



PB-003-1153003 Seat No. _____

M. Sc. (Electronics) (Sem. III) (CBCS) Examination

May / June - 2018

Paper - 11 : Op-Amp & Its Applications

Faculty Code : 003

Subject Code : 1153003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- 1** Answer the following questions in brief : (Any **Seven**) **14**
- (1) Explain input bias and input offset currents.
 - (2) Draw and explain equivalent circuit of an operational amplifier.
 - (3) Define oscillator and multivibrator.
 - (4) Design a narrow-band bandpass filter with $F_C = 1$ kHz, $Q = 5$ and $A_F = 10$
 - (5) Draw the block diagram of a typical operational amplifier and explain working of each in not more than 3 lines.
 - (6) Mention advantages and disadvantages of active filters.
 - (7) For an inverting amplifier designed using IC 741, with $R_1 = 1k\Omega$ and $R_F = 4.7k\Omega$; calculate values of A_F , $R_i F$, $R_o F$, f_F and $V_{oo} T$. ($AOL=200000$,
 $R_i = 2M\Omega, R_o = 75\Omega, f_o = 5Hz$)
 - (8) Explain working of an op-amp integrator in brief.
 - (9) Draw the circuit diagram of a closed loop differential amplifier. Also derive expression for its voltage gain.
 - (10) Enlist characteristics of an ideal operational amplifier.
- 2** Attempt any **two** of the following questions : **14**
(Each 7 Marks)
- (1) With appropriate circuit diagram explain any one application of instrumentation amplifier.
 - (2) With necessary diagrams explain working of summing, scaling and averaging amplifier in inverting mode.
 - (3) Write a detailed note on various open-loop configurations of an op-amp.

- 3** Answer the following questions :
- (1) Write a detailed note on RC-phase shift oscillator. **5**
 - (2) Explain use of instrumentation amplifier in temperature indicator and controller. **5**
 - (3) Explain AC amplifier with single power supply with help of necessary diagrams. **4**

OR

- 3** Answer the following questions :
- (1) Write a short note on floating load type voltage to current converter. **5**
 - (2) Write a detailed note on Schmitt Trigger. **5**
 - (3) Explain working principle of an oscillator. Also explain frequency stability. **4**

- 4** Answer the following questions :
- (1) What is slew rate? What are the causes? Explain effect of slew rate in real applications of op-amp. **5**
 - (2) Explain working of a square wave generator using op-amp. **5**
 - (3) Write a short note on peaking amplifier using op-amp. **4**

- 5** Answer any **two** of the following questions : **14**
(Each 7 Marks)
- (1) Write a detailed note on variation in offset voltage due to change in power supply and temperature.
 - (2) For voltage series feedback derive expressions for closed-loop voltage gain, input resistance, output resistance, bandwidth and total output offset voltage.
 - (3) Draw high frequency op-amp equivalent circuit and with help of necessary expressions, explain how open-loop gain varies with frequency.
 - (4) What is a filter? Explain design and working of first and second order low-pass filter. Design first and second order low-pass filter with $F_C = 1000$ Hz.