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C14-EE-106

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BOARD DIPLOMA EXAMINATION, (C-14)
OCTOBER/NOVEMBER-2018
DEEE-FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : 3 Hours] [Total Marks: 80

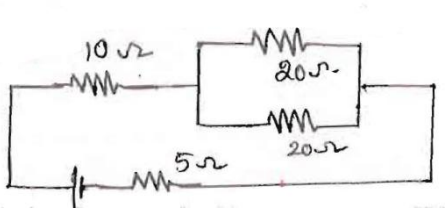
PART-A

4X10=40

Instructions :

1. Answer **All** questions.
2. Each question carries **Four** marks(Two marks for each bit).
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. (a) Differentiate conductor, insulator and semiconductor based on valence electrons.
   (b) Define specific resistance and state its unit.
2. (a) Define electric potential (b) Calculate the equivalent resistance of circuit shown in figure.



3. (a) Write the SI units of (i) Electrical power and Electrical Energy.
   (b) Define efficiency.
4. (a) Write the equation for Joules law of electrical heating and elaborate terms used
   (b) Write any four applications of heat produced due to electric current.
5. (a) State Right hand thumb rule (b) Plot the magnetic field pattern of a solenoid.
6. (a) Define Permeability (b) Define leakage factor
7. (a) State Faraday's first law of electromagnetic induction. (b) Calculate inductance of a coil that includes 40V, When current at a rate of 4A/S
8. (a) Define dynamically induced EMF. (b) A coil of 600 turns carrying a current of 10A gives rise to a magnetic flux of 0.01Wb. Calculate energy stored in the coil.
9. (a) State the coulombs second law of electrostatics (b) Plot the electrostatic field patterns of isolated positive charge and isolated negative charge.

10. (a) State Gauss theorem (b) Define electric flux density and write its unit.

PART-B

10X4=40

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

11. (a) Define ohm's law and write its limitations (b) A heater elements is made of nichrome wire having resistivity of 45 x 10^{-6} Ω-cm. the diameter of wire is 0.15cm . Calculate the length of the wire required to get a resistance of 3Ω.
12. (a) The field coils of a DC motor have a resistance of 200Ω at 20^0C and after 8 hrs run the resistance increase to 250Ω. What is the final temperature of field coils if α_0 for copper is 0.0043/^{0} C at 0^0c.

    (b)Three resistances of 5Ω, 6Ω and 10Ω are connected in parallel. Current through 6Ω resistance is 2.5A . Determine current in the other branches.
13. (a) A potential difference of 100V is applied across a 25Ω resistor. Calculate current, power dissipated and energy transferred into heat in 5 minutes

    (b) Calculate the electricity bill for the month of September at the rate of 60 paisa/unit/ the following are the details of load on a circuit connected through meter.

    i. 5 lights of 60W each working for 6 hrs day
    ii. Two fluorescent tubes of 125W each working for 3hrs/day and
    iii. One 1000W heater working for 3 hrs/day

    Meter rent is Rs. 5 per month.
14. (a) Explain different parts of electric iron. (b) An electric kettle is required to heat 15 litres of water from 15^0C to boiling point in 40 minute. Assuming efficiency of the heater to be 80%, Calculate energy supplied to kettle in KWhr.
15. (a) Compare electrical circuit with magnetic circuit in any six aspects. (b) Derive an expression for the magnitude of force on a current carrying conductor in a magnetic field.

16. (a) Explain self inductance and mutual inductance (b) A coil of 200 turns of wire is wound on a magnetic circuit of reluctance 2000AT/Wb. If a current of 1A flowing in the coil is reversed in 10ms then evaluate the average emf induced in the coil.

17. (a) Develop an expression for energy stored in magnetic field.

    (b) A coil of 800μH is magnetically coupled with another coil of 200μH. The coefficient of coupling between the coils is 0.05. Calculate the total inductance if the two coil are connected in (a) series aiding and series opposing.

18. (a) Explain dielectric strength and dielectric constant.

    (b) Two capacitors 2μF and 8μF are connected in series across a potential difference of 200V. Determine charge on each capacitor and total energy stored in them.

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