ROLL NO. _____

Code: DE54 **Subject: ENGINEERING MATERIALS**

DipIETE – ET (NEW SCHEME)

Time: 3 Hours **JUNE 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. 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. Which of the following is a ceramic material?

(A) Leather **(B)** MgO
(C) Invar **(D)** Nylon

b. Materials which lack permanent magnetic dipoles are called

(A) diamagnetic **(B)** ferromagnetic
(C) semi-magnetic **(D)** none of the above

c. Silicon doped with gallium is

(A) Intrinsic Semi Conductor **(B)** n-type Semi Conductor
(C) p-type Semi Conductor **(D)** None of the above

d. Which of the following is not a permanent magnetic material?

(A) Chromium Steel **(B)** Silicon iron
(C) Cobalt Steel **(D)** Alnico

e. Voltage dependent resistors are usually made from

(A) Graphite **(B)** Charcoal
(C) Silicon Carbide **(D)** Nichrome

f. Variable resistors are generally

(A) Carbon resistors **(B)** thin film resistors
(C) thick film resistors **(D)** wire wound resistors

g. A p-n junction offered

(A) High resistance in forwarded as well as reverse direction
(B) Low resistance in forwarded as well as reverse direction
(C) Conducts in forwarded direction only
(D) Conducts in reverse direction only

h. A FET has

(A) Very high input resistance **(B)** Very low input resistance
(C) Current controlled features **(D)** Forward biased p-n junction

i. Which one of the following is a unipolar device?

(A) FET **(B)** p-n diode
(C) Zener diode **(D)** None of the above

j. Materials which can store electrical energy are called

(A) Magnetic materials **(B)** Dielectric materials
(C) semi conductor **(D)** Super conductor

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. What are the various factoring affecting the resistivity of electrical material? **(8)**

b. Explain temperature dependence of electrical resistivity and conductivity in conductors. **(8)**

Q.3 a. Explain the effect of temperature on the behavior of a dielectric. **(8)**

b. Explain the following:
(i) Polarization
(ii) Dielectric loss **(4+4)**

Q.4 a. Explain dielectric properties of polymers. **(8)**

b. Give classification of magnetic materials. **(8)**

Q.5 a. Explain the process of magnetization of magnetic materials. Draw hysterisis loop for a magnetic materials. **(8)**

b. What are the different types of semiconductor? Explain n-type and p-type semiconductor with the help of energy band diagram. **(8)**

Q.6 a. Write short notes on
(i) Hall coefficient (ii) Diffusion **(4+4)**

b. Explain working of Bipolar junction transistors (n-p-n and p-n-p). **(8)**

Q.7 a. What is the function of a relay? How they can be classified in different categories? Explain in brief. **(10)**

b. Explain construction of MOSFET. **(6)**

Q.8 a. Explain distinguishing properties of FET from BJT. **(8)**

b. Describe diffused junction technique of fabrication in brief. **(8)**

Q.9 Write short notes on

(i) Thermistors.
(ii) Ferrites and their application in high frequency devices. **(8+8)**