xiii) Write a node on preferred value system in resistors.

xiv) Explain the process of Epitaxial Growth.

xv) Draw the Hysteresis loop of hard steel & alloyed steel.

## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

Q.3 Explain classification of conducting materials in to low resistivity & high resistivity materials.

Q.4 Classify diamagnetic, Paramagnetic & Ferromagnetic Materials.

Q.5 How testing of transistors and FET is done.

Q.6 How will you classify capacitors? Discuss different types of variable capacitors.

Q.7 Explain the various process of IC Manufacturing?



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121532/031032

**3rd Sem. / ELTX / I.C. / M.E.**

**Subject : Elect. & Eltx. Materials & Components / ECM**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 a) What is a connector.

b) Hard ferrites are used for making _____ equipments.

c) An expended form of SMT is _____ .

d) Two properties of copper.

e) What do you mean by Resistance? Give its unit of measurement.

f) What are hard magnetic materials?

g) What is the need of Shielding?

h) Give two applications of Teflon.

i) Draw the atomic structure of copper.

j) Alnico is used for making.

k) What is superconductivity.

l) Write the unit of Capacitance & Inductance.

m) An expended form of PVC is _____ .

n) What do you mean by breakdown voltage?

o) In P Type semiconductor, the minority carriers are _____ .

p) What are connectors? Give their two types.

q) Write the properties of Varnish.

r) Iron, Cobalt & nickel are _____ materials.

## SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

Q.2 i) Give two advantages of ICs over discrete, components.

ii) Which conducting material is used for making resistance wire for rheostats & motor starter?



iii) What are thermocouples and its applications?

iv) Write the composition of

a) AlNiCo

b) CuNiCo

v) Write the properties and applications of Silver.

vi) Differentiate between soft and hard magnetic materials.

vii) Which form of Iron is the purest form and why.

viii) Write a short note a 'SMD's' and its applications.

ix) Draw the symbols of DPDT, SPDT, Dry Reed relay & PNP Transistor.

x) What are intrinsic and extrinsic semiconducting materials?

xi) Explain in brief differences between Dia, Para & Ferromagnetic materials.

xii) Why DC relays are more popular than AC relays.

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**3rd Sem. / Electrical**

**Subject : Electrical and Electronics Engineering Materials**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 a) Define energy band.

b) Air is an example of insulating material. (True/Flase)

c) Define resistivity

d) Define corrosion.

e) Give two examples of high resistivity materials.

f) Define superconductor?

g) Write two applications of carbon.

h) Define P-type semiconductor.



i) Define dielectric strength.

j) Define brittleness.

k) Define tensile structure.

l) Define Weatherability.

m) PVC stands for _____.

n) Write any two properties of asbestos.

o) Define B-H curve.

p) Define soft ferrites.

q) Define eddy current loss.

r) Write any two applications of fuses.

## SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

Q.2 i) What are conducting materials? Draw energy band for conducting materials.

ii) Explain different factors affecting the resistivity of conducting materials.

iii) What are different properties of steel?

iv) Write various applications of gold.

v) What are applications of superconductors?

vi) Draw atomic structure of germanium and carbon.

vii) What is bundle conductor? Give its applications.

viii) Explain tensile and compressive strength.

ix) Explain Electro-thermal breakdown in solid dielectrics.

x) What are different applications of PVC?

xi) What are different properties of Mica?

xii) Explain hysteresis loop including coercive force and residual magnetism.

xiii) Comparison between soft magnetic and hard magnetic materials.

xiv) Explain the concept of eddy current and hysteresis loss.

xv) Explain materials used for lead soldering and fuses.



## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

Q.3 On the basis of atomic structure, write comparison between conducting, semiconducting and insulating materials.

Q.4 What are insulating materials? Explain different thermal properties of insulating materials.

Q.5 What are thermosetting materials? Explain different thermosetting materials in detail.

Q.6 Write various engineering materials necessary for fabrication of motors.

Q.7 Write short notes on:

a) Low silicon alloy steel for electric rotating machines.

b) Non-oriented steels for rotating machines.

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**3rd Sem. / IC / Eltx / ME /Comp / PE / E&E**

**Subject : Electrical and Electronics Materials and Components**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 a) Draw energy band for semiconductor materials.

b) Silver is an insulating material. (True /False)

c) Define low resistivity material.

d) Write any tow applications of aluminium.

e) Expand PVC.

f) What is superconductivity ?

g) Varnish is used for _____.

h) Define permeability.

i) Material used for fuse are _____.



j) Define capacitance.

k) What is metal film resistor ?

l) Define breakdown voltage.

m) SI unit of resistance.

n) Write any tow applications of inductors.

o) SMD stands for ____.

p) What is use of connector ?

q) Expand FET.

r) IC stands for _____.

## SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

Q.2 i) Draw atomic structure of silicon and germanium.

ii) What are different factors affecting resistivity of conducting materials?

iii) What are the applications of brass ?

iv) What are different properties of Bakelite ?

v) What are different types of magnetic material?

vi) What are the applications of soft magnetic materials ?

vii) Explain bimetals and their applications.

viii) What are different types of capacitor ? Explain

ix) What is di-electric ? What is its effect on capacitance ?

x) What are variable type resistors ? Give examples of variable types resistors.

xi) Why there is need of shielding in inductors ?

xii) What are the applications of relay ?

xiii) Explain different types of cables.

xiv) Explain the method for testing of transistor.

xv) Explain basic characteristics of semi-conductor materials.



## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

Q.3 On the basis of atomic structure, write comparison between conducting, semiconducting and insulating materials.

Q.4 What is the principle of thermocouple ? Explain different thermocouple materials. Also write its applications.

Q.5 Explain various engineering materials necessary for the fabrication of transformers.

Q.6 Explain constructional detail of SMD. Also write its specifications.

Q.7 Explain in detail, hybrid IC technology.

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**3rd Sem. / Electrical / PS/ E&E / Fire Tech & Safety**

**Subject : Electrical and Electronics Engineering Materials**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 a) Give two examples of semiconductor.

b) Draw atomic structure of germanium.

c) Define resistivity.

d) Give two examples of low resistivity materials.

e) The resistivity of steel is ___ (more/less) than copper.

f) Define bundle conductor

g) Name two pentavalent impurities.

h) In P-type semiconductor, the minority carriers are ____.



xv) What are different materials used for lead soldering ?

## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

Q.3 Classification of materials into conducting, semiconducting and insulating materials based on their energy bands.

Q.4 What are different thermal properties of insulating materials ? Explain.

Q.5 Name any three gaseous insulating materials. Also give their properties and applications of these gaseous insulating materials.

Q.6 Comparison between soft magnetic and hard magnetic materials in details.

Q.7 List various engineering materials necessary for fabrication of generators.

i) Define abrasive resistence

j) Define thermal conductivity.

k) Expand PVC.

l) Write two properties of silk.

m) Air is gaseous insulating material. (True/False)

n) Define permeability

o) Define magnetic saturation.

p) Compare soft ferrite and hard ferrite.

q) Chrome steel is an example of soft magnetic material. (True/False)

r) Materials used for thermocouple are _____.

## SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

Q.2 i) What are different factors affecting resistivity of conductors ?



ii) Explain various properties of aluminium

iii) What are semiconductors ? Name commonly used semiconductors.

iv) Explain various properties of manganin.

v) Name different types of physical properties of insulating materials.

vi) What are thermosetting materials ?

vii) What are applications of PVC ?

viii) What are ceramic materials ?

ix) Explain enamels for winding wires.

x) What are the applications of glass fibre sleeves ?

xi) What are different types of magnetic materials ?

xii) What are methods of reduction of eddy current loss ?

xiii) Explain cold rolled grain oriented steels for transformer

xiv) What are application of hard ferrites ?

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**3rd Sem. / Electrical / PSE / E&E Engg.**

**Subject : Electrical & Electronics Engg. Materials**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 a) Define resistance?

b) What are conducting materials?

c) Name any two high resistive material.

d) What is ACSR?

e) Define permeability.

f) What is CRGO steel?

g) Expand PVC.

h) What are super conductors?

i) What is bimetallic strip?

j) What is fuse?



k) Name any two semiconducting material.

l) What is doping?

m) What is an energy band?

n) What is an intrinsic semiconductor?

o) What is curie temperature?

p) What is B-H curve?

q) Bushings of transformer are made of _____.

r) Soldering material is generally an alloy of _____.

## SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

Q.2 i) Write short notes on super conductors and super conductivity.

ii) Explain the factors on which resistivity of a material depends.

iii) State the factors on which dielectric loss depends.

iv) Explain electrical properties of insulating material.

v) What is hygroscopicity?

vi) What is ceramic?

vii) Name various thermoplastics material and give their applications.

viii) What are various dielectric gases in common use?

ix) What are paramagnetic materials?

x) What are ferromagnetic material? What is the effect of temperature on ferromagnetism?

xi) What is magnetostriction effect?

xii) Give a brief description of materials used in D.C machines.

xiii) What are major alloys of copper?

xiv) Explain why silicon steel is used for the construction of transformer core?

xv) Draw crystal structure of germanium and silicon.



## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

Q.3 How will you distinguish between conduction, insulators and semi conductors on the basis of energy band theory.

Q.4 How insulators are classified into various classes on the basis of their working temperature? Give example of each type.

Q.5 What is hysterisis loop? What information is drawn from it.

Q.6 Discuss important properties and applications of copper.

Q.7 What are the important points of difference between intrinsic and extrinsic semiconductors?

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**3rd Sem./ ELECTRICAL ENGG, Power Station Engg, Elect. &Elctx. Engg./ Arc Tech & Safety**

**Subject : Electrical and Electronics Engg. Materials**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Objectives questions. All questions are compulsory (10x1=10)

**(Course Outcome/CO)**

Q.1 Name any one semiconducting materials.(CO-1)

Q.2 The rheostats are made up of _____ (CO-2)

Q.3 Bronze is an alloy of copper and _____(CO-1)

Q.4 In P-type semiconductors, the minority carriers are _____. (CO-1)

Q.5 Name any one high resistive material. (CO-1)

Q.6 _____ can be used as insulating material in spark plug. (CO-3)

Q.7 Bakelite is a _____. (CO-3)

Q.8 _____ have highest permeability. (CO-6)

Q.9 Thermocouple is used for measurement of _____ (CO-2)



Q.10 The material used for making Outer frame of a D.C machine is _____. (CO-7)

## SECTION-B

**Note:** Very Short answer type questions. Attempt any ten parts 10x2=20

Q.11 Define energy band. (CO-1)

Q.12 Draw the atomic structure of Germanium(CO-1)

Q.13 Define extrinsic semiconductor. (CO-1)

Q.14 Mention two application of Aluminium in the field of Electrical Engg. (CO-2)

Q.15 Mention two properties of Bronze (CO-1)

Q.16 Mention any two Chemical properties of Insulating Materials (CO-3)

Q.17 Mention any two applications of Polythene(CO-3)

Q.18 Mention two properties of Porcelain. (CO-3)

Q.19 What are magnetic materials. (CO-6)

Q.20 What is permeability. (CO-6)

Q.21 What is thermocouple. (CO-2)

Q.22 Name any two Hard magnetic material (CO-6)

## SECTION-C

**Note:** Short answer type questions. Attempt any eight questions. 8x5=40

Q.23 Mention any five difference between P-type semiconductor and N-type semiconductor(CO-1)

Q.24 Explain any five Thermal properties of insulating material. (CO-3)

Q.25 Mention any five difference between Thermosetting material and Thermo plastic material. (CO-3)

Q.26 Mention five applications of soft magnetic materials. (CO-6)

Q.27 Name some Thermoplastic material. Mention any two of its propertien and any two of its applications. (CO-3)

Q.28 Explain the working of H.R.C Fuse with the help of neat diagram. (CO-5)

Q.29 What is Mica. Explain its types and Properties. (CO-3)

Q.30 What is Ceramic. Mention any four of its Properties. (CO-3)

Q.31 Name any five parts of a D.C machine. Mention with reasons the material used for making those



parts. (CO-7)

Q.32 Define Semiconductors. Mention any four applications of superconductors. (CO-2)

## SECTION-D

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

Q.33 Explain the difference between conducting, insulation and semiconducting material on the basis of their energy bands. (CO-1)

Q.34 What are Glass. Mention its properties and applications. (CO-3)

Q.35 Explain the construction, working and applications of Bimetal. (CO-7)

Q.36 What is varnish. Explain various types of varnish with their applications. (CO-3)

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**3rd Sem. / Elect Engg.**

**Subject : Electrical & Electronics Engg. Materials**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Objective type questions. All questions are compulsory (10x1=10)

**(Course Outcome/CO)**

Q.1 Resistance of conductor is in inversely proportional to length. (CO-5)

Q.2 Silicon is example of _____ material. (CO-1)

Q.3 A good insulation material should have _____ dielectric strength. (CO-3)

Q.4 Nichrome is an alloy of _____ and chromium. (CO-4)

Q.5 Give full form of $SF_6$. (CO-8)

Q.6 Good insulating material should have _____ resistance. (CO-3)

Q.7 Soldering material is generally an alloy of _____ (CO-5)



Q.30 Write chemical and mechanical properties of insulating materials. (CO-8)

Q.31 What is thermocouple? Explain its working and applications. (CO-5)

Q.32 Write name of insulating material used for each part of A.C and D.C machines. (CO-7)

## SECTION-D

**Note:** Long answer type questions. Attempt any three questions out of four questions. (3x10=30)

Q.33 Discuss characteristics of magnetic materials. Also Compare soft magnetic and Hard Magnetic materials. (CO-6)

Q.34 Discuss high resistivity conducting material with their properties and applications. (CO-2)

Q.35 Discuss various liquid insulating materials with their properties and applications. (CO-3)

Q.36 Write short note on :

a) Mica Products b) Copper alloys. (CO-5)

(**Note:** Course outcome/CO is for office use only)

Q.8 Give full from ACSR. (CO-2)

Q.9 Working principle of the thermocouple is based upon _____ effect. (CO-7)

Q.10 Name any two hard magnetic materials (CO-6)

## SECTION-B

**Note:** Very Short answer type questions. Attempt any ten questions out of twelve questions. (10x2=20)

Q.11 Define Resistivity. (CO-1)

Q.12 List Energy bands according to material classification. (CO-1)

Q.13 Define bundle Conductor. (CO-2)

Q.14 Define Alloy and give one example. (CO-4)

Q.15 Define annealing. (CO-2)

Q.16 Give ant two applications of semiconducting materials. (CO-4)

Q.17 Define permeability. (CO-6)

Q.18 Define Hygroscopicity. (CO-3)

Q.19 List material used for soldering. (CO-7)

Q.20 Define eddy currents. (CO-5)



Q.21. What happens when bimetallic strip is heated? (CO-5)

Q.22 Name any two gaseous insulating materials. (CO-8)

## SECTION-C

**Note:** Short answer type questions. Attempt any eight questions out of ten question. (8x5=40)

Q.23 Classify the engineering material based on their atomic structure. (CO-1)

Q.24 Why Copper is considered as a good conductor? Give its applications. (CO-2)

Q.25 Define superconductivity. List applications of superconducting materials. (CO-4)

Q.26 What are different types of semiconducting materials? Give Examples. (CO-4)

Q.27 Differentiate between Thermoplastic and Thermosetting plastics. (CO-3)

Q.28 Explain properties and applications of Mica. (CO-6)

Q.29 Define hysteresis loss and what are the factors on which hysteresis loss depends? (CO-6)

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**3rd Sem. / Elect. Engg.**

**Subject : Electrical & Electronics Engg. Materials**

Time : 3 Hrs. M.M. : 100

## SECTION-A

**Note:** Objective type questions. All questions are compulsory 8x2=16 ~~(10x1=10)~~

**(Course Outcome/CO)**

Q.1 Draw atomic structure of Germanium. (CO-1)

Q.2 The armature core of a.d.c machine is made up of ..... (CO-7)

Q.3 Hard magnetic materials have low permeability and high coercive force. (CO-6)

Q.4 Give full form of C.R.G.O. (CO-5)

Q.5 Name the best suitable material for heating element. (CO-4)

Q.6 Define Resistivity. (CO-2)

Q.7 The process of removing magnetic properties



materials with their applications. (CO-6)

Q.30 Discuss properties and applications of PVC. (CO-3)

Q.31 Why silicon steel is used for construction of Transformer Core. (CO-7)

Q.32 How Eddy current loss can be minimized. (CO-6)

## SECTION-D

**Note:** Long answer type questions. Attempt any three questions. 10X2=20 ~~3x10=30~~

Q.33 Explain in detail different Electrical properties of insulating materials. (CO-4)

Q.34 Compare conducting, Semiconducting and insulating materials. (CO-1)

Q.35 Write short note on : a) Fuse b) thermocouple. (CO-6)

Q.36 Define hysteresis loop. What are the causes of hysteresis loss? How hysteresis loss can be minimized? (CO-5)

(**Note:** Course outcome/CO is for office use only)

from the magnet is called..... (CO-6)

Q.8 Nichrome is an alloy of.....and chromium. (CO-2)

Q.9 Name any two Soft magnetic materials.(CO-6)

Q.10 Give full form of PVC. (CO-3)

## SECTION-B

**Note:** Very Short answer type questions. Attempt any ten parts 8x3=24 ~~10x2=20~~

Q.11 Give examples of N Type and P Type semiconducting materials. (CO-1)

Q.12 Name any two copper alloys. (CO-2)

Q.13 List materials used for making

i) Motors ii) Choke (CO-7)

Q.14 Define Superconductivity. (CO-2)

Q.15 Name any two liquid insulating materials with applications. (CO-3)

Q.16 What is the full form of HRC Fuse. (CO-5)

Q.17 List two applications of Mercury. (CO-4)

Q.18 Define permeability. (CO-6)



Q.19 Name materials used in soldering. (CO-5)

Q.20 Define Hysteresis Loss. (CO-4)

Q.21 List two applications of asbestos. (CO-3)

Q.22 Define Doping. (CO-1)

## SECTION-C

**Note:** Short answer type questions. Attempt any five questions out of ten. 5x8=40

Q.23 Describe various factors affecting resistivity of conduction materials. (CO-1)

Q.24 Differentiate between hard drawn copper and annealed copper. (CO-2)

Q.25 Classify plastics materials with their properties and applications. (CO-3)

Q.26 Differentiate between N Type and P Type semiconductor. (CO-4)

Q.27 Discuss bundle conductor and write its applications. https://www.hsbteonline.com (CO-5)

Q.28 Explain Gaseous insulating material with properties and applications? (CO-8)

Q.29 Give examples of soft and hard magnetic