

Reg. No. :

Name :

1 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
- Schmitt Trigger
 - 555 Timer
 - Inverter.

(2×12=24)

P.T.O.

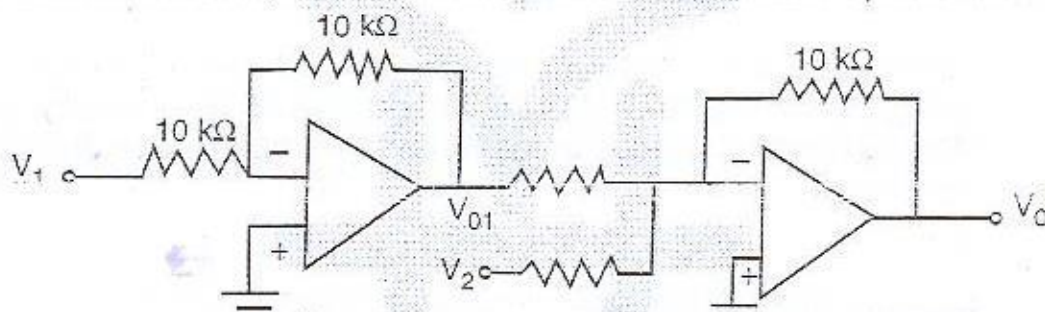
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SECTION – B

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

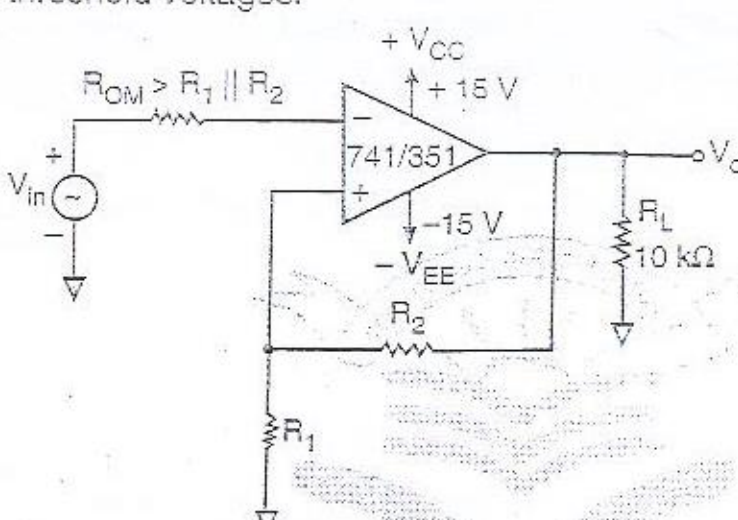
3. a) What is input offset voltage ?
- b) Determine the output voltage of a differential amplifier for the input voltages of $300 \mu\text{V}$ and $250 \mu\text{V}$. The differential gain of the amplifier is 5000 and the value of CMRR is 100.
- c) Explain with circuit diagram, the working of an open loop op-amp in differential amplifier configuration.
4. a) What is slew rate ?
- b) Calculate the output voltage of the following circuit with $V_1 = 5 \text{ V}$ and $V_2 = 5 \text{ V}$.



- 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 $30 \text{ k}\Omega$ and $f_H 2 \text{ KHz}$ into a filter with $f_H 3 \text{ KHz}$.
- c) Explain briefly with circuit diagram, the voltage limiting action of a basic op-amp comparator.

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6. a) What is Schmitt Trigger ?
- b) In a Schmitt trigger circuit using op-amp having maximum output voltage swing $\pm 14 \text{ V}$, $R_1 = 100 \Omega$ and $R_2 = 56 \text{ k}\Omega$, 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
- Serial in parallel out shift register.
 - 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 $F(A, B, C) = \sum m(1, 2, 6, 7)$.
- c) Explain the design of synchronous counter. (4×9=36)