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**DEPARTMENT OF PHYSICS**

**ELECTRONICS**

**UNIT – I**

**2MARKS**

1. What do you understand by proper biasing?
2. What is called a varactor diode?
3. Give the advantages of Tunnel diode.
4. What is a hot Camir diode?
5. In what type of circuit are tunnel diodes commonly used?
6. Give any applications of LED.
7. Define photo diode.
8. Write a continuity equation.
9. Give the circuit symbol of p – n junction diode?
10. How is a P-N junction diode formed?
11. What is a forward bias?
12. What is reverse bias?
13. What is a depletion region in a p-n junction diode?
14. Define light emitting diode.
15. Give some material used in LED.
16. What are the uses of LED?
17. Give any three advantages of LED.
18. What are the disadvantages of LED?
19. Define schottky diode

**5 MARKS**

1. Discuss about the theory of tunnelling in tunnel diode.
2. Explain the construction and working of laser diode with neat diagram.
3. What is Varactor diode? Explain briefly how it can be used in tuning circuits.
4. Describe the construction and operation of Gunn diode with necessary diagram.
5. Explain the current – voltage characteristics of a PN junction.
6. Give the principle and working of photodiode.
7. Explain the LASER diode.
8. Write a note on Einstein equation.
9. Write a note on schottky diode.

**10 MARKS**

1. Deduce the continuity equation for change of a semiconductor. Apply the same to P -type and N – type semiconductors.
2. Explain the operation and biasing of LED. List its applications.
3. Explain the basic operation of:
4. Schottky diode
5. Photo diode with neat diagram.
6. Describe the construction and working of a photodiode?
7. Define Tunnel diode. Explain operation of Tunnel diode and its characteristics.
8. Define Varactor diode. Explain operation of Varactor diode and its characteristics.
9. Explain the Einstein equation.
10. Explain the forward and reverse bias of PN junction.

**UNIT –II**

**2 MARKS**

1. Name the three terminals of JFET.
2. What is ESD? What is its effect on MOS devices?
3. What is a traic?
4. What is an intrinsic standoff ratio?
5. Why FET is called as unipolar transistor?
6. How can an SCR be turned off?
7. What is FET?
8. What are the two types of FET?
9. Give any two differences between a FET and transistor.
10. Why is a FET called as unipolar device?
11. Draw the circuit symbol of n- channel and p – channel FET.
12. What is pinch of voltage in FET?
13. Define drain resistance in FET.
14. Define mutual conductance in a FET.
15. Define amplification factor in a FET
16. Define SCR.
17. Name the terminals of SCR.
18. Define thyristors.
19. What are the two types of Thyristors?
20. Define Gate triggering.
21. Define Rate of effect.
22. Define light triggering.
23. Write a applications of UJT.

**5 MARKS**

1. Describe the construction and working of depletion MOSFET with necessary diagram.
2. Explain the construction, operation and characteristics of Traic.
3. Discuss the construction working and characteristics of D-MOSFET with neat diagram.
4. Explain the construction, working of UJT with necessary diagram.
5. List the advantages of JFET.
6. Draw the circuit diagram for power control using Diac. Explain its operation.
7. Explain the VI characteristics of SCR.
8. Write a note on Turning off SCR.
9. Write a note on Turning ON SCR.
10. Explain the Biasing of SCR
11. Explain the characteristics of JFET.
12. What is FET? What are the different types of FET?
13. Write a note on applications of SCR.
14. Explain the VI characteristics of Diac.
15. Explain the difference between SCR and Traic.
16. Explain the VI characteristics of UJT.
17. Write a note an equivalent circuit SCR.
18. Explain how UJT can be used as relaxation oscillator.

**10 MARKS**

1. Solve the following differential equation using analog computer

d2y/dx2 + 2 dy/dx + 4y =3

1. Explain the operation of SCR and its V-I characteristics.
2. Explain the construction, operation and VI characteristics of JFET. Define the parameters of JFET.
3. Explain the operation of UJT and its V-I characteristics.
4. Explain the construction, operation and VI characteristics of Triac.
5. Explain the construction, operation and VI characteristics of Diac.
6. Explain the forward and reverse characteristics of SCR.

**UNIT –III**

**2MARKS**

1. When is an OP-AMP being ideal one?
2. Define CMRR.
3. Give the applications of instrumentation amplifier.
4. What is a differentiator?
5. Define slew rate of an operational amplifier.
6. Differentiate virtual ground and ordinary ground.
7. List the OP-Amp characteristics.
8. What is an instrumentation amplifier?
9. What is an operational amplifier?
10. Mention any four properties of an ideal operational amplifier.
11. What is an inverting op – amp?
12. What is a non – inverting op – amp?
13. What are the uses of op – amp?
14. What is D\A converter?
15. What is an A\D converter?
16. What is comparator?
17. Define input resistance.
18. Define voltage gain.
19. Define output resistance.
20. What is sign changer?
21. What is scale changer?
22. What is phase shifter?
23. Define frequency response of Op-amp.
24. Define active filters.
25. Define low pass filter.
26. Define High pass filter.
27. Define band pass filter.

**5 MARKS**

1. Explain log and antilog amplifiers using OP-amp with neat diagram.
2. Discuss based pass and band rejection filters with necessary circuit diagram.
3. Explain how operational amplifier can be used as differentiator circuit. Also draw the expected input and output waveforms.
4. Explain the first order low pass filter circuit using operational amplifier with neat circuit diagram.
5. What are the ideal characteristics of OP-AMP?
6. Explain the parameters of Op-amp.
7. Write a note an Op-amp as a voltage amplifier.
8. Explain how operational amplifier can be used as integrating circuit. Also draw the expected input and output waveforms.
9. Write a note an inverting amplifier.
10. Write a note an Non inverting amplifier.
11. Explain the Op-amp as a Voltage follower.
12. Explain the Op-amp as a Summing amplifier.
13. Explain the Op-amp as a comparator.
14. Explain the simultaneous equation.

**10 MARKS**

1. Discuss the band pass characteristics of an active resonant band pass filter with necessary diagrams.
2. Discuss how OP-Amp can be used as inverting and non – inverting amplifier with neat circuit diagram.
3. Explain OP-Amp as integrator and differentiator with neat diagrams.
4. Explain the parameters of Op-amp.
5. Explain Op-amp as a comparator.
6. Describe the function of an op – amp as (a) sign changer (b) scale changer (c) phase shifter
7. Explain log and anti log amplifiers.

**UNIT- IV**

**2 MARKS**

1. Define schmitt’s trigger circuit.
2. What is a VCO? Give two applications that require a VCO?
3. What is meant by PLL?
4. Why D/A converter is called as Encoder.
5. What are the two conditions required for a sustained state of oscillation?
6. What is called a binary-weighted resistor DAC?
7. Draw the circuit of Schmitt trigger.
8. Give the basic steps involved in D/A conversion process.
9. Define sample hold circuit.
10. Define oscillator.
11. Define sinusoidal oscillator.
12. Define non sinusoidal oscillator.
13. Write a principle of phase shift oscillator.
14. What is D\A converter?
15. What is an A\D converter?

**5 MARKS**

1. Explain the working of phase shift oscillator with neat circuit diagram. Derive an expression for its frequency of oscillation.
2. Explain dual slope A/D converter with necessary circuit diagram.
3. Explain Schmitt trigger circuit with neat circuit diagram.
4. Write short notes on Sample Hold circuit.
5. A 555 timer configured to run in the astable mode (oscillator). Determine the frequency of the output and the duty cycle. Given values are R1 = 2.2KΩ, R2 = 4.7 KΩ, Cext = 0.022µF.
6. Explain the wien bridge oscillator.
7. Explain binary weighted resistor method
8. Explain R – 2R ladder method.
9. Discuss about successive approximation converter.
10. Explain the twin-T oscillators.
11. Explain the operation of voltage control oscillator.
12. Write a note on phase locked loops.

**10 MARKS**

1. Draw the circuit diagrams of D/A converters with binary weighted resistors and ladder type. Explain their working.
2. Draw the circuit of square wave generator using an op-amp. Explain its operation by drawing the capacitor voltage waveforms.
3. Derive the expression for the period of a symmetrical waveform.
4. Discuss in detail the operating principles of phase locked loops with necessary block diagram.
5. Explain the phase shift oscillator.
6. Draw the circuit of triangular wave generator using an op-amp. Explain its operation by drawing the waveforms.
7. Draw the circuit of saw-tooth wave generator using an op-amp. Explain its operation by drawing the waveforms.
8. Draw the circuit diagrams of A/D converters with successive approximation method and dual slope method. Explain their working.

**UNIT – V**

**2 MARKS**

1. list the steps involved in the fabrication of monolithic IC’s
2. Define sheet resistance.
3. List the basic processes involved in the fabrication of an IC.
4. State diffusion law.
5. Give any two applications of monostable multivibrator.
6. Mention any four advantages of integrated circuit.
7. What are the different types of monolithic diodes?
8. Define IC circuit.
9. Write advantages of IC circuit.
10. Define discrete circuit.
11. Write a note on limitations of ICs.
12. Define wafer.
13. What are the two types of ICs?
14. Define diffusion.
15. Define etching.
16. What are the two types of etching?
17. Define ion implantion.
18. Define epitaxy.
19. Define negative photo resist.
20. Define positive photo resist.

**5 MARKS**

1. Explain the classification of ICs.
2. Write a note on charge coupled device.
3. Discuss the general concepts and loss mechanisms CCDs.
4. Explain the action of the monostable multivibrator using IC555 with neat circuit diagram.
5. How are IC diode fabricated? Sketch the cross sections of two types of emitter based diodes. Discuss its VI characteristics.
6. Draw the pin connections of IC 555 timer and explain the function of each terminal.
7. Discuss in detail epitaxial, masking and etching processes of ICs with necessary diagram.
8. Explain the method of fabricating with necessary diagram.
9. Explain the applications of monostable operation.
10. Explain the fabricating monolithic resistor.
11. Explain the fabricating monolithic capacitor
12. Explain the fabricating monolithic diodes.
13. Explain the fabricating monolithic inductors
14. Explain the fabricating monolithic transistor.
15. Write a note on monolithic integrated circuits.
16. Write a note on epitaxy.
17. How IC diodes are fabricated? Sketch the cross-section of two types of emitter base diode.

**10 MARKS**

1. Explain the working of astable multivibrator with neat circuit diagram. Derive an expression for its frequency of oscillation.
2. Explain the fabrication of integrated capacitors and inductors. Draw their cross sectional views and equivalent circuits.
3. Give the construction of a semiconductor photodiode. Draw and discuss the volt-ampere characteristics.
4. Explain the IC555 timer.
5. Explain the monostable operation of IC555 timers.
6. Explain the astable operation of IC555 timers.
7. Explain the charge coupled devices.
8. Explain the fabricating monolithic resistors and diodes.
9. Explain the fabricating monolithic transistors and capacitors