

BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
F.Y.B.Sc.(Computer Science) Sem-II : WINTER :- 2021
SUBJECT: PRINCIPLES OF ANALOG ELECTRONICS-II

Day : Thursday
 Date 27-01-2022

W-20082-2021

Time : 02:00 PM-05:00 PM
 Max. Marks: 60

N. B. :

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

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

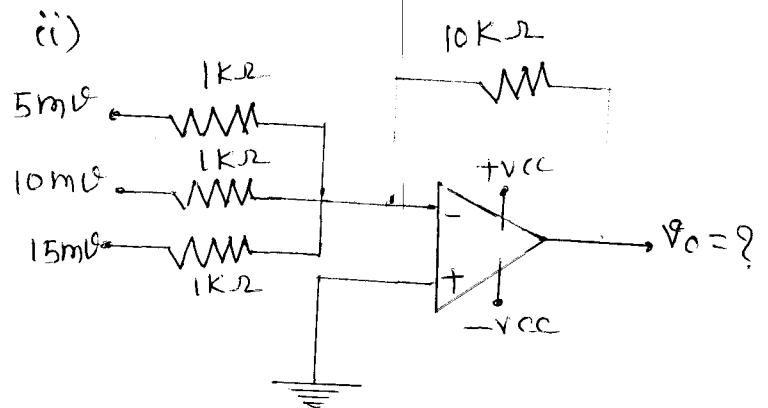
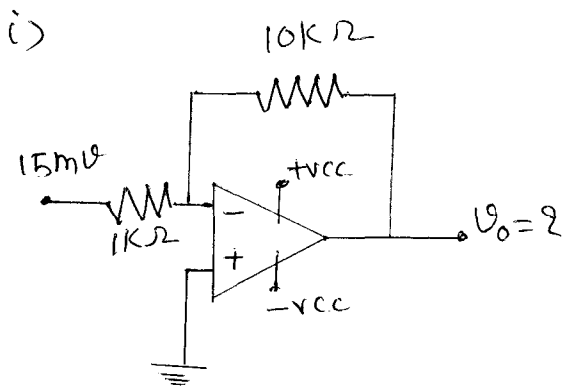
- a) Draw well-labelled diagram for OP-AMP as subtractor and derive equation for its output voltage.
- b) With neat diagram explain the working of Colpitt's Oscillator. Also state the equation for its output frequency.
- c) Draw block diagram of SMPS and explain its working in detail.

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

- a) Explain the working of OP-AMP as an integrator with necessary diagram. Draw output waveform for it if the input applied is square wave.
- b) Draw diagram for double ended input double ended output differential amplifier and also explain it.
- c) Draw and explain the block diagram of On-Line UPS.

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

- a) Identify the following circuit configuration and determine the output voltage.



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- b) Explain the action of phase shift oscillator with neat diagram. Also state its equation for output frequency.
- c) Draw and explain block diagram of regulated power supply.

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

- a) Explain the Barkhausen criterion for sustained Oscillations.
- b) State and explain four characteristics of OP-AMP.
- c) A Hartley oscillation has $L_1 = 0.2 \mu H$ and $L_2 = 1 \mu H$. What is the feedback fraction and frequency of oscillations if $C = 1000 \text{ pF}$. Also calculate the minimum voltage gain necessary to start oscillations?
- d)
 - i) Define the terms related to UPS : transition time and Back up time.
 - ii) State any two applications of SMPS.

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

- a) What is feedback? State and explain its types.
- b) Draw diagram for non-inverting amplifier circuit. State its equation for gain.
- c) Define the following for differential amplifier:
 - i) Differential input
 - ii) Common mode input
 - iii) Input impedance
- d) State any three applications of oscillator circuits.
- e) Draw well-labeled block diagram for OP-AMP.
- f) A crystal oscillator has the following values in its equivalent circuit:
 $L = 3H$, $C_s = 0.1 \text{ pF}$, $C_m = 10 \text{ pF}$ and $R = 1 \text{ K}\Omega$.
Calculate its parallel resonant frequency.

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