

DipLETE – ET/CS (NEW SCHEME) - Code: DE52 / DC52**Subject: FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING****Time: 3 Hours****Max. Marks: 100****DECEMBER 2009****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.
- Out of the remaining EIGHT Questions answer any FIVE Questions. 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. Force between two charged particles is proportional to
(A) Inverse of distance (B) Inverse square of distance
(C) Inverse cube of distance (D) None of the above
- b. The super - position theorem is applicable to
(A) Current only (B) Voltage only
(C) Both current and voltage (D) Current, voltage and power
- c. Which d.c. motor has approximately constant speed?
(A) Series motor (B) Shunt motor
(C) Cumulatively compound motor (D) All of the above
- d. The difference between the synchronous speed & the actual speed of an induction motor is known as
(A) Regulation (B) Back lash
(C) Slip (D) Lag
- e. A step up transformer increases
(A) Power (B) Power factor
(C) Voltage (D) Frequency
- f. When PN junction is unbiased, the junction current at equilibrium is
(A) Zero as no charges cross the junction
(B) Zero as equal number of carriers cross the barrier
(C) Mainly due to diffusion of majority carrier
(D) Mainly due to the diffusion of minority carriers
- g. A zener diode is invariably used with
(A) Forward bias (B) Reverse bias
(C) Zero bias (D) None of the above
- h. The ripple factor of a full wave rectifier circuit is compared to that of a half wave rectifier circuit without filter is
(A) Half of that for a half wave rectifier
(B) less than half of that for a half wave rectifier circuit
(C) Equal to that of a half wave rectifier

(D) None of the above

i. Largest current flow of a bipolar transistor occurs

(A) In emitter

(B) In base

(C) In collector

(D) Through emitter collector

j. For a Hartley oscillator, frequency f is given by

(A) $\frac{1}{2\pi LC}$

(B) $\frac{2\pi}{\sqrt{LC}}$

(C) $\frac{1}{2\pi\sqrt{LC}}$

(D) $\frac{1}{2\pi LC}$

Answer any FIVE Questions out of EIGHT Questions.

Each question carries 16 marks.

Q.2 a. Give comparison of the electric and magnetic circuits on the basis of similarities and dissimilarities.

(8)

b. A capacitor is charged by a d.c. source through a resistor of 1 mega ohm. If, in one second, the p.d. across capacitor reaches 80% of its initial value, calculate its capacitance.

(8)

Q.3 a. State and explain Kirchhoff's laws.

(8)

b. Give the conversion relation of star to Delta and Delta to star. Solve the network shown in Fig. 3 (b). Find the resistance between the points 'A' and 'B'.

(2+6)

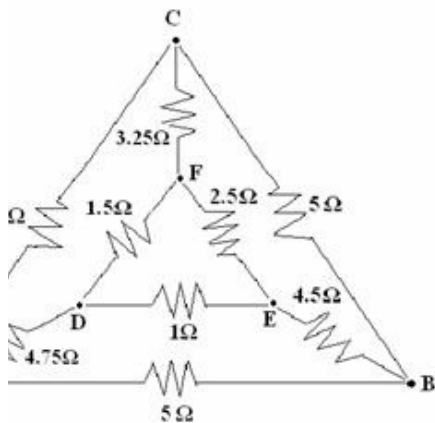


Fig.3 (b)

Q.4 a. Explain the principle of a DC motor. What are the different methods of speed control of a dc shunt motor?

(4+4)

b. A 120V dc shunt motor draws a current of 200A. The armature resistance is 0.02Ω and shunt field resistance 30Ω

. Find the back emf. If the lap wound armature has 90 slots with 4 conductors per slot, at what speed will the motor run when the flux per pole is 0.04 wb? (8)

- Q.5** a. Explain the principle of operation of three-phase induction motor. (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)
- Q.6** a. Distinguish between conductors, semiconductors and insulators with the help of energy band diagrams. (8)
- b. What is zener diode? Explain its main features. (8)
- Q.7** a. Define power supply source effect, load effect, line regulation and load regulation. Write equation for each item. (8)
- b. What are clipping and clamping circuits? Explain any two functions of clipping circuits. (4+4)
- Q.8** a. What is a transistor? What are the different types of transistors? In a common base connection, current amplification factor is 0.9. If the emitter current is 1 mA, determine the value of base current. (4+4)
- b. Name different methods of transistor biasing. Mention the steps that are taken to design the transistor biasing circuits. (2+6)
- Q.9** a. What are the advantages of negative voltage feedback in amplifiers? Explain in brief. (8)
- b. A negative feedback amplifier has an open loop gain of 60000 and a closed loop gain of 300. If the open loop upper and cut off frequency is 15 kHz, estimate the closed loop upper cut off frequency. Also calculate the total harmonic distortion with feed back if there is 10% harmonic distortion without feedback. (8)