

Reg. No.

--	--	--	--	--	--	--	--	--	--



BSCPHC 382

**Choice Based Credit System VI Semester B.Sc.
Degree Examination, September 2022
(2021 – 22 Batch Onwards)
PHYSICS
Electronics**

Time : 3 Hours

Max. Marks : 80

- Instructions :** i) Answer questions from **all** Units.
ii) Scientific calculators are **allowed**.

PART – A

1. Answer **any 8** questions. **(8×1=8)**
- i) What is Supply Voltage Rejection Ratio (SVRR) in an OPAMP ?
 - ii) What is positive feedback in a circuit ?
 - iii) What is the use of Pin. No. 8 in an OPAMP ?
 - iv) How many outputs will be there for a binary adder ?
 - v) Give the Boolean expression for the output of a two input NOR gate.
 - vi) Give an example for a universal gate.
 - vii) The modulating frequency of AM wave is f_m . What is its bandwidth ?
 - viii) How many sidebands will be present in FM wave ?
 - ix) What is skip distance in ionospheric communication ?
2. Answer **any 6** questions. **(2×6=12)**
- i) The CMRR of an OPAMP is 10^4 . If common mode gain is 10, find differential mode gain.
 - ii) State Barkhausen criteria for an oscillator.
 - iii) What is a filter ? Name any two filters.
 - iv) Realize OR gate using NAND gates.
 - v) Write the truth table for two input NOR gate.

P.T.O.



- vi) Write the logic diagram for Boolean expression $Y = \overline{AB} + A$, using basic logic gates.
- vii) Mention any two advantages of diode detector.
- viii) Mention any two limitations of AM.
- ix) Give any two comparisons between LED and LCD monitors.

PART – B

Unit – I

- 3. a) Explain input offset voltage, input offset current and CMRR of an OPAMP. **3**
- b) Explain the action of capacitor filter with required diagram. **5**
- c) Derive an expression for voltage gain of a feedback amplifier in terms of feedback fraction. Explain the action of transistor phase shift oscillator with a circuit diagram. **8**

OR

- 4. a) Give any three differences between positive and negative feedback in electrical circuit. **3**
- b) Explain OPAMP inverting amplifier and obtain expression for its gain. **5**
- c) Explain the working of full wave bridge rectifier with required diagram. What is ripple factor ? Show that ripple factor is 0.482 for a bridge rectifier. **8**
- 5. a) For a zener regulator, $V_z = 10 \text{ V}$, $R_s = 1 \text{ K}\Omega$, $R_L = 2 \text{ K}\Omega$ and the input voltage varies from 20 to 50 V. Find the maximum and minimum values of zener current. **4**

OR

- b) An amplifier without feedback has an output of 45 V for an input of 0.05 V. If 1% negative feedback is applied, what is the output voltage ? **4**

Unit – II

- 6. a) Explain the working of NOT gate using discrete circuit. **3**
- b) State and explain De-Morgan's theorems. **5**
- c) What is a counter ? Explain the working of ripple counter using JK Flip-Flops and write the timing diagram. **8**

OR



7. a) Write the logic diagram, truth table and symbol of a JK Flip-Flop. **3**
b) Explain XOR gate using basic logic gates with its logic diagram and truth table. **5**
c) Explain the sum of products method for the simplification of Boolean expression with an example. **8**
8. a) Simplify Boolean expression $Y = ABC + A\bar{B}C + A\bar{B}\bar{C}$ and draw the logic diagram for simplified expression. **4**
OR
b) Prove (i) $(A + B)(A + C) = A + BC$ (ii) $(\bar{A} + B)(A + B) = B$. **4**

Unit – III

9. a) Write a note on classification of radio waves on the basis of modes of propagation. **3**
b) Describe AM radio transmitter with a block diagram. **5**
c) With required wave diagrams obtain an expression for AM wave. Mention any three advantages of SSB transmission. **8**
OR
10. a) Give any three comparisons of AM and FM. **3**
b) Explain the working of linear diode detector showing wave forms at different blocks. **5**
c) With neat labelled diagram, explain the working of Cathode ray tube. Mention any three uses of CRO. **8**
11. a) The maximum and minimum peak to peak voltages of an AM wave are 16 mV and 4 mV respectively. Calculate modulation index. If the carrier power is 5 KW, find the total power. **4**
OR
b) What are carrier, sideband and total power in an AM wave across a load of 100Ω , when the carrier voltage is 100 V and modulation index is 0.5. **4**
-