

N.B

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat diagrams **WHEREVER** necessary.
- 4) Use of scientific calculator is **ALLOWED**.

Q.1 Answer any **TWO** of the following: (12)

- a) Explain the working of Wein bridge oscillator with necessary diagram. Also state its equation for frequency.
- b) Explain the working of OP-AMP as differentiator with neat diagram. Also draw output waveform for it when the input applied is square wave.
- c) With necessary diagram explain OP-AMP as non-inverting amplifier.

Q.2 Answer any **TWO** of the following: (12)

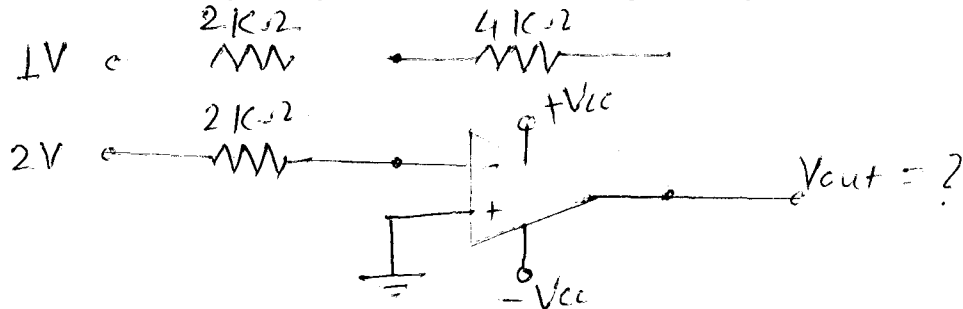
- a) Explain the working of SMPS with the help of block diagram. Also define duty cycle.
- b) With neat diagram explain the working of Colpitt's oscillator. Also state equation for its output frequency.
- c) Explain the working of OP-AMP as subtractor. Derive equation for its output voltage.

Q.3 Answer any **TWO** of the following: (12)

- a) i) Draw block diagram of OFF-Line UPS and explain it.
ii) State importance of UPS.
- b) Draw and explain double ended input double ended output differential amplifier with constant current source.
- c) Explain the working of OP-AMP as a non-inverting amplifier.

Q.4 Answer any **THREE** of the following: (12)

- a) Identify the following configuration and find the output voltage:



- b) With necessary diagram explain OP-AMP as comparator.
- c) Explain the working of regulated power supply.
- d) Define the following terms of a regulated power supply: i) Load regulation
ii) Line regulation

Q.5 Answer any **FOUR** of the following: (12)

- a) Define feedback. Explain types of feedback.
- b) Draw well labelled block diagram of OP-AMP.
- c) State any three applications of SMPS
- d) In a transistor Colpitt's oscillator, if $C_1 = 0.001 \mu\text{F}$, $C_2 = 0.01 \mu\text{F}$, and $L = 15 \mu\text{H}$. Find frequency of oscillations.
- e) State and explain any three parameters of differential amplifier.
- f) Explain the concept of virtual ground.