Roll No……..….. **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 (hi, hr, ho and hf).
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.