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C16–EE–105

6039

BOARD DIPLOMA EXAMINATION, (C–16)

SEPTEMBER/OCTOBER - 2020

DEEE—FIRST YEAR EXAMINATION

ELECTRICAL ENGINEERING MATERIALS

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

PART—A 3×10=30

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. List the properties of copper.

2. State the applications of ACSR conductors.

3. Define extrinsic semiconductors and give examples.

4. State the properties of PVC.

5. List the properties of impregnated paper.

6. Define relative permittivity.

7. Define the terms 'magnetic flux density' and 'MMF'.

8. List the special purpose materials.

9. Distinguish between primary and secondary cells.

10. Define trickle charging.

PART—B 10×5=50

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. Write the properties and applications of aluminium. 10

12. *(a)* State the requirements of low resistivity materials.

(b) A resistor has a colour band sequence : Grey, Blue, Gold and Gold. Find its resistance value. 4+6=10

13. *(a)* Compare *p*-type and *n*-type semiconductors.

(b) State the factors affecting the dielectric loss. 6+4=10

14. *(a)* Classify the insulating materials on the basis of temperature with examples.

(b) Distinguish between thermoplastics and thermosetting resins. 6+4=10

15. Explain about the hysteresis loss. 10

16. State and explain about the bimetal. 10

17. Explain the construction and working of lithium ion battery. 10

18. *(a)* Write the chemical reactions during charging and discharging of nickel-iron cell.

(b) Calculate the ampere-hour efficiency and watt-hour efficiency of a battery having 15 hours charge rate of 10 A and delivering 6 A for 20 hours with a mean terminal voltage of 2 V, the terminal voltage during charging has a mean value of 2·5 V. 4+6=10

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

PART—A 3×10=30

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. Define the term annealing.

2. State any three requirements of low resistivity materials.

3. What is meant by doping in semiconductor?

4. State any three factors affecting the insulation resistance.

5. List any three properties of nitrogen gas.

6. Define permittivity and state the permittivity values for

(a) Air

(b) Transformer oil

7. What is meant by eddy current loss?

8. State the advantages of enamel coated copper wire.

9. Define ampere-hour efficiency and watt-hour efficiency.

10. State the indications of fully charged lead-acid battery.

PART—B

10×5=50

Instructions **:** (1) Answer *any* **five** questions.

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

(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. *(a)* List the properties and applications of Tungsten. 5

(b) List the properties and applications of copper. 5

12. *(a)* List the properties and applications of platinum. 5

(b) Explain the colour coding of resistor as per BIS. 5

13. *(a)* Compare N-type and P-type semiconductors. 5

(b) State the applications of dielectric materials. 5

14. Explain the effects of the following on P.V.C. 10

(a) Fillers *(b)* Stabilizers

(c) Plasticizers *(d)* Additives

15. Explain hysteresis loop with a neat sketch. 10

16. Explain the process of galvanizing and impregnation. 10

17. Explain the construction of lead-acid battery with a neat sketch. 10

18. *(a)* Write the chemical reactions during charging and discharging of nickel-iron cell. 5

(b) An alkaline cell is discharged at a steady current of 4A for 12 hours, the average terminal voltage being 1·2 volt. To restore to its original state of charge, a steady current of 3 amp for 20 hours is required, the terminal voltage being 1·6 volt. Calculate 5

(i) Ampere-hour efficiency

(ii) Watt-hour efficiency

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