বিদ্যাসাগর বিশ্ববিদ্যালয়

# VIDYASAGAR UNIVERSITY

## M.Sc. Examinations 2020
## Semester IV
## Subject: PHYSICS
## Paper: PHS 495 (Special Paper)
(Practical)

**Full Marks: 50** **Time: 3 hrs.**

*Candidates are required to give their answers in their own words as far as practicable.*

### PHS495 A (Solid State Physics-II)

***Answer Any One of the Following:***

1. Explain the Principle of Guoy Method and describe the experimental arrangement. Find $P_{eff}$ theoretically for the sample supplied to you.
2. Describe the experimental procedure of Guoy Method. Show the necessary plots and find $P_{eff}$ Experimentally for the sample supplied to you.
3. Explain the principle of Photoconductivity and describe the experimental arrangement. Why the Relaxation time is related to minority carriers?
4. Describe the experimental procedure of Photoconductivity. Show the necessary plots and find Relaxation time for the sample supplied?
5. Explain the Principle of Optical Absorption experiment. Describe with a neat diagram the Spectrophotometer and indicate different parts.
6. Describe the experimental procedure of optical Absorption experiment. Show the necessary Plots with variation of wavelength and find the band gap of the supplied sample?
7. Explain the Principle of ESR and describe the experimental arrangement through a block diagram.
8. Describe the experimental procedure of ESR .Show the necessary plots with frequency? How will you determine Lande g factor experimentally of the supplied sample?

9. Explain the Principle of Solar cell experiment and show different solar cell parameters. Describe the experimental arrangement.
10. Describe the experimental procedure of Solar cell experiment. Show the necessary plots with variation of intensity of light and find the fill factor of the supplied solar cell.
11. Explain the Principle of Junction capacitance measurement and show different parameters. Describe the experimental arrangement.
12. Describe the experimental procedure of Junction capacitance measurement. Show the necessary plots and find out different parameters of the supplied sample experimentally.

## PHS – 495 B (Applied Electronics - II)

1. Explain the theory of designing a Schmitt trigger circuit using OP Amp µA741.
2. Explain the procedure of taking data for the Schmitt trigger experiment using OP Amp µA741.
3. Explain the method of generation of DSB-TC and DSB-SC signals using analog multiplier IC MC 1495 or MC1496.
4. Write down the principles and methodology of designing a VCO using a PLL IC (NE 565).
5. Discuss how a VCO can be used to generate FM signal.
6. Discuss how a PLL can be used to demodulate an FM signal.
7. Write a program for 8085 microprocessor to find out the smallest number from a given array of 20 numbers.
8. Draw the circuit diagram to convert 4 bit serial number to 4-bit parallel number. Explain the operation.
9. Describe the addition of two BCD numbers with proper circuit diagram.
10. Describe the process of modulation and demodulation of PAM with two signals by proper sketching.
11. Write a program in 8085 microprocessor to perform $(25)_H$ Exor $(10)_H$ . Also mention the memory locations starting from 7000 for storing the program.
12. Describe the method of generating 4-bit slow-signal from a 4-bit fast-signal using PISO register circuit.