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BSCPHC 352

**Credit Based VI Semester B.Sc. Degree Examination, April/May 2017
(2013 – 14 and Earlier Batch)
PHYSICS (Paper – VIII)
Electronics**

Time : 3 Hours

Max. Marks : 80

- Instructions :**
- i) Answer questions from **all** Units.
 - ii) Multiple choice questions must be answered in the **first** page of the answer book **only**.
 - iii) **Scientific** calculators are allowed.

PART – A

1. Answer the following questions by choosing the most appropriate answer.

(1×8=8)

- i) The configuration of transistor used for voltage, current and power amplification is
 - a) CB
 - b) CC
 - c) CE
 - d) all CB, CC and CE
- ii) Which of the following known as voltage controlled device ?
 - a) MOSFET
 - b) n-p-n transistor
 - c) p-n-p transistor
 - d) None of these
- iii) The phase diff. between input and output signals in a non inverting amplifier is
 - a) 45°
 - b) Zero
 - c) 180°
 - d) 90°
- iv) An OPAMP amplifies
 - a) AC Voltage only
 - b) DC Voltage only
 - c) Both AC and DC
 - d) None of the above
- v) An oscillator is an amplifier with gain
 - a) ∞
 - b) Zero
 - c) Unity
 - d) Half

P.T.O.



- vi) In a full adder circuit there are _____ outputs.
 a) One b) Four c) Three d) Two
- vii) Value of Modulation index m for 100% AM wave is
 a) One b) >1 c) <1 d) Zero
- viii) The primary colors used in mixing in case of colour TV are
 a) Yellow, Blue and Green b) Red, Blue and Green
 c) Red, Yellow and Blue d) Blue, Red and Violet
2. Answer **any six** of the following. (2×6=12)
- i) Mention any two differences between BJT and MOSFET.
 - ii) Show that $\alpha_{DC} = \frac{\beta_{dc}}{1 + \beta_{dc}}$.
 - iii) Explain Barkhausen criterion for oscillation.
 - iv) Construct OR gate from NAND gate.
 - v) Draw the circuit and truth table of D-flip flop.
 - vi) Why reception of sky wave is good during night when compared to day time ?
 - vii) How is interference of video signal from audio signal removed in TV transmission ?
 - viii) Draw a block diagram of optical fiber communication.

PART – B

Unit – I

3. a) Describe voltage divider bias used for biasing a transistor. 4
 - b) Define h-parameter model for two port network and arrive at h-parameter model of a transistor in CE mode. 7
- OR
4. a) Draw DC and AC equivalent circuits for a CE amplifier. 4
 - b) With suitable diagrams describe the construction and working of n-channel E-MOSFET. 7



5. a) For a given voltage divider bias of a transistor in CE mode the circuit parameters are $V_{CC} = 15V$, $R_1 = 33K\Omega$, $R_2 = 12K\Omega$, $R_C = 3.3K\Omega$, $R_E = 1K\Omega$ and $V_{BE} = 0.7V$. Draw DC load line and determine operating point. 4

OR

- b) In an AC equivalent circuit for CE amplifier the circuit parameters are $R_C = 10K\Omega$, $R_E = 100\Omega$, $R_L = 2.2K\Omega$, $R_1 = 100K\Omega$, $R_2 = 10K\Omega$, $h_{fe} = 200$ and $h_{ie} = 4K\Omega$. Find voltage gain A_v , current gain A_i , input resistance R_i , output resistance R_o . 4

Unit – II

6. a) With a circuit, explain the working of an inverting amplifier of an OPAMP and obtain expression for voltage gain. 4
b) What is an oscillator ? Describe the construction and working of Wein bridge oscillator. 7

OR

7. a) Explain the action of voltage regulator using series transistor and OPAMP. 4
b) Explain without a circuit diagram the working of a full wave bridge rectifier. Obtain expressions for efficiency and ripple factor. 7
8. a) An amplifier without feedback has an output of 50V for an input of 0.1V. If 1% negative feedback is applied, what is the output voltage ? 4

OR

- b) In a Zener shunt regulator the input voltage is 16V with a series resistance of $1K\Omega$, and $V_z = 10V$. A load of $3K\Omega$ is connected across the Zener diode. Calculate the Zener current and power dissipated across load. 4

Unit – III

9. a) With suitable diagrams describe the construction and working of OR gate using discrete components. 4
b) Construct half adder and full adder circuits and explain their operations using truth tables. 7

OR



10. a) Explain the working of decade counter. 4
 b) Give the construction and working of clocked RS flip flop using truth table. 7
11. a) Simplify and draw the logic diagram. 4
 $Y = ABC + \bar{A}BC + A\bar{B}\bar{C}$
 OR
- b) Simplify and draw the logic diagram. 4
 $Y = (A + B + C)(A + B)$

Unit – IV

12. a) Distinguish between AM and FM. 4
 b) Explain optical fiber communication system with a block diagram and mention any four advantages of the same. 7
 OR
13. a) With a diagram, explain how a diode detector is used for detecting AM signal. 4
 b) Explain the working of Cathode Ray Tube (CRT) with a relevant diagram. 7
14. a) A sinusoidal carrier wave of frequency 10 MHz is amplitude modulated with modulation index 40%. Find the side band frequencies and their amplitudes. 4
 OR
- b) An AM transmitter radiates radio-wave of 50KW at modulation index 90%. Calculate the power of carrier wave. 4