

Biyani Girls College
Model Test Paper-2015-16
Electronics

Time- 3 Hours

Maximum Marks- 100

Unit-I

1. State and prove the Thevenin Theorem. Explain the limitation of this theorem.
2. Explain the meaning of four networks. Find out the input, output and mutual impedances for an active four terminal network and derive the relation among them.

Unit-II

3. Draw the circuit diagram and explain the working of a full wave rectifier with shunt capacitor filter. Derive an expression of ripple factor for the circuit.
4. Explain the working of a voltage Tripler with the help of a suitable circuit diagram.

Unit-III

5. The potential drop on a resistance of 2.2 k is 2.2 volts. It is connected to the collector of a common emitter transistor amplifier. Calculate the value of base current, if given that $\beta = 9$.
6. Explain the need of biasing in transistor amplifier and define the various bias stability factors. Draw the circuit diagram for common emitter transistor amplifier with four resistors bias network. And derive the expression for thermal bias stability factor for this circuit.

Unit-IV

7. Explain how using P-N diode and transistor in the following logic operations can be obtained. Give the circuit diagrams and circuit symbols with truth table for each case.
 - a. AND
 - b. OR
 - c. NOT
8. Prove that all logic operations can be performed using NAND Gate.

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Unit-I

1. State and prove maximum power transfer theorem that the power lost in the generator is equal to the power delivered to the load, and power efficiency is only 50%.
2. What do you mean by active and passive network? Define input and output impedances of a four terminal network and find out its expression.

Unit-II

3. What do you understand by depletion layer? Find out the expression for width of depletion layer for a P.N. junction diode and explain its dependence on externally applied potential difference.
4. If reverse saturation current for P.N. junction diode is $40 \mu\text{A}$ then what current will flow through it on applying 0.1 volt forward biased voltage $\left(\frac{e}{kT} = 40 \text{ volt}^{-1}\right)$

Unit-III

5. Describe the experiment method for drawing the input and output characteristics of P-N-P transistor forward current ratio, input impedance and transfer reverse voltage ratio for this circuit configuration.
6. For a common base amplifier, potential difference across the resistance of 2200 connected with collector is 2.2 volts. Find out the base current ($\alpha = 0.9$)

Unit-IV

7. Using P-N junction diode and transistor find the following gate operation-
 - i. AND Gate
 - ii. OR Gate
 - iii. NOT Gate
8. Using De' Morgan's theorem prove following-
 - i. $A + B + \bar{C} = (A + B) C$
 - ii. $AB + CD = \overline{\overline{AB} \cdot \overline{CD}}$

