



**K24P 3919**

**Reg. No. : .....**

**Name : .....**

**I Semester M.Sc. Degree (C.B.C.S.S. – OBE – Reg./Supple./Imp.)**

**Examination, October 2024**

**(2023 Admission Onwards)**

**PHYSICS/PHYSICS WITH COMPUTATIONAL AND NANO SCIENCE**

**SPECIALIZATION**

**MSPHN01C04/MSPHY01C04 : Electronics**

**Time : 3 Hours**

**Max. Marks : 60**

**SECTION – A**

**Answer any 5, each one carries 3 marks.**

1. Outline block diagram representation of a typical OPAMP.
2. What are the differences between synchronous and asynchronous counters ?
3. What is the potential timing problem in flip-flop circuits ?
4. What are the different classifications of microprocessors ?
5. Explain the oscillator principles.
6. Summarize the different comparator characteristics.

**(5×3=15)**

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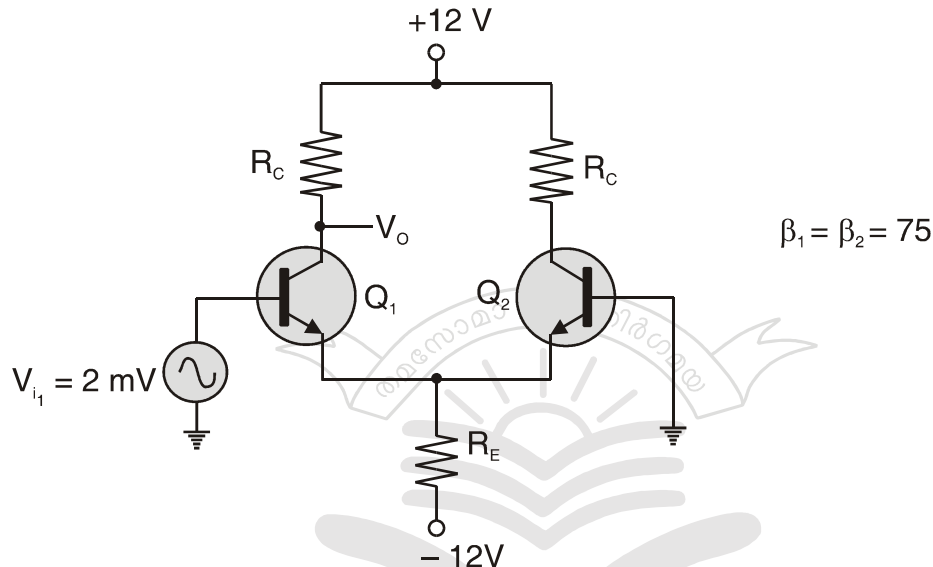
**P.T.O.**



## SECTION – B

Answer **any 3**, **each** one carries **6** marks.

7.



In the circuit shown, if  $r_i = 20 \text{ k}\Omega$ ,  $R_C = 72 \text{ k}\Omega$  and  $R_E = 48 \text{ k}\Omega$ , calculate

- Single-ended output voltage
  - Common mode gain.
- Build a J-K flipflop by using an S-R flipflop.
  - Categorize different flag registers.
  - Design a synchronous 3-bit Up-down counter using J-K FFs.
  - Make use of op-amp 1458/353 to design a triangular wave generator. **(3×6=18)**

## SECTION – C

Answer **any 3**, **each** one carries **9** marks.

- Organize and explain the different functional units of the 8085 microprocessor.
- Compare and contrast R-2R ladder type DAC and weighted resistor type DAC.
- List and appraise different types of shift registers.
- Justify how the inverting, noninverting and differential configurations of OPAMP are useful in applications like summing, scaling and averaging amplifiers.
- Distinguish and explain first-order low-pass and high-pass Butterworth filters.

**(3×9=27)**