 (C) 4% (D) 5%
- i. In full-wave rectification, if the input frequency is 50 Hz, then the output frequency will be
 (A) 50 Hz (B) 75 Hz
 (C) 100 Hz (D) 200 Hz
- j. In two stage CE amplifier, Gain at high freq reduces due to
 (A) Input coupling capacitance
 (B) Output coupling capacitance
 (C) Insufficient input
 (D) Parasitic capacitance

PART- A

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

- Q.2** a. Define leakage flux and pinging. Explain ampere turns calculation for a magnetic circuit. (8)
- b. Describe qualitatively and quantitatively the force between long parallel current carrying conductors. (8)
- Q.3** a. What are the different methods of measurement of power in 3-phase circuit? Explain the two wattmeter method in brief. (8)
- b. State the following: (8)
 (i) Ohm's law
 (ii) Norton's Theorem.
 (iii) Maximum power transfer theorem.
 (iv) Kirchoff's laws.
- Q.4** a. Give reasons, why the starters are required for starting a motor? (6)
- b. A 240V dc shunt motor has an armature resistance of 0.4 ohm and is running at the full-load speed of 600 r.p.m. with a full load current of 25A. The field current is constant. Find the speed if a resistance of 1 ohm is added in series with the armature (i) at the full-load torque and (ii) at twice the full-load torque. (10)

PART- B

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

- Q.5** a. Explain concept and analysis of rotating magnetic field using analytical approach. (8)
- b. Assume, A 3- ϕ , 50Hz, 50 kW induction motor has an efficiency of 90% at rated output, At this load the stator copper loss and rotor copper loss are equal to stator core loss. The friction and winding loss is equal to one third of the stator core loss. Calculate (i) Air gap power (ii) slip (8)

- Q.6** a. Classify the materials based on the energy band diagram and explain them. **(8)**
- b. Explain the appropriate equivalent circuit of a diode and derive diode current equation. **(8)**
- Q.7** Discuss Power Supply Source effect, Load effect, Line regulation and Load regulation. **(16)**
- Q.8** Name the different methods of transistor biasing. Mention the steps that are required to design the transistor biasing circuits. **(16)**
- Q.9** a . Draw voltage series feedback topology and derive its gain. Give additional effects of negative feedback on an amplifier. **(8)**
- b. Explain the operation of BJT phase shift oscillator. **(8)**