

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]  
(2064)

14612

**B. Tech 2nd Semester Examination**

**Basic Electronics (O.S.)**

**EC-1001**

**Time : 3 Hours**

**Max. Marks : 100**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in Section-E.

**SECTION - A**

1. (a) What is diffusion current? Derive expression for diffusion current density in a semiconductor. (10)
- (b) Derive the voltage-current equation for the p-n diode. (10)
2. (a) Explain the principle, working and characteristics of photodiode. (10)
- (b) Discuss the choke-input and capacitor-input filters to filter the output of a rectifier. (10)

**SECTION - B**

3. (a) What are the advantages of a FET over a bipolar transistor? (10)
- (b) Discuss the static characteristic and transfer characteristic curves for an N-channel MOSFET which may be operated in either the depletion or enhancement mode. (10)

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4. (a) What do you understand by hybrid parameters of a transistor? Give their importance. (10)
- (b) Draw a biasing circuit for an enhancement MOSFET. Explain how the gate-source junction is forward biased. (10)

### SECTION - C

5. (a) Discuss the effect of feedback on input and output resistance. (10)
- (b) Draw and explain the equivalent circuit for BJT at high frequency. (10)
6. (a) Describe the working of RC coupled amplifier. Obtain the expression for the voltage gain in mid and low frequencies. (10)
- (b) Explain the stabilization of gain of an amplifier by negative feedback. (10)

### SECTION - D

7. (a) What are the advantages of integrated circuits over conventional circuits? What are their drawbacks? (10)
- (b) Discuss the characteristics of phototransistor and its applications. (10)
8. (a) Describe the function of an OP-AMP as an adder and a phase shifter. (10)
- (b) Discuss how OP-AMP can be used as a comparator. (10)

### SECTION - E

9. (i) Thickness of transition region for a typical p-n junction is the order of how many micrometer? (1)

- (ii) Define dynamic resistance of a diode. (2)
- (iii) What is the condition for maximum efficiency of full wave rectifier? (1)
- (iv) Draw the circuit diagram of zener diode as voltage regulator. (2)
- (v) Define beta ratio of a transistor. (1)
- (vi) If the base resistor is very small then the transistor will operate in which region? (1)
- (vii) How the gate-source diode of a JFET is biased? (1)
- (viii) When the gate voltage becomes more negative in an N-channel JFET, how the channel between the depletion layers behaves? (1)
- (ix) Draw the circuit diagram of voltage feedback. (2)
- (x) What factors affect the gain of the amplifier at high frequencies? (2)
- (xi) What are the four basic methods of coupled amplifiers? (2)
- (xii) How we classify the integrated circuits on the basis of applications? (1)
- (xiii) List the function of operational amplifier. (2)
- (xiv) What is the basic concept of operational amplifier? (1)