



C16-EE-106

# 5037-A

## BOARD DIPLOMA SUPPLEMENTARY (INSTANT) EXAMINATION, (C-16)

JUNE - 2019

### DEEE - FIRST YEAR EXAMINATION BASIC ELECTRICAL ENGINEERING

Time : 3 Hours]

[Total Marks : 80

#### PART - A

2×15=30

**Instructions :**

- (1) Answer any 15 questions.
- (2) Each question carries 2 marks.
- (3) Answer should be brief and straight to the point and shall not exceed five simple sentences.

- 1 State the factors on which resistance of a conductor depends.
- 2 The equivalent resistance of two resistors is  $2.4\Omega$  when connected in parallel. If one resistor value is  $4\Omega$  then find the value of second resistor.
- 3 Define temperature coefficient of resistance.
- 4 State the effect of temperature on conductors.
- 5 Define Electrical energy and state its SI unit.
- 6 Calculate power dissipated by the resistor of  $100\Omega$  has a potential difference of 230V DC across it.
- 7 State Joule's law.
- 8 Define thermal efficiency.
- 9 State Right hand thumb rule.

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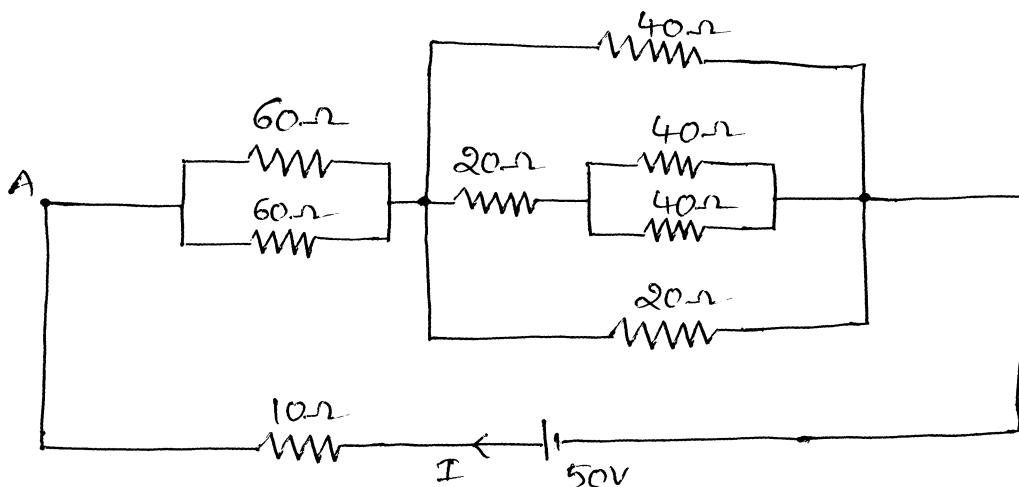
- 10 Write the expression for field strength :
- (i) At any point on the axis of a circular conductor.
  - (ii) At centre of a circular conductor.
- 11 A magnetic circuit consists of an iron ring of mean length 100cm with cross sectional area of 20 cm<sup>2</sup>. Calculate the reluctance of the magnetic path. Assume  $\mu_r = 600$ .
- 12 Define :
- (i) Magnetic flux
  - (ii) m.m.f.
- 13 Determine the force required to separate two magnetic surfaces with contact area of 200 cm<sup>2</sup>, if the flux density across the surface is 0.2T.
- 14 Define mutual inductance.
- 15 State Faraday's first law of electromagnetic induction.
- 16 Calculate the coefficient of coupling for two coils having self-inductances of 40m H and 60m H. The mutual inductance between them is 30m H.
- 17 Plot electrostatic field.
- (i) Between unlike charges
  - (ii) Due to isolated negative charges.
- 18 State Gauss theorem.
- 19 A parallel plate air capacitor of area 36 cm<sup>2</sup> and with plates 4mm apart is charged to a potential of 230 V. Calculate the Energy stored in it.
- 20 Write any four applications of capacitors.

## PART - B

10×5=50

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

- 21 Determine the total resistance and current drawn from the supply for the circuit shown in fig. 7+3



- 22 (a) A copper coil has a resistance of  $30\Omega$  at  $20^\circ\text{C}$  and  $33.45\Omega$  at  $50^\circ\text{C}$ . Find 7
- (i) Temperature coefficient of resistance at  $0^\circ\text{C}$
  - (ii) Resistance of the coil at  $0^\circ\text{C}$ .
- (b) Determine the voltage drop across each resistor, when two resistances of  $20\Omega$  and  $40\Omega$  are connected in series across a supply of  $240\text{V}$ . 3

- 23** Calculate the monthly electricity bill of a domestic service with the following loads for the month of March 2016.
- (i) 5 Lamps of 100 W each used for 6 hours a day.
  - (ii) 2000 W immersion heater used for 30 minutes a day.
  - (iii) 4 fans of 60W each used for 9 hours a day.
  - (iv) 1KW electrical iron used for 90 minutes a day.
- The cost per unit of consumption is Rs. 2/- and the meter rent per month is Rs. 20/-.
- 24** An electric heater rated at 1 KW, 230V has to raise the temperature of 3 litres of water from 20°C to boiling point. Find the time taken by the heater if its efficiency is 85%.
- 25** An iron ring has cross-sectional area of  $6\text{cm}^2$  and a mean diameter of 30cm an air gap of 1mm has been made by a saw-cut across the section of the ring. If a magnetic flux of 0.4mwb is required in the air gap, find the current required to produce this flux when a coil of 500 turns is wound on the ring. The iron has a relative permeability of 600. Neglect the effect of magnetic leakage and fringing.
- 26** (a) State Lenz's law. 3
- (b) Derive an expression for equivalent inductance, when two inductances are connected in series-aiding. 7
- 27** (a) Derive an expression for energy stored in a magnetic field. 7
- (b) State Fleming's right hand rule. 3
- 28** (a) State Coulomb's law of electrostatics. 4
- (b) Two capacitors of capacitance  $4\mu F$  and  $6\mu F$  respectively are connected in series across a p.d. of 250V. The capacitors are disconnected from the supply and are reconnected in parallel with each other. Calculate new p.d. and charge on each capacitor. 6