

## Department- Physics

### Question Bank

Class: T.Y.B.Sc.      Subject: Physics – IV      Semester- IV – Electronics (PH354)

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#### Chapter- 1 Special Purpose Diode

##### Question for 1 Marks

1. State materials used for LED.
2. What is photodiode?
3. State application of photodiode.
4. What is varactor?
5. Draw optocoupler circuit.
6. Give applications of seven segment display.
7. What is seven segment display? Draw its schematic diagram.
8. Give two examples of optoelectronic devices.
9. State the advantages of LEDs over incandescent lamps.
10. Define optocoupler and draw the optocoupler circuit.
11. Give four applications of LED.
12. State applications of varactor diode.
13. Draw the a.c. equivalent circuit and schematic symbol of a varactor.
14. Give the working principle of LED.
15. Give limitations of LEDs.
16. What is meant by photovoltaic mode of operation of solar cell.
17. Draw I-V characteristics of photodiode.
18. Give limitations of photodiode.
19. What is the approximate LED current if d. c. input voltage is 40 V and series resistance is  $2\text{ K}\Omega$ ? Assume forward voltage  $\sim 2\text{ V}$ .

## Chapter- 2 Transistor Amplifier

### Question for 1 Marks

1. Enlist four classes of amplifier,
2. What do you mean by class-A operation of an amplifier?
3. What do you mean by class-C operation of an amplifier?
4. What do you mean by class-B operation of an amplifier?
5. What do you mean by class-AB operation of an amplifier?
6. What is high –fidelity amplifier?
7. State the formula for voltage gain of an amplifier.
8. If oscilloscope displays a pulse width of  $0.2 \mu\text{s}$  and a period of  $3.0 \mu\text{s}$ , find duty cycle.
9. Calculate resonant frequency of a tank circuit having capacitor of  $470 \text{ PF}$  and inductor of  $2 \mu\text{H}$ .
10. What is position of Q point in case of class A,B,C, and AB amplifier?
11. What are advantages of class-B amplifier?
12. What are dis-advantages of class-B amplifier?
13. Define duty cycle and conduction angle.
14. Define crossover distortion.
15. What is resonant frequency of tank circuit?
16. What is differential amplifier?
17. What is power gain?

### Question for 5 Marks

1. What is differential amplifier? Explain differential input and output of differential amplifier. Draw necessary circuit diagram.

### Question for 8 Marks

1. Discuss class A amplifier with suitable circuit diagram. Obtain the formula for its power gain, output power and efficiency.
2. Explain cross over distortion in push-pull amplifier. Draw the circuit diagram for push-pull amplifier. How is it eliminated?
3. With suitable circuit diagram, explain the working of class C amplifier.

## Chapter- 3 Field Effect Transistor

### Question for 1 Marks

1. When a change in  $V_{GS}$  of a JFET is 0.2 V and change in drain current is 0.4 mA, find the value of transconductance.
2. What is FET?
3. Draw the schematic symbol for n-channel JFET.
4. Give advantages of FET over BJT.
5. Give advantages of MOSFET over JFET.
6. Give application of MOSFET.
7. Give application of JFET.

### Question for 5 Marks

1. Explain the construction of n-channel JFET. Draw its transfer characteristics curve.
2. Distinguish between JFET and MOSFET.
3. Explain application of FET as variable resistor.
4. Explain the construction of n-channel MOSFET. Draw its transfer characteristics curve.
5. Explain the construction of i) n-channel JFET and ii) P-channel JFET.

## Chapter- 4 Applications of Operational Amplifier

### Question for 1 Marks

1. Define CMRR.
2. Define slew rate of an op-amp.
3. Which feedback is used in amplifier circuit?
4. What is meant by comparator?
5. What is meant by Integrator?
6. What is meant by differentiator?
7. What is meant by instrumentation amplifier?
8. Define trip point.
9. What do you mean by operational amplifier?

### Question for 5 Marks

1. Discuss the working of OP-Amp as an integrator. Show that the output voltage is proportional to integral of input voltage.
2. Explain the concept of Schmitt trigger.
3. Explain the action of an op-amp as a differentiator, derive the necessary formula for output.

4. Describe the concept of comparator.
5. Draw and explain circuit diagram of three op-amp instrumentation amplifier.

Question for 8 Marks

1. What is Op-Amp? Draw the symbol. State parameters of an ideal OP-Amp. Determine the value of CMRR in dB if differential voltage gain is 200 and common mode voltage gain is 0.5.

### Chapter- 5 Timer (IC-555)

Question for 1 Marks

1. What do you mean by a monostable multivibrator?
2. What do you mean by a astable multivibrator?
3. What do you mean by a bistable multivibrator?
4. What is meant by multivibrator?
5. Why timer IC is called 555?

Question for 5 Marks

1. Draw the block diagram of 555 timer. Explain various comprising parts.
2. Explain the astable multivibrator using IC 555.
3. Explain the bistable multivibrator using IC 555.
4. Explain the monostable multivibrator using IC 555.

Problems

1. Determine the frequency of oscillation of astable multivibrator using IC555. Given :  $R_A = R_B = 10 \text{ K}\Omega$  and  $C = 0.01 \mu\text{F}$ .
2. A monostable multivibrator is constructed using a capacitor of  $1\mu\text{F}$  and a resistor  $R_A$  . if the pulse width is  $2.2\text{mS}$ , determine the value of  $R_A$ .

### Chapter- 6 Regulated Power Supply

Question for 1 Marks

1. What is regulated power supply?
2. State any two features of IC78XX.
3. State any two features of IC79XX.
4. Draw pin diagrams of 78XX and 79XX.
5. Draw the 10-pin diagram of IC723.
6. Draw the 12-pin diagram of IC723.

7. Draw block diagram of a three terminal regulator.
8. What is meant by ripple?

#### Question for 5 Marks

1. Draw the block diagram of IC- 723 and explain it.
2. Draw block diagram of a three terminal regulator and explain it.
3. Explain positive voltage regulator using IC 78XX.
4. Explain negative voltage regulator using IC 79XX.
5. Explain basic low voltage regulator using IC723. Draw the suitable circuit diagram. Explain designing of low voltage regulator.
6. Explain high voltage regulator using IC723. Draw the suitable circuit diagram. Explain designing of high voltage regulator.

#### Problems

1. Design basic low voltage regulator using IC723 for following data:  $v_o = +5$  volt, current flowing through  $(R1 + R2) = I = 1$  mA and limiting current  $I_L = 100$ mA.
2. Design basic high voltage regulator using IC723 for following data:  $v_o = +15$  volts, current flowing through  $(R1 + R2) = I = 1$  mA and limiting current  $I_L = 100$ mA.

#### Chapter- 7 combinational circuits

##### Question for 1 Marks

1. What is difference between combinational and sequential logic?
2. What are the types of digital circuits?
3. What do you mean by SOP?
4. What do you mean by POS?
5. What do you mean by standard SOP form?
6. What do you mean by standard POS form?
7. Draw the structure of 2-variables k-map.
8. Draw the structure of 3-variables k-map.
9. Draw the structure of 4-variables k-map.
10. Draw block diagram of sequential circuit.
11. What do you mean by gray code?
12. What are combinational circuits?
13. What are sequential circuits?

##### Question for 5 Marks

1. Design and construct half adder using k-map.

2. What is multiplexer? Draw circuit diagram for 4:1 multiplexer.
3. What is demultiplexer? Draw circuit diagram for 1:4 demultiplexer.
4. Design and construct full adder using k-map.
5. Design and construct half subtractor using k-map.
6. Design and construct full subtractor using k-map.

Question for 8 Marks

1. What is difference between combinational and sequential logic? What are multiplexers and demultiplexers? Draw the diagram for 4-input multiplexer.

Problems

### Chapter- 8 Sequential Logic Circuits circuits

Question for 1 Marks

1. What is shift register?
2. What is meant by flip-flop?
3. Draw logic diagram of R-S flip-flop with NAND gates.
4. Draw logic diagram of R-S flip-flop with NOR gates.
5. Draw logic diagram of J-K flip-flop.
6. Draw logic diagram of master slave J-K flip-flop.
7. How R-S flip-flop converted in to D flip-flop.
8. How is J-K flip flop converted in to T flip-flop.
9. What is counter?
10. What are two important types of counter?
11. What do you mean by modulus of a counter?
12. What do you mean by synchronous counter?
13. What do you mean by asynchronous counter?
14. What is up counter?
15. What is down counter?
16. What is Up/down counter?
17. What is buffer register?
18. What are different types of register?
19. Draw a logic block symbol of a buffer register.

Question for 5 Marks

1. Using logic diagram and truth table, explain R-S flip-flop using NAND gates.
2. Using logic diagram and truth table, explain R-S flip-flop using NOR gates.

3. Describe in detail clocked R-S flip-flop.
4. With logic diagram and truth table explain J-K flip-flop.
5. Explain Master-Slave J-K flip-flop.
6. Explain D flip-flop using logic diagram and truth table.
7. Explain T flip-flop using logic diagram and truth table.
8. Differentiate synchronous and asynchronous counters.
9. Draw a circuit diagram of 4-bit SISO shift register. Explain its working.
10. Draw a circuit diagram of 4-bit SIPO shift register. Explain its working.
11. Draw a circuit diagram of 4-bit PISO shift register. Explain its working.
12. Draw a circuit diagram of 4-bit PIPO shift register. Explain its working.

Question for 5 Marks

1. What is shift register? State various types of registers. Draw a circuit diagram of 4-bit SISO shift register. Explain its working.
2. What is counter? Explain the working of a 4-bit asynchronous counter with suitable diagram and input-output waveforms.
3. What is counter? Explain the working of a 4-bit synchronous counter with suitable diagram and input-output waveforms.
4. What is shift register? State various types of registers. Draw a circuit diagram of 4-bit SIPO shift register. Explain its working.
5. What is shift register? State various types of registers. Draw a circuit diagram of 4-bit PISO shift register. Explain its working.
13. What is shift register? State various types of registers. Draw a circuit diagram of 4-bit PIPO shift register. Explain its working.