



C09-EE-105

3037

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2013

DEEE—FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : 3 hours]

[Total Marks : 80

PART—A

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Derive the formula for equivalent resistance of three resistances when they are connected in parallel.

2. Define work, power and energy, and state their units.

3. List the main requirements of low-resistivity materials.

4. Define Fleming's left-hand rule.

5. State Lenz's law and explain it.

6. Define coefficient of coupling between two coils.

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7. Define the following :
- (a) Electric flux
 - (b) Electric flux density
 - (c) Electric field intensity
8. List the factors affecting insulation resistance.
9. What is soldering? Mention the types of solder.
10. Distinguish between *P*-type and *N*-type semiconductors.

PART—B

Instructions : (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) State the laws of resistance. 3
(b) An aluminium resistor has a resistance of 43.6Ω at 20°C and 47.2Ω at 40°C . Find the temperature coefficient of the resistor at 0°C . 7
12. (a) List the properties of (a) manganin, and (b) nichrome. 5
(b) Explain the process of impregnation of machine windings. 5
13. (a) Define ampere. 3
(b) A steel ring of relative permeability 950 has a mean perimeter of 800 mm and a cross-sectional area of 400 mm^2 . A radial air gap of 1 mm width is cut in the ring. The ring is wound with 1200 turns. Calculate the current required to produce a flux of 15 mWb. [Neglect leakage and fringing] 7

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- 14.** (a) Define (a) self-inductance, and (b) mutual inductance. 4
(b) Derive an expression for energy stored in a magnetic field. 6
- 15.** (a) State Coulomb's laws of electrostatics. 4
(b) Three capacitors of 2 F, 1 F and 4 F are connected in parallel across a 220-V DC supply. Find the equivalent capacitance and the charge on each capacitor. 6
- 16.** (a) State Joule's law of electric heating. 3
(b) A soldering iron is rated at 50 W when connected to a 250-V supply. If the soldering iron takes 5 minutes to heat to a working temperature of 190 °C from 20 °C, find its mass assuming it to be made of copper. [Given, specific heat capacity of copper as 390 J/kg °C. Assume 90%] 7
- 17.** (a) State the properties of (i) asbestos, and (ii) mica. 3+3
(b) State the properties and applications of sulphur-hexafluoride gas. 4
- 18.** (a) Distinguish between intrinsic and extrinsic semiconductors. 4
(b) Sketch the characteristics of common-emitter configuration. 4
(c) Draw the *V-I* characteristics of a *P-N* junction/diode. 2
