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**DEPARTMENT OF PHYSICS**

**APPLIED PHYSICS - III**

**UNIT – I**

**2 MARK**

1. What are conductors? Give example
2. What is an insulator? Give example.
3. What is a semiconductor?
4. What is the difference between a semiconductor and a conductor?
5. What is a valance band?
6. What is a conduction band?
7. What is a forbidden energy gap?
8. What are the two types of semiconductors?
9. What is N – type semiconductor?
10. What is P – type semiconductor?
11. Give any two differences between N – type and P – type semiconductor.
12. Why is intrinsic semiconductor act as an insulator at 0˚K?
13. Why is pentavalent impurity called as donor impurity?
14. Why is trivalent impurity called as acceptor impurity?
15. Give the energy band diagram of a conductor, insulator and a semiconductor?
16. What is called Hall effect?
17. What are the uses of Hall effect?
18. What is Hall voltage?
19. What is Hall constant?
20. How is a P-N junction diode formed?
21. What is a depletion region in a p-n junction diode/
22. What is a forward bias?
23. What is reverse bias?
24. What is breakdown voltage?
25. What is avalanche breakdown?
26. What is Zener break down?
27. What is the difference between avalanche breakdown and Zener break down?
28. Define Zener resistance?
29. Mention the uses of Zener diode.
30. What is tunnel diode or easki diode?
31. What valley voltage in tunnel diode?
32. What are the tunnel diodes?
33. What are the advantages of tunnel diode?
34. What are the disadvantages of tunnel diode?
35. What a backward diode?
36. Give the circuit symbol of p – n junction diode?
37. Give the circuit symbol of tunnel diode?
38. Give the circuit symbol of backward diode?
39. Why is the backward diode called as backward diode?
40. Why is a backward diode called as uni tunnel diode?

**5 MARK**

1. Explain theory of energy bands in crystals
2. What is the difference between conductors, insulators and semiconductors?
3. Write a note an conductors?
4. Write a note an semiconductors?
5. Write a note an insulators?
6. What is the difference between intrinsic semiconductor and extrinsic semiconductors?
7. Explain the intrinsic semiconductor.
8. Explain the extrinsic semiconductor.
9. Write a note an P- type semiconductor?
10. Write a note an N- type semiconductor?
11. Write a note an Hall effect?
12. Explain the P – N junction diode.
13. Explain the breakdown in P – N junction.
14. What are the characteristic of Zener diode?
15. Write a note an Tunnel diode ?
16. Write a note an back ward diode?

**10 MARK**

1. On the basis of energy band theory, give explanation for semiconductor, insulators and conductors?
2. Describe the N – type and P – type semiconductor.
3. Distinguish between the N – type and P – type semiconductor.
4. Distinguish between the intrinsic and extrinsic semiconductors.
5. What is hall effect describe how this effect is used to find the concentration of electrons and holes in a semiconductor.
6. Discuss the construction and working of a Zener diode. Explain with a neat circuit , how will you determine the zener diode characteristics?
7. What is tunnel diode? Describe the characteristic of a tunnel diode. Mention its advantage and disadvantage.
8. Describe avalanche and Zener breakdown?

**UNIT – II**

**2MARK**

1. What is a transistor?
2. What are the three parts of a transistor?
3. What are the basic circuit configurations of a transistor?
4. Draw the circuit of common base mode.
5. What are the characteristic of common base connection?
6. What are the characteristic of common emitter connection?
7. Mention any three characteristics of a common collector configuration?
8. What is called static characteristic curve of a transistor?
9. Define input impedance in common base mode.
10. Define current amplification in common base mode.
11. Define the output impedance in common base mode.
12. Define the output admittance in common mode and mention its unit.
13. Define (a) input impedance (b) current amplification factor (c) output impedance in common emitter mode
14. Define (a) Z- parameter (b) Y – parameter (c) H – mparameter.
15. What is an amplifier?
16. Draw the circuit diagram of basic common base amplifier?
17. Define the voltage gain of the amplifier?
18. Define power gain of the amplifier?
19. What is an oscillator?
20. What are the different classifications of an oscillator?
21. What is FET?
22. What are the two types of FET?
23. Give any two difference between a FET and transistor.
24. Why is a FET called as unipolar device?
25. Draw the circuit symbol of n- channel and p – channel FET.
26. What is pinch of voltage in FET.
27. Define drain resistance in FET.
28. Define mutual conductance in a FET.
29. Define amplification factor in a FET.

**5 MARK**

1. Explain a transistor action.
2. Draw the circuit for P-N-P and N-P-N transistor.
3. Write a note an transistor circuit configuration.
4. Explain hybrid parameters.
5. Write a note transistor as an amplifier.
6. Write a note an transistor as an oscillator.
7. Explain the junction field effect transistor.
8. Write a note an FET amplifier.
9. Explain the characteristics of JFET.
10. Draw the basic circuit diagram of transistor in three different mode and state advantage in each mode.
11. What is FET? What are the different types of FET?

**10 MARK**

1. Define input impedance, current gain and output impedance of a transistor in (a) common mode and (b) common emitter mode.
2. Describe with a circuit, how you will determine characteristics of FET.
3. Describe an experiment to determine the static characteristic of a transistor in a common emitter mode
4. Describe an experiment to determine the static characteristic of a transistor in a common base mode
5. How will be determining the input impedance, the current gain and the output admittance of a transistor in a common base mode.

**UNIT – III**

**2 MARK**

1. What is expansion for LASER?
2. What is expansion for MASER?
3. What is spontaneous emission?
4. What is stimulated emission?
5. What are the difference between spontaneous emission and stimulated emission?
6. What is population inversion?
7. What are the necessary conditions for LASER action?
8. What is pumping in laser?
9. What is the advantage of four level laser?
10. What is a metastable state?
11. Draw the energy levels of four level laser?
12. What is a ruby crystal?
13. What are the main parts parts of ruby laser?
14. Draw the energy level diagram of a ruby laser.
15. Draw the energy level diagram of a He – Ne laser.
16. Give the most important transitions in He – Ne laser.
17. What are the advantages of He – Ne laser?

**5 MARK**

1. Explain the principle of laser.
2. Explain stimulated emission.
3. Explain spontaneous emission.
4. Explain population inversion.
5. Write a note a meta stable.
6. Explain the working of Ruby laser.
7. Explain different methods of population inversion.
8. Write a note on
9. Optical pumping
10. Metastable state.
11. Write about the application of laser in communication, in computer and in medicine.

**10 MARK**

1. Describe the principle of laser and maser action
2. What is stimulated emission? Derive the Einstein coefficient.
3. Describe the construction and working of an ammonia maser.
4. Describe the construction and working of a ruby laser
5. Describe the construction and working of a He – Ne laser.
6. Explain the principle and construction of Ammonia Maser with suitable diagram.
7. Briefly explain the applications of laser.

**UNIT – IV**

**2 MARK**

1. What are called photo devices?
2. What is extrinsic photoelectric effect?
3. What is extrinsic photoelectric effect?
4. What are the three groups of photo devices?
5. What is electro luminescence?
6. What are the types luminescences?
7. What are the methods of excitation?
8. What is intrinsic excitation?
9. What is avalanche excitation?
10. What is tunneling excitation?
11. What is injected electro luminescence?
12. What is LED?
13. Give some material used in LED.
14. What are the uses of LED.
15. What is photo conduction?
16. What is photo diode?
17. What is a digital clock?
18. Draw the block diagram of a digital clock?
19. Give any three advantages of LED.
20. What are the disadvantages of LED?
21. What is LCD?
22. What are the two types of LCD?
23. What are the advantage of LCD over that of LED

**5 MARK**

1. Write a note an light emitting diode?
2. Discuss about radiative transitions.
3. Explain luminescent efficiency.
4. Write a note an method of excitation?
5. Discuss about the material for LED.
6. Discuss about configuration of LED.
7. Explain photo conduction.
8. Write a note an photo diode?
9. Write a note an photo transistor?
10. Write a note an digital clock?
11. Explain seven segment displays.
12. Explain liquid crystal display.
13. Write a note an dynamic scattering LCD.
14. Write a note an field effect LCD.

**10 MARK**

1. What is LED? Describe is construction and working. Write a note on the material for LED?
2. What is photoconduction? derive an expression for photoconductivity.
3. Describe the construction and working of a photodiode?
4. Describe the construction and working of a phototransistor?
5. With block diagram, describe the function of a digital clock.
6. What LCD? Describe is construction and working. Write a note on the material for LCD?

**UNIT – V**

**2 MARK**

1. What is an operational amplifier?
2. Mention any four properties of an ideal operational amplifier.
3. What is an inverting op – amp?
4. What is an non – inverting op – amp?
5. What is differential op – amp?
6. What is CMRR?
7. What are the uses of op – amp?
8. What is D\A converter?
9. What is an A\D converter?
10. What is comparator?
11. Define input resistance.
12. Define voltage gain.
13. Define output resistance.
14. What is sign changer?
15. What is scale changer?
16. What is phase shifter?

**5 MARK**

1. Write a note an op – amp.
2. Mention the properties of an ideal op – amp.
3. Draw the basic inverting and non – inverting op – amp. Derive an expression for voltage gain.
4. Describe the action of a differential op – amp.
5. Describe the action of a integrating op – amp
6. Describe the action of a adding or summing op – amp
7. Explain binary weighted resistor method
8. Explain R – 2R ladder method.
9. Discuss about counter type A\D converter.
10. Discuss about successive approximation converter.
11. Explain the op – amp as a comparator.

**10 MARK**

1. Describe the fundamental principle of A\D converter. Describe the successive approximation
2. Describe the function of an op – amp as (a) sign changer (b) scale changer (c) phase shifter
3. Describe the D\A converter with binary weighted method
4. Describe the counter type A\D converter.
5. With circuits explain the use of op-amp to perform the following.
6. Inverting amplifier
7. Summing amplifier
8. What are the salient features of an op-amp? Explain how op-amp can be used as an integrator and as a differentiator.
9. Draw the circuit diagram of inverting and non inverting op-amp and explain their action. Derive expressions for their voltage gain.
10. Describe the working of a R – 2R ladder type D\A converter with a neat diagram.