

(Pages : 3)

M – 5853

Reg. No. :

Name :

First Semester M.Sc. Degree Examination, November 2021

**Physics with Specialization in Nano Science / Physics with Specialization
in Space Physics**

PHNS 513/PHSP 513 : BASIC ELECTRONICS

(2020 Admission)

Time : 3 Hours

Max. Marks : 75

PART – A

Answer any **five** questions. Each question carries **3** marks.

- I. (a) Write a short note on schmitt trigger.
- (b) Write a short note on IMPATT diode.
- (c) Write a short note on bending loss in optic fiber.
- (d) Write a short note on demultiplexer.
- (e) What do you meant by parity generators and checkers?
- (f) What do you meant by miller effect?
- (g) Write a short note on optical amplifier.
- (h) Compare digital and analogue instruments with examples.

(5 × 3 = 15 Marks)

P.T.O.



PART – B

Answer **all** questions. Each question carries **15** marks.

- II. (a) What do you mean by active filter and explain first and second order low pass Butterworth filter with circuit diagram.

OR

- (b) With the help of circuit diagram, design and explain (i) square wave generator, (ii) triangular wave generator.

- III. (a) What is flip flop and explain (i) J K Flip flop, (ii) Master Slave J K. and (iii) Flip flop switching time.

OR

- (b) (i) Distinguish the basic difference between register and counter
(ii) Explain synchronous counter.

- IV. (a) Explain optical amplifier and semiconductor optical amplifier.

OR

- (b) Distinguish active and passive transducers with example and Explain thermoelectric transducers.

(3 × 15 = 45 Marks)

PART – C

Answer any **three** of the following questions. Each question carries **5** marks.

- V. (a) Design a wide band pass filter with $f_L = 200$ Hz. And $f_H = 1$ KHz and a pass band gain = 4. Draw the circuit diagram, frequency response curve and calculate the Q value of the filter.
- (b) The cut off frequency of a certain low pass filter is 2 KHz. Convert this low pass filter to have a cut off frequency of 3 KHz by using the frequency scaling technique.



- (c) Explain J K flip flop with logic diagram and truth table parity generators checkers.
- (d) Draw the logic diagram and truth table and wave forms for a three bit binary ripple counter.
- (e) Find the core radius necessary for single mode operation at 1320 nm of a step index fiber with $n_1 = 1.48$ and $n_2 = 1.478$. Determine numerical aperture and acceptance angle of this fiber.
- (f) A continuous 40 Km long optical fiber link has a loss of 0.4 dB/km.
- (i) What is the optical power that must be launched into the fiber to maintain an optical power level of $2.0 \mu W$ at the receiving end and
- (ii) What is the required input power if the fiber has a loss of 0.6 dB/km.

(3 × 5 = 15 Marks)

