Reg. No. : ....

Name : ....

First Semester M.Sc. Degree Examination, August 2021

Physics

PH 213 : BASIC ELECTRONICS

(2018–19 Admission)

Time : 3 Hours   Max. Marks : 75

PART – A

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

I.   (a)   How to calculate the power gain of an audio amplifier?

(b)   Which parameters of a BJT limit its high frequency response?

(c)   Explain the difference between first and second order filters.

(d)   Give the design of a 3-bit serial in parallel out shift register.

(e)   Explain the action of a PIN photodiode.

(f)   Explain the working principle and use of a strain gauge.

(g)   Draw the volt-ampere characteristics of a Tunnel Diode and indicate the negative resistance region.

(h)   Explain the working of the LVDT transducer.

(5 × 3 = 15 Marks)

P.T.O.

PART – B

Answer **all** questions, each questions carries **15** marks

II.   A   (i)   Discuss the frequency response characteristics of a negative feedback amplifier.

          (ii)   What are gain and phase margins?

OR

      B   (i)   Discuss the circuit and working of an operational amplifier based Schmitt Triger.

          (ii)   Show how to design for a particular UTP and LTP   **15**

III. A   (i)   Discuss the methods of binary arithmetic operations.

          (ii)   Give the design of half-adder and full-adder circuits and explain their working.

OR

      B   (i)   Explain with circuits the operation of asynchronous and synchronous binary counters

          (ii)   What are the advantages of synchronous counters?   **15**

IV.   A   (i)   Use suitable block diagrams and explain in detail the working of a Cathode Ray Oscilloscope.

          (ii)   How dual trace can be achieved in a CRO?

OR

      B   (i)   Discuss in detail the structure and working of a semiconductor laser.

          (ii)   What is the advantage of using heterojunction in laser diodes?   **15**

(3 × 15 = 45 Marks)

PART – C

Answer **any three** questions. Each question carries **5** marks:

V.   (a)   An audio amplifier is said to have a voltage gain of 60 dB. If an input signal of 2 mV amplitude is applied then calculate the output voltage.

(b)   An opamp square wave oscillator is required to oscillate at a frequency of 1.5 kHz. Calculate the value of timing resistance if the value of timing capacitor used is 0.22 μF. The feedback factor β is 0.5.

(c)   Give the design of a 3-bit binary ripple counter using J-K flip flops and logic gates which is having a control input for up and down counting modes.

(d)   Give the design of a 10-bit input parity generator circuit.

(e)   A fibre optic cable is 30km long. The measured ratio of input power to output power is 55. Calculate the attenuation of the fibre in dB per km.

(f)   A step index multimode optical fibre is having a core refractive index of 1.55 and cladding refractive index 1.45. Calculate the Numerical Aperture of the fibre.

(3 $\times$ 5 = 15 Marks)

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