

**K-418**

Total Pages : 4

Roll No. ....

**MSCPH-509**

**ELECTRONICS**

M.Sc. Physics (MSCPH)

2nd Semester Examination, 2023 (Dec.)

**Time : 2 Hours]**

**Max. Marks : 70**

**Note :** This paper is of Seventy (70) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

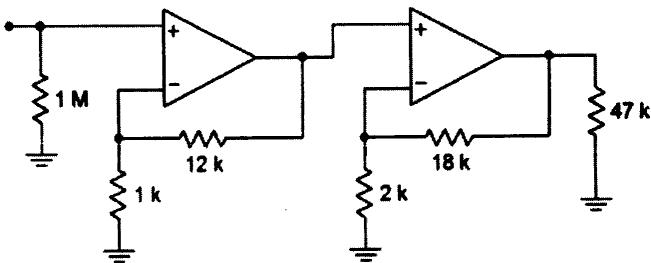
**SECTION–A**

**(Long Answer Type Questions)**

**Note :** Section 'A' contains Five (05) long answer type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

(2×19=38)

1. What are the properties of an ideal operational amplifier used in measurement and instrumentation system? Explain with the help of circuit diagram how it is used for :
  - (a) Adder.
  - (b) Subtractor.
  - (c) Integrator.
  - (d) Differentiator.
  
2. Draw a neat diagram of a full wave bridge type rectifier circuit. Explain its working in detail clearly making the direction of flow of currents of positive and negative cycles.
  
3. Explain why a transistor action can not be achieved by connecting two back to back diodes. In a transistor explain why emitter region is heavily doped, base width is small and collector area is large.
  
4. What are the significant differences between construction of an enhancement type MOSFET and depletion type MOSFET. Explain with suitable diagram.
  
5. What is the voltage gain for the first stage of following circuit? What is the input impedance?



## SECTION-B

### (Short Answer Type Questions)

**Note :** Section 'B' contains Eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only. (4×8=32)

1. A silicon diode has a reverse saturation current of 10 nA and a forward voltage drop of 0.7 V at room temperature. Calculate the diode current when it is forward-biased with a voltage of 0.8 V at room temperature, assuming an ideality factor is 1.
2. Draw the voltage-characteristics (V-/) for a solar cell and photo-diode.
3. What are the advantages of FET over bipolar junction transistor?
4. Differentiate between common emitter, common base and common collector circuits.
5. Discuss about the charge-coupled device (CCD)?
6. What is the general purpose of Op-Amplifier? What is the packaging and pinouts of Op-Amp? What are the op amp analysis idealizations?

7. Differentiate between active and passive components in the context of integrated circuits.
  8. Explain the classification of integrated circuits based on their scale of integration.
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