Reg. No. : ....

Name : ....

I Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.) Examination, October 2022
(2019 Admission Onwards)
PHYSICS
PHY – 1C04 : Electronics

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer both questions either (**a** or **b** from **each** question).   **(2×12=24)**

1. a) Deduce the expression for the closed loop voltage gain, Input resistance, output resistance and band width of a voltage series feedback amplifier using Op-Amp. How will you construct an amplifier of minimum gain, in voltage series feedback configuration ?

   OR

   b) Explain the working of first order low pass and high pass Butterworth filters. Also draw the frequency response and explain it's behaviour.

2. a) What is meant by D/A converter ? What are the parameters used to define the performance of D/A converter ? With the help of a diagram explain the working of R-2R ladder network type DAC.

   OR

   b) With the help of a functional block diagram explain the internal architecture and register array of Intel 8085 microprocessor.

SECTION – B

Answer **any 4**. (**1** mark for Section **a**, **3** marks for Section **b** and **5** marks for Section **c**).   **(4×9=36)**

3. a) What is a shift register ?

   b) What are the various types of shift registers used ?

   c) Draw the logic diagram and symbol of an 8-bit serial-in-parallel-out shift register and explain it's working.

P.T.O.

4. a) What is a summing amplifier ?

   b) Explain how an Op-Amp works as a summing amplifier and derive the expression for the output of a summing amplifier.

   c) What is the output voltage of an Op-Amp inverting summing amplifier for the following set of input voltages and resistors R_f = 1 MΩ in all cases, V_1 = +1 V, V_2 = + 2V, V_3 = + 3V R_1 = 500 kΩ R_2 = 1 MΩ R_3 = 1 MΩ. ? What would be the expression for the output voltage if you replace R_f with a capacitor C ?

5. a) What are synchronous counters ?

   b) Discuss its advantage over asynchronous counter.

   c) Draw the timing diagram of a 4 bit synchronous up-counter and explain.

6. a) What is the function of differentiator a circuits ?

   b) Show that an Op-Amp differentiator circuit performs the differentiation operation.

   c) Design a differentiator circuit to differentiate an input signal that varies from 10 Hz to 2 kHz. Assume C_1 = 0.1 µF.

7. a) What is an astable multivibrator ?

   b) Explain the construction of Astable multivibrator using 555 timer.

   c) Calculate the frequency and duty cycle of 555 Astable multivibrator given C = 0.01 µF, R_A = 10 KΩ, and R_B = 50 KΩ. Also draw the output waveform.

8. a) What is meant by ROM ?

   b) Draw the block diagram of a typical ROM and explain.

   c) Discuss five applications of ROM.