K21P 4199

Reg. No. : .....

Name : .....

I Semester M.Sc. Degree (CBSS – Reg./Supple./Imp.) Examination, October 2021
(2018 Admission Onwards)
PHYSICS
PHY 1C04 : Electronics

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **both** questions (either **a** or **b**).

1. a) Explain with circuit diagram the closed loop op-amp configuration with voltage shunt feedback. Derive the expression for its voltage gain. Also discuss how an inverting amplifier can be modified as current to voltage converter.

OR

b) Explain a basic differentiator with circuit diagram. Obtain input and output waveforms and frequency response of a practical differentiator. Also obtain the expression for its output voltage.

2. a) With the help of neat diagrams, explain the working of R2R ladder type DAC.

OR

b) Describe with circuit diagram and waveform the working of astable multivibrators using
   a) Schmitt Trigger
   b) 555 Timer
   c) Inverter. **(2×12=24)**

P.T.O.

SECTION – B

Answer **any four**. **1** mark for part **a**, **3** marks for part **b**, **5** marks for part **c**.

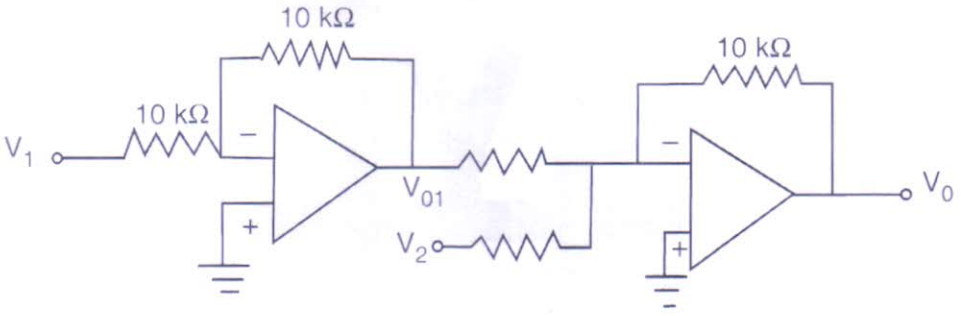
3. a) What is input offset voltage ?

   b) Determine the output voltage of a differential amplifier for the input voltages of 300 μV and 250 μV. The differential gain of the amplifier is 5000 and the value of CMRR is 100.

   c) Explain with circuit diagram, the working of an open loop op-amp in differential amplifier configuration.

4. a) What is slew rate ?

   b) Calculate the output voltage of the following circuit with $V_1 = 5$ V and $V_2 = 5$ V.



   c) Describe with circuit diagram the working of a voltage to current converter.

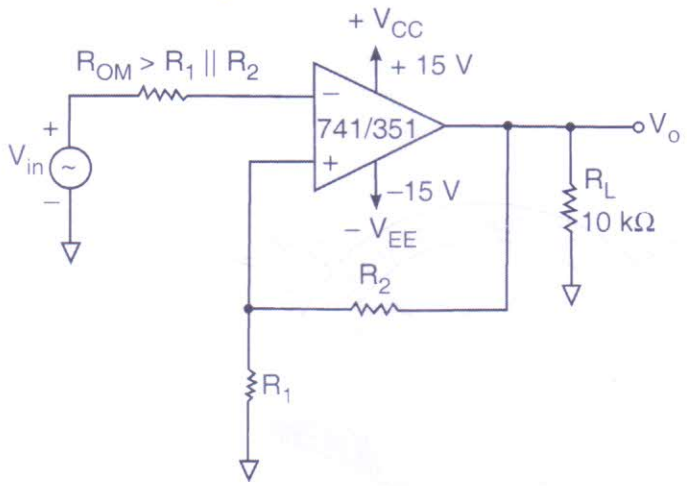
5. a) Distinguish between triangular wave generator and sawtooth wave generator.

   b) Find the resistance to be used to convert a first order low pass Butterworth filter with resistance 30 kΩ and f_H 2 KHz into a filter with f_H 3 KHz.

   c) Explain briefly with circuit diagram, the voltage limiting action of a basic op-amp comparator.

6. a) What is Schmitt Trigger ?

   b) In a Schmitt trigger circuit using op-amp having maximum output voltage swing ±14 V, R_1 = 100 Ω and R_2 = 56 kΩ, calculate the upper and lower threshold voltages.



   c) Explain 8085 microprocessor and name the registers used in it.

7. a) What is PROM ?

   b) What is meant by race around condition in flip flops ?

   c) Explain with logic diagram the working of

      i) Serial in parallel out shift register.

      ii) Parallel in parallel out shift register.

8. a) What do you mean by maximum clock frequency associated with flip flops ?

   b) Use a 4 × 1 MUX to implement the logic function F(A, B, C) = ∑m (1, 2, 6, 7).

   c) Explain the design of synchronous counter. **(4×9=36)**