

D 13160

(Pages : 3)

Name.....

Reg. No.....

**FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, NOVEMBER 2021**

(CBCSS)

Physics

PHY 1C 04—ELECTRONICS

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. In cases where choices are provided, students can attend **all** questions in each section.
2. The minimum number of questions to be attended from the Section / Part shall remain the same.
3. The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.
4. There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.

Section A

8 Short questions answerable within 7½ minutes.
Answer **all** questions, each carry weightage 1.

1. How is digital switching done using MOSFET?
2. Give the basic principle of the working of Light dependent resistor (LDR). Mention its application.
3. Define the term CMRR and explain what will be the condition for CMMR to infinite.
4. Differentiate between wide band reject filter and narrow band reject filter.
5. What are ripple counters? Give its advantages.
6. Give the principle of working of an IR emitter. Mention two uses.
7. What are the functions of an accumulator?
8. Give two characteristics of a non-inverting amplifier.

(8 × 1 = 8 weightage)

Turn over

Section B

4 essay questions answerable within 30 minutes.

*Answer any **two** questions, each carry weightage 5.*

9. Explain the working of MOSFET under depletion mode. Also explain the working of enhancement type MOSFET.
10. Explain the construction and operation of semiconductor lasers.
11. What are Butterworth filters? Explain the design and working of a first order low-pass and high-pass filters using op-amp.
12. Explain the internal architecture of 8085 microprocessor.

(2 × 5 = 10 weightage)

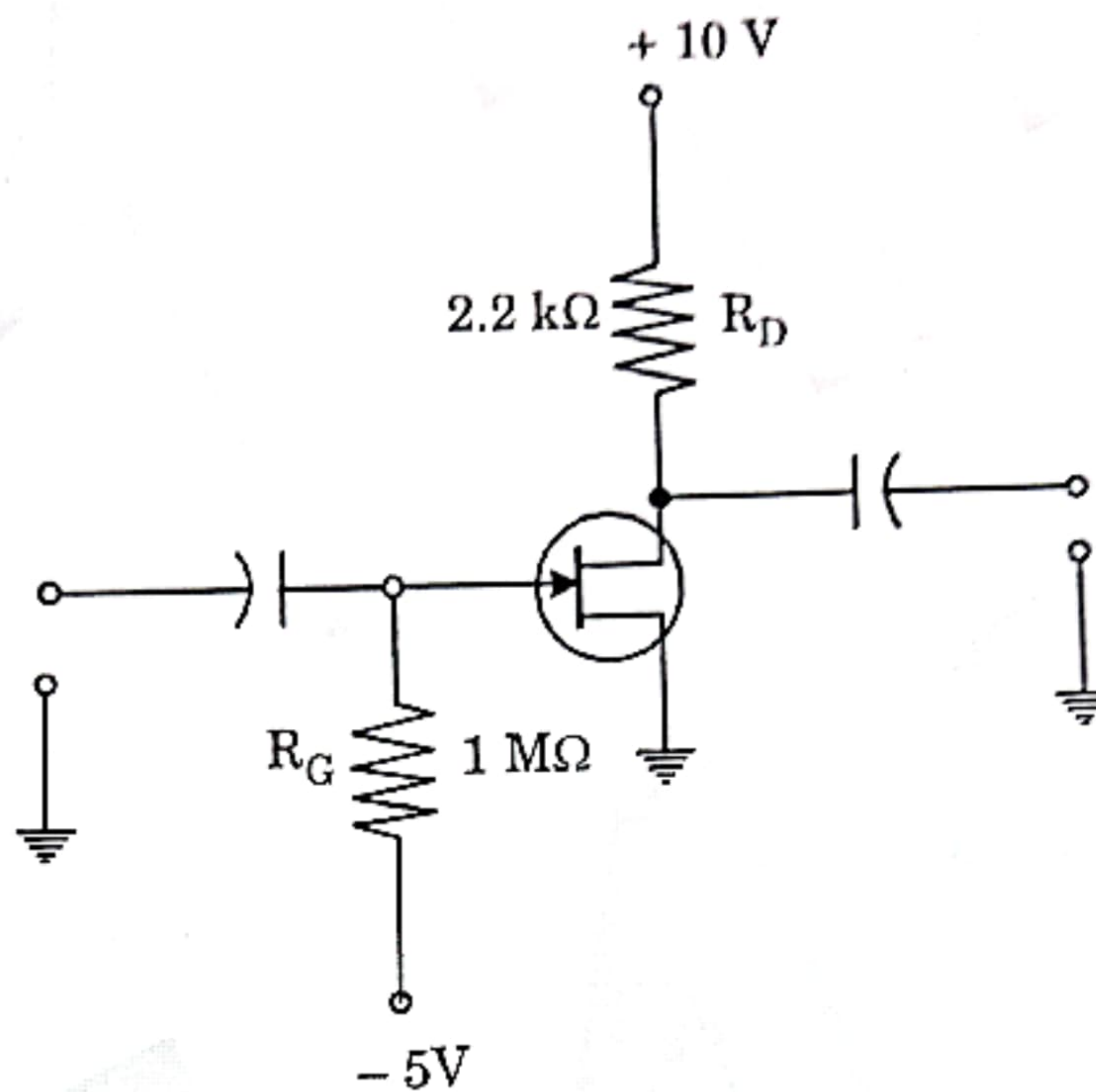
Section C

7 problems answerable within 15 minutes.

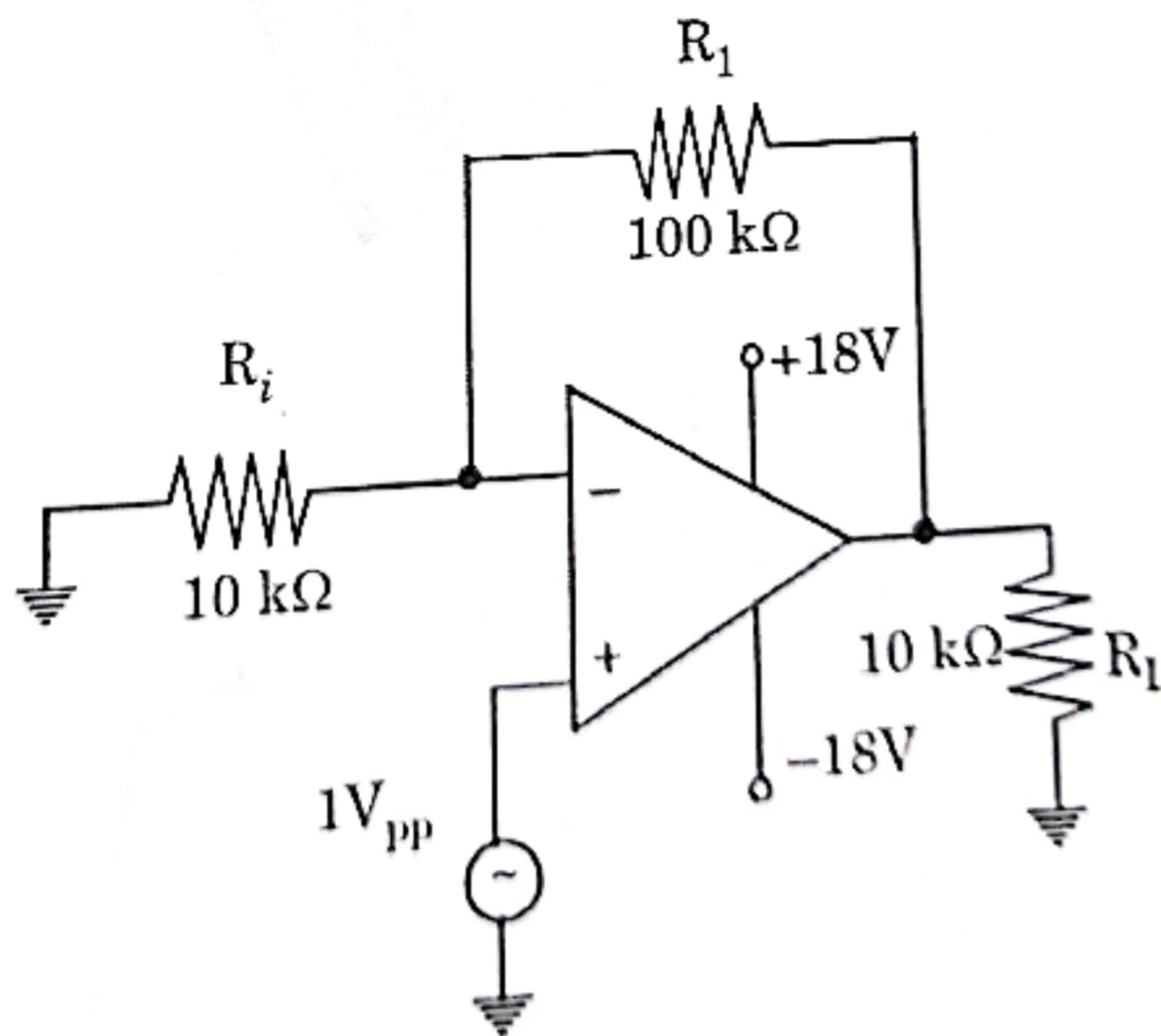
*Answer any **four** questions, each carry weightage 3.*

13. For a light emitting diode made of GaAsP, the energy gap is 1.90 eV. What is the wavelength of radiations emitted? Are these radiations visible radiations? Take $h = 6.6 \times 10^{-34}$ Js.
14. Explain narrow band-pass filter. Design a narrow band-pass filter so that $f_c = 1$ kHz, $Q = 3$, $A_F = 10$.
15. A power amplifier has a power gain of 40 db. If an input power of 3 mW is applied, then calculate the output power.
16. Design a second order low-pass filter for a cut-off frequency 1 kHz ($C = 0.01 \mu\text{F}$).

17. JFET in given Figure has values of $V_{GS(off)} = -8V$ and $I_{DSS} = 16\text{ mA}$. Determine the values of V_{GS} , I_D and V_{DS} for the circuit :



18. For the noninverting amplifier circuit shown in Figure, find (i) Closed loop voltage gain ; and (ii) Maximum operating frequency. The slew rate is $0.5\text{ V}/\mu\text{s}$.



19. Describe master slave JK flip-flop.

(4 × 3 = 12 weightage)