ROLL NO. _____

Code: DE52/DC52 Sub: FUNDAMENTALS OF ELECTRICAL & EL GG.

DipIETE – ET/CS

Time: 3 Hours **DECEMBER 2012** **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. A resistance of 5Ω is further drawn so that its length becomes double. Its resistance will now be

(A) 5 ohms **(B)** 7.5 ohms
(C) 10 ohms **(D)** 20 ohms

c. 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

d. The desirable properties of transformer core material are

(A) low permeability and low hysteresis loss
(B) high permeability and high hysteresis loss
(C) high permeability and low hysteresis loss
(D) low permeability and high hysteresis loss

e. A 3- Phase slip ring induction motor has

(A) short circuited rotor **(B)** double cage rotor
(C) wound rotor **(D)** all of these

f. Silicon doped with Gallium is

(A) intrinsic semi conductor **(B)** pure conductor
(C) P-type Semi conductor **(D)** N-type Semi conductor

g. In a reverse biased P-N junction, the current through the junction increa abruptly at

(A) zero Voltage **(B)** 1.2 V
(C) 0.72 V **(D)** breakdown voltage

h. Largest current flow of a bipolar transistor occurs

(A) in emitter **(B)** in base
(C) in collector **(D)** through emitter-collector

i. 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

j. A Hartley Oscillator circuit uses

(A) capacitive feedback
(B) a tapped inductor
(C) a tapped capacitor
(D) a tapped inductor for inductive feedback

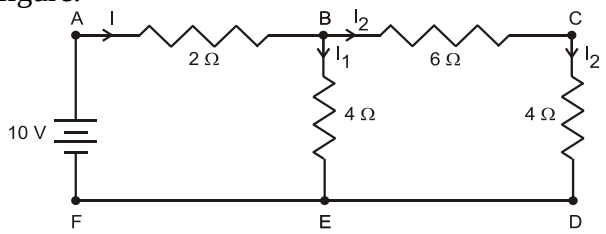
PART A
Answer at least TWO questions. Each question carries 16 marks.

Q.2 a. Give Comparison of Electric and magnetic circuits on the basis of similarities and dissimilarities. **(8)**

b. Derive the expression for the force on current carrying conductor in magnetic field. **(8)**

Q.3 a. State and explain Kirchhoff's Laws. **(8)**

b. Determine the current flowing in each branch of the circuit shown in the given figure. **(8)**



Q.4 a. What are the different types of DC motors? Explain in brief. Give their applications. **(8)**

b. A 220 V DC shunt motor takes 22A at rated voltage and runs at 1000 rpm. Its armature resistance is 0.1 Ω. Calculate resistance inserted in armature circuit to reduce the speed to 800 rpm when
(i) load torque is proportional to speed
(ii) when load torque varies as square of speed. **(8)**

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Q.5 a. Explain the principal of operation of 3-phase Induction Motor. **(**

b. A 3-phase, 50 Hz induction motor has 8 poles. It runs at a speed of 700 rpm. Determine. **(8)**
(i) Synchronous speed
(ii) Slip
(iii) Rotor frequency at the time of starting
(iv) Rotor frequency at the given speed.

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

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. **(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. Give additional effects of negative feedback on an amplifier. **(8)**

b. Explain the operation of BJT phase shift oscillator. **(8)**