

**F.Y. B. SC. (COMPUTER SCIENCE) SEM -II (CBCS -2016  
COURSE) : SUMMER - 2018  
SUBJECT : PRINCIPLES OF ANALOG ELECTRONICS – II**

Day : Friday  
Date : 20/04/2018

**S-2018-0805**

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

**N.B.:**

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

**Q.1 A)** Select the correct option and rewrite the complete sentence: **[06]**

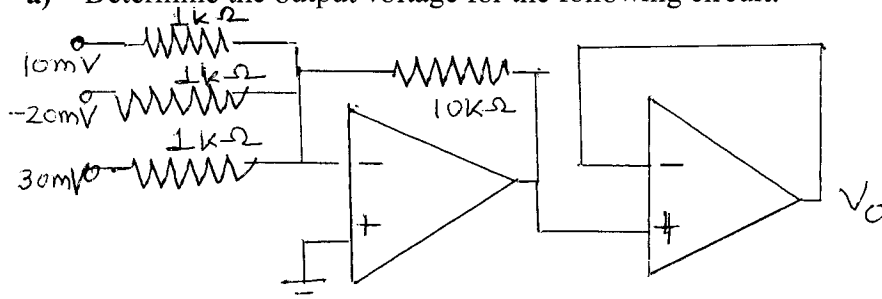
- a) A Hartley oscillator has  $L_1 = 0.2 \mu\text{H}$  and  $L_2 = 1 \mu\text{H}$ , then feedback fraction is \_\_\_\_\_.  
 i) 0.1      ii) 0.3      iii) 0.2      iv) 1
- b) Non-inverting amplifier uses \_\_\_\_\_ type of feedback.  
 i) Positive      ii) Negative      iii) Positive and Negative      iv) None of these
- c) Ideal OP-AMP has \_\_\_\_\_ CMRR.  
 i)  $\infty$       ii) 0      iii) 1      iv) None of these
- d) Wein bridge oscillator is \_\_\_\_\_ type of oscillator.  
 i) LC      ii) RC      iii) R-L-C      iv) LR
- e) Concept of virtual ground is used in \_\_\_\_\_.  
 i) Transistor      ii) Power supply      iii) OP-AMP      iv) None of these
- f) UPS stands for \_\_\_\_\_.  
 i) Usable Power Supply      ii) Uninterrupted Power Supply      iii) Unity Power Supply      iv) Unity Power Service

**B)** Answer all the questions in one sentence: **[06]**

- a) State any two applications of oscillators.
- b) State the Barkhausen criteria for sustained oscillations.
- c) If the input to OP-AMP as integrator is square, what will be the output waveform?
- d) Which type of power supply is used in computers?
- e) Draw a circuit diagram of unity gain amplifier using OP-AMP.
- f) Draw a circuit diagram of non-inverting amplifier using OP-AMP.

**Q.2** Answer **ANY THREE** of the following: **[12]**

- a) Determine the output voltage for the following circuit.



- b) Define the following parameters of differential amplifier  
 i) Differential gain      ii) Common mode gain  
 iii) Input bias current      iv) Tail current
- c) Draw circuit diagram for phase shift oscillator. State its frequency of oscillation.
- d) With necessary diagram explain the working of OP-AMP as a comparator.

**P.T.O.**

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

- a) Draw circuit diagram of an inverting amplifier and also calculate the gain if the value of input resistor is  $10\text{k}\Omega$  and that of feedback resistor is  $100\text{k}\Omega$ .
- b) Explain the following parameters of OP-AMP.
  - i) Input offset voltage
  - ii) Input offset current
  - iii) SVRR
- c) Draw well labeled diagram for double ended input single ended output differential amplifier.
- 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 and feedback fraction.
- e) Define following for power supply.
  - i) Load regulation
  - ii) Line regulation
  - iii) Transient response

**Q.4** Answer any **TWO** of the following:

- a) Draw and explain the block diagram of online UPS. **(12)**
- b) i) Draw well labelled diagram for OP-AMP as a subtractor.  
ii) A crystal oscillator has the following values in its equivalent circuit  $L = 3\text{H}$ ,  $C_s = 0.1\text{pF}$ ,  $C_m = 10\text{pF}$  and  $R = 1\text{k}\Omega$ . Calculate its parallel resonant frequency.
- c) Draw well labeled block diagram of double ended input double ended output differential amplifier. Explain it.

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

- a) With neat block diagram explain the working of regulated power supply.
- b) Explain the action of Hartley oscillator with necessary diagram.
- c) Draw and explain the working of SMPS with necessary block diagram.

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