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Total No. of Pages : 02

Total No. of Questions : 09

M.Sc. (Physics) (2015 to 2017) (Sem.-1)
SEMICONDUCTORS AND ELECTRONICS DEVICES

Subject Code : MPH-104

M.Code : 71604

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt FIVE questions in ALL including the compulsory question No-9.

1. a) Discuss the working of field effect transistor as switch and amplifier. (10)
b) Explain MOSFET. Discuss about depletion mode of MOSFET in detail. (10)
2. a) What are light emitting diodes? Give its applications. (10)
b) Discuss about CMOS. List its various advantages and limitations. (10)
3. a) What is simultaneity postulate of lumped circuit theory? (8)
b) Discuss in detail about series and parallel connections of non-linear resistors with the help of well labelled circuit diagrams. (12)
4. a) Discuss in detail the importance of Thevenin and Norton theorems. (10)
b) What do you mean by bistable circuits? Discuss relaxation in oscillator. (10)
5. a) Discuss in detail about working of inverting amplifier. Derive relation for voltage gain also. (10)
b) Explain the working of voltage to current convertor. (10)
6. a) What do you mean by differential amplifier? Discuss its transfer characteristics. (10)
b) What is phase shift oscillator? How oscillations are generated in RC phase shift oscillator? (10)

7. a) What do you mean by flip flop? Discuss in detail about JK flip flop. (15)
b) Write a short note on registers. (5)
8. Discuss the fundamentals of VLSI circuits and IC design in detail. (20)
9. a) What do you mean by fermi level? (2.5×8=20)
b) What is the difference between direct and indirect semiconductors?
c) Define Ohmic and rectifying contacts.
d) What are non-linear resistors? Draw symbol.
e) State characteristics of comparator.
f) What do you mean by ripple rejection?
g) What is the cause of slew rate in amplifier?
h) Draw logic circuit of following logic expression

$$Y = \overline{A}B + \overline{B}C + \overline{C}A$$

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.