

**F.Y. B. SC. (Computer Science) SEM –II (CBCS - 2016 COURSE) :**  
**WINTER - 2018**

**SUBJECT: PRINCIPLES OF ANALOG ELECTRONICS – II**

Day: Wednesday  
Date: 17/10/2018

Time: 03.00 PM TO 06.00 PM  
Max. Marks: 60

**W-2018-0907**

**N.B:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw diagrams **WHEREVER** necessary
- 4) Use of **CALCULATOR** and log table is allowed

**Q.1 A) Select the correct option and rewrite the complete sentence. (06)**

- a) In differential mode \_\_\_\_\_ .
  - i) opposite polarity signals are applied to the inputs.
  - ii) the gain is one
  - iii) the outputs are of different amplitudes
  - iv) only one supply voltage is used.
- b) For an OP-AMP with negative feedback the output is \_\_\_\_\_ .
  - i) equal to the input                      ii) increased
  - iii) fed back to the inverting input
  - iv) fed back to the non – inverting input
- c) OP-AMP integrator uses \_\_\_\_\_ .
  - i) capacitor as feedback element      ii) resistor as feedback element
  - iii) in inductor as feedback element    iv) a simple wire as feedback element
- d) A crystal oscillator uses \_\_\_\_\_ .
  - i) Silicon crystal                      ii) Germanium crystal
  - iii) Crystal diode                      iv) Piezo - electric
- e) If  $T_{ON}$  and  $T_{OFF}$  are equal then duty cycle is \_\_\_\_\_ .
  - i) 100%                      ii) 30%                      iii) 50%                      iv) 80%
- f) UPS stands for \_\_\_\_\_ .
  - i) uninterrupted power supply                      ii) unified power supply
  - iii) user power supply                      iv) uninterrupted process system

**B) Answer all the questions in ONE sentence. (06)**

- a) Define ripple for power supply.
- b) State any two applications of UPS.
- c) What is regenerative feedback?
- d) State advantages of SMPS.
- e) Give the formula for the frequency of oscillations for Hartley oscillator.
- f) Define the term slew rate for OP-AMP.

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

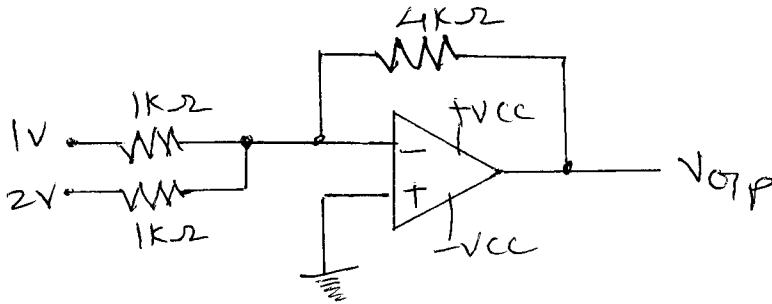
- a) With neat diagram, derive the expression for the gain of OP-AMP as inverting mode amplifier.

**P.T.O**

- b) State and explain the Barkhausen criteria for sustained oscillations.
- c) Draw diagram for double-ended-input-double-ended-output differential amplifier with constant current source.
- d) Define the following parameters of OP-AMP
  - i) Input offset current
  - ii) Input impedance
  - iii) Input – offset voltage
  - iv) CMRR

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

- a) Find the output of the following circuit:



- b) Explain any three parameters for differential amplifiers.
- c) Define the following parameters for power supply :
  - i) Load regulation
  - ii) Line regulation
- d) What is the concept of virtual ground in an OP-AMP.
- e) Draw block diagram for off-line UPS.

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

- a) Explain on-line Ups with necessary diagram.
- b) Draw and explain the Colpitt's oscillator with necessary diagram.
- c) With neat diagram explain the working of OP-AMP as differentiator. Also draw the output waveform if the input is square wave.

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

- a) Draw block diagram of SMPS. Explain the functions of each block.
- b) For OP – AMP If  $V_1 = 1V$ ,  $V_2 = 3V$ ,  $V_3 = 2V$  connected to the inverting input with  $R_1 = R_2 = R_3 = 2K \Omega$  and  $R_F = 3K \Omega$  Determine the output voltage.
  - ii) Sketch the diagram for the above configuration.
- c) With neat diagram explain the working of phase-shift oscillator.