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Total No. of Printed Pages: [01]

Total No. of Questions: [09]

B.Sc. (Hons.) Physics (Semester – 3rd)
ANALOG SYSTEM AND APPLICATIONS

Subject Code: BPHYS1-301

Paper ID: [19131515]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a. Explain the importance of doping in the intrinsic semiconductor in brief.
- b. What is the thermal voltage during forward biasing of PN diode
- c. What is barrier width in PN diode? Explain in brief using suitable schematic.
- d. Brief the diffusion and drift current in PN diode.
- e. Illustrate the superiority of NPN transistor over PNP if any.
- f. Write down the unit of four hybrid parameters (h_i , h_r , h_o and h_f).
- g. What do you mean by Barkhausen's criterion in positive feed backing?
- h. How voltage divider bias is different from fixed bias configuration in BJT analysis.
- i. Write down the characteristics of an ideal Op-Amp
- j. What do you mean by CMRR in Op-Amp?

Section – B

(5 marks each)

- Q2. Brief conduction and valence band of PN diode through Energy Level Diagram.
- Q3. Discuss I-V characteristics of CE mode NPN transistor.
- Q4. Explain the importance of load line and Q-point in IV characteristics.
- Q5. Illustrate the fixed bias configured dc analysis of NPN transistor.
- Q6. Write down the use of practical Op-Amp.

Section – C

(10 marks each)

- Q7. Explain the construction and working principle of (i) LED, ii) Photodiode & iii) Solar Cell.
- Q8. Discuss the RC-coupled amplifier and its frequency response in details. Also explain how it differed with direct and transformer coupled amplifier.
- Q9. What is Op-Amp? Explain its working in mathematical operation of (i) Adder, (ii) Subtractors (iii) Differentiator, (iv) Integrator and (v) exponentiation.