Total Pages : 4 Roll No. .....

PHY-504

Semiconductor Devices, Analog and Digital Electronics

M.Sc. PHYSICS (MSCPHY-12/13/16/17)

First Year, Examination, 2019 (June)

Time : 3 Hours] **Max. Marks : 80**

Note : This paper is of Eighty (80) marks divided into three (03) sections A, B and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains four (04) long answer type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

(2×19=38)

1. Describe the working of P-N junction diode under forward and reverse biasing.

2. Give the theory of operational Amplifier and its characteristics parameters.

3. Give the theory and applications of De-Morgan's theorems.

4. Give classification of oscillators in brief and derive Barkhausen condition to maintain oscillations in feedback oscillator.

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of eight (08) marks each. Learners are required to answer any four (04) questions only. (4×8=32)

1. Give the expression for width of depletion layer in junction diode.

2. Explain the biasing of P-N junction diode.

3. Explain amplifiers and their classification.

4. Why a part of output is fedback as signal in amplifiers ?

5. Explain why a power amplifier is called a large signal amplifier ?

6. Explain the distortions produced in class A and push-pull amplifiers.

7. Write a short note on octal system.

8. Give the truth table for binary multiplication.

SECTION–C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective type questions of one (01) mark each. All the questions of this section are compulsory. (10×1=10)

1. P-type semiconductor material is :

(a) silicon doped with indium

(b) silicon

(c) silicon doped with arsenic

(d) germanium.

2. When a diode is heavily doped

(a) the Zener voltage will be low

(b) the Avalenche voltage will be high

(c) the depletion region will be thin

(d) the leakage current will be low.

3. A regulated power supply consists of

(a) A power transformer

(b) A full wave rectifier

(c) A smoothing filter

(d) A voltage regulator circuit.

4. In a transistor with normal bias, the emitter junction

(a) is reversed biased (b) has a high resistance

(c) has a low resistance (d) is forward biased.

5. The voltage gain of a common base amplifier depends upon

(a) load resistor R_L

(b) input resistance of transistor

(c) a.c. alpha

(d) All the above.

6. Maximum theoretical conversion efficiency of a class-B push-pull amplifier is :

(a) 25% (b) 50%

(c) 78.5% (d) 85.6%.

7. Introduction of negative feedback in an amplifier increases

(a) gain (b) noise level

(c) band-width (d) harmonic distortion.

8. In an a stable multivibrator

(a) $\beta = 1$ (b) $\beta > 1$

(c) $\beta < 1$ (d) $\beta A = 1$.

9. A FET has a :

(a) source (b) gate

(c) drain (d) all of the above.

10. The output of UJT can be taken from its :

(a) base 1

(b) base 2

(c) emitter

(d) any one of three terminals.