C16-EE-106

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BOARD DIPLOMA EXAMINATION, (C-16)

MARCH / APRIL - 2019

DEEE - FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : **3 Hours]**   [Total Marks : **80**

PART - A $2 \times 15 = 30$

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 ohm's law.

2 Define specific resistance and write its unit.

3 Define temperature coefficient of resistance.

4 Draw and write down an expression for equivalent resistance when three resistors are connected in parallel.

5 Write the symbols and units of electrical work, electrical power.

6 Calculate the input of an electric motor when the output of the motor is 10 H.P. and efficiency is 90%.

7 Write down the expression for joule's law of electric heating and expand the terms.

8 Define thermal efficiency.

9 State Right Hand Thumb rule.

10 Write down expressions for field strength (a) At the centre of a circular conductor (b) At any point on the axis of a circular conductor.

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11 Define magnetic flux and reluctance.

12 Define magnetic leakage coefficient.

13 State Faraday's first law of electro magnetic induction.

14 Define self inductance.

15 State Fleming's Right Hand rule.

16 Write down expression for lifting power of a magnet and expand the terms.

17 State coulomb's first law of electro statics.

18 Define relative permittivity.

19 Plot electrostatic field around an isolated positive charge and isolated negative charge.

20 Write down the formula for capacitance of a capacitor explaining each term and mention its unit. http://www.sbtetonline.com

PART - B $10 \times 5 = 50$

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 (a) Distinguish between conductor, insulator and semi conductor with respect to valence electrons.   4

  (b) Two resistances of $50\,\Omega$ and $10\,\Omega$ are connected in parallel and the combination draws a current of 20 A from the supply. Determine the current in each branch and supply voltage.   6

22 A coil of copper wire has a resistance of $70\,\Omega$ at $20^\circ C$ and is connected to a 230 V supply. By how much the voltage be increased in order to maintain the current constant if the temperature of the coil rises to $60^\circ C$. Take the temperature coefficient of resistance of copper as 0.00428 at $0^\circ C$.

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23 A house has the following load :

(a) 10 lamps of 60 W each working for 10 hrs a day.

(b) 1 electric iron of 450 W working for 1 hr a day.

(c) 8 fans of 80 W each working for 12 hrs a day.

(d) 1 heater of 1000 W working for 1 hr a day.

(e) 1 refrigerator of 250 W working for 12 hrs a day.

Calculate the monthly bill if rate of charge per unit is Rs. 1.20

plus Rs. 20/- as meter rent for the month of March.

24 Calculate the time taken and the cost of energy used to raise the temperature of one litre of water from 15°C to 90°C in a 250 V electric kettle. Resistance of kettle is 100 Ω. Efficiency of kettle is 85%, cost of electrical energy is 75 paise per unit.

25 (a) Derive an expression for the force between two long and straight parallel current carrying conductors.   7

(b) Define ampere.   3

26 Develop an expression for energy stored in a magnetic field.

27 The combined inductance of two coils connected in series is 0.6 H and 0.1 H, depending on the relative directions of the currents in the coils. If one of the coils when isolated has a self inductance of 0.2 H, Calculate the (a) mutual inductance (b) coupling coefficient

28 Three capacitors of 2 μF, 4 μF and 6 μF are connected in series across a 220 V d.c. supply. Find (a) the total capacitance (b) charge on each capacitor (c) potential drop across each capacitor.

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