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| Bon Secours College for Women Nationally Accredited with “A” Grade by NAAC (Affiliated to Bharathidasan University, Trichy-24) Recognized by UGC Under Section 2(f) & 12 (B)    Vilar Bypass, Thanjavur-613 006. |

**DEPARTMENT OF PHYSICS**

**MATERIAL SCIENCE**

**UNIT I**

**2 marks**

1. What are bonds?
2. What is meant by elastic property?
3. What is bond length?
4. What is a dispersion bond?
5. What is mean by Ionization energy?
6. Define interatomic forces?
7. What is mean by electrovalent bond?
8. Give two properties of Ionic bond?
9. Define covalent bond?
10. Give two properties of covalent bond?
11. What is mean by Metallic bond?
12. What is mean by dispersion bond?
13. Define dipole bond?
14. Define hydrogen bond?
15. Give two properties of dipole bond?
16. Give two properties of hydrogen bond?
17. Give two properties of dispersion bond?
18. What are the different types of chemical bond?
19. Distinguish between Ionic and Covalent bonds? Any two?
20. What is mean by valence electron?

**5 marks**

1. Briefly explain about dipole bond.
2. Give the properties of metallic bond.
3. List the properties of covalent bond.
4. Derive expression for bulk modulus of crystals.
5. Distinguish between Ionic and covalent bonds.
6. Explain about interatomic forces.
7. Give a brief account on review of atomic structure.
8. Briefly explain about dispersion bond.
9. Give the properties of dipole bond.
10. Write a short notes Hydrogen bond?

**10 marks**

1. Give a brief notes on review of Atomic structure.
2. What are the types of chemical bonds and explain it?
3. Explain Dispersion bond and dipole bond.
4. Give the difference between ionic and covalent bond?
5. Explain abot lattice energy of ionic crystals.

**UNIT -II**

**2 marks**

1. What is meant by ceramics?

2. Define electrets.

3. What are ceramic materials?

4. Give the function of moderator.

5. What is mean by polymers?

6. General properties of polymers.

7.What is plastics?

8.Difference between thermosetting plastics and thermoplastics.

9.Define Ceramics?

10.What is super strong materials?

11.Properties of super strong materials?

12. Define cermets?

13. Types of ceramics?

14. Uses of ceramics?

15. What is electrets?

16. Give two application of electrets.

17. Give which material used in nuclear reactor.

18. Classify nuclear engineering materials?

19. What is moderator?

20. Define control materials?

**5 marks**

1. What are thermoelectric materials? Explain it
2. Give a brief account on classification of polymers.
3. What are the general properties of polymers?
4. Write notes on Electrets.
5. Define polymers? Explain the properties.
6. Difference between thermosetting plastics and thermoplastics.
7. Gives some properties of ELASTROMERS?
8. Define SSM?
9. Explain cermets.
10. Explain the nucler engineering materials.

**10 marks**

1. Explain the types of plastics/
2. Explain about super strong materials?
3. Explain about super alloy?
4. Explain ceramics?
5. Explain about polymers ant it’s properties?
6. Explain thermo electric material and cermets?
7. Give the application of electrets?
8. Give classification of nuclear engineering material?

**UNIT III**

**2 marks**

1. What are magnetic methods?
2. Give any two applications of electron microscope.
3. What is NDT?
4. Define resolving power of a microscope.
5. Benefic of NDT?
6. Define ‘’RADIOGRAPHY’’?
7. What is gamma ray radiography?
8. Define X-ray radiography?
9. Comparing between gamma-ray and X-ray?
10. Define photo elastic methods?
11. Explain the magnetic methods?
12. Explain the ELECTRICAL methods.
13. Draw the ultrasonic methods diagram?
14. Thermal methods?
15. Detection by scattering of light?
16. Define Principle of magnetic focusing.
17. Define SEM?
18. Write the advantage of Magnetostriction ultra sonic generator
19. Write the advantage of Piezoelectric oscillator circuit?
20. Write the disadvantage of Piezoelectric oscillator circuit?

**5marks**

1. Explain the radiographic methods?
2. Comparison between the gamma ray and X-ray?
3. Explain the Electrical methods?
4. What is ultra-sonic methods? with neat diagram?
5. What are the Equipment used in non-destructive testing? explain it?
6. Explain about Scanning Electron Microscope?
7. Give the construction and working of Magnetostriction Ultrasonic Generator?
8. Explain about Ultrasonic methods?
9. Explain Visual and other optical methods?
10. Give a short notes on Thermal methods?
11. Explain Piezoeelectric oscillator circuit?

**10 marks**

1. Explain the surface defect detection by NDT?
2. Describe electron microscope?
3. Give briefly on Production of X-ray?
4. Explain the magnetostriction ultra sonic generator?
5. Piezoelectric ultra sonic generator? With diagramme?

**UNIT-IV**

**2 marks**

1. Explain the metallic glasses ?
2. Give the two applications of the metallic glasses?
3. FRP the abbreviation?
4. FRP advantage?
5. FRP disadvantage?
6. Explain the MMC?
7. Define optical materials?
8. Difference between technology and materials?
9. Give the applications of the fiber optical materials?
10. What is mean by plastic fibers?
11. What is physical to be measured?
12. What is modulation effects in optical fibers?
13. Difference between physical parameter to be measured and modulating effects in optical fibers?
14. LED abbreviation?
15. Advantage of LED in electronic displays?
16. Disadvantage of LED in electronic displays?
17. Advantage of liquid crystal displays?
18. Disadvantage of liquid crystal displays?
19. Any two Properties of lithium niobate?
20. Define SAW materials?
21. Application of SAW devices?
22. Merits of SAW devices?
23. What is Sonar transducers?
24. What is Biomaterials ?
25. Types of Biomaterials?

**5 marks**

1. Give the application of the metallic glasses?
2. Advantage and disadvantage of the LEDs in electronic displays?
3. Explain the liquid crystal display system? with figure.
4. Define the Aabustic material and their applications?
5. Give the Properties of lithium niobate?
6. Explain the fiber reinforced plastics with advantage and disadvantage?
7. Give the various optical materials?
8. Explain the Display materials?

**10 marks**

1. Difference between TECHNOLOGY & MATERIALS?
2. Explain the material for optical source and detectors?
3. Fiber optical materials and their applications?
4. Properties of lithium niobates?
5. Application of the SAW devices?

**UNIT-V**

**2 marks**

1. Define elasticity?
2. What is plasticity?
3. What is ductility?
4. What is brittleness?
5. What is hardness?
6. What is toughness?
7. What is stiffness?
8. What is resilience?
9. What is endurance?
10. What is strength?
11. What is creep?
12. What is fracture?
13. Types of the fracture?
14. Define brittle fracture?
15. Define Ductile fracture?
16. Explain the fatigue fracture? f
17. Define creep fracture?
18. Define machinability?
19. Explain the weld ability?
20. Explain cast ability?
21. Explain the malleability?
22. What is heat treatment?
23. Types of hardening?
24. Different types of annealing?
25. Explain the recovery?
26. Define grain growth?
27. Distinction between hot working and cold working?
28. Explain the tempering?
29. Tempering process two types?
30. Define carburizing?
31. Types of mechanical test?
32. Test on the basic of indentation?
33. Test on the basic of scratch?
34. Test on the basic of abrasion?
35. Define Precaution?
36. Precaution advantage?
37. Precaution disadvantage?
38. Define the power metallurgy?
39. Power metallurgy product?
40. Deformation two types?

**5 marks**

* 1. Give the different mechanical properties of engineering materials?
  2. What is mean by creep and explain it?
  3. Give the theories of creep?
  4. Write a short notes on fracture?
  5. Distinguish between brittle and ductile fracture.
  6. What are the factors affecting mechanical properties of a material?
  7. Distiguish between modified and full annealing process?
  8. Describe about tensile test?
  9. Describe vickers hardness test?
  10. Explain fatigue test?
  11. Wrire a short notes on metal forming processes?
  12. Give the difference between elastic and plastic deformation?
  13. Give the difference between slip and twinning?
  14. Explain bauschinger effect?
  15. What are the differnt types of annealing processes?

**10 marks**

* + 1. Explain about different mechanical properties of engineering materials?
    2. Explain what are the factors influencing creep resistance?
    3. Give a account on four types of fracture?
    4. Give a brief account on types of technological properties?
    5. Explain about factors affecting mechanical properties of a material?
    6. Distiguish between hot and cold working.
    7. Give brief account on normalising
    8. Explain about the types of mechanical tests
    9. Describe hardness test?
    10. Explain about impact test?
    11. Describe metal forming processes?
    12. Describe powder metallurgy?