AB-3184
Third Year B.Sc. (Electronics) (Sem. V) Examination
March/April – 2015
Electronics : Paper - VI
(Theory of Operational amplifier)

Time : 2 Hours] [Total Marks : 50

Instruction :
(1)

Fill up strictly the details of signs on your answer book.
Name of the Examination :
THIRD YEAR B.SC. (ELECTRONICS) (SEM. V)
Name of the Subject :
ELECTRONICS : PAPER - VI
Subject Code No. : 3 1 8 4 
Section No. (1, 2,.....): Nil

(2) Figures on the right indicate full marks.
(3) All symbols and abbreviations have their usual meaning.
(4) Non-programmable calculators are allowed.
(5) Q.1 is compulsory.
(6) Assume data if necessary.

1  Answer in brief:
   (1) What are the different blocks of a feedback amp?
   (2) Define CMRR
   (3) What are the disadvantages of open loop op-amp configuration?
   (4) Draw the pin configuration of IC 741C
   (5) Enlist the characteristics of an ideal op-amp?
   (6) Why operational amplifier is called so?
   (7) What is voltage follower?

2  (a) Derive the expression for voltage gain and input resistance of inverting amplifier with feedback.
   (b) The 741C is configured as an inverting amplifier with \( R_i = 1k\Omega \), \( R_F = 10k\Omega \). Compute the closed loop voltage gain and input resistance.

OR

AB-3184] 1
[Contd...
2. (a) Find out the operating point of a dual input unbalanced output differential amplifier.
   (b) Design a zener constant current bias circuit according to the following specifications:
       Emitter current $I_{E3} = 4\,mA$. Zener diode with $V_z = 3.9\,V$ and $I_{z1} = 45\,mA$. Transistor with $\beta_{ac} = \beta_{dc} = 100$ and $V_{BE} = 0.7\,V$ and supply voltage $= \pm 9\,V$.

3. (a) Explain peaking amplifier with a neat diagram and frequency response.
   (b) For a peaking amplifier, $R_1 = 1k\Omega$, $L = 100\mu\text{H}$ with $3\,\Omega$ internal resistance, $C = 0.01\mu\text{F}$, $R_F = 6.8k\Omega$ and $R_L = 10k\Omega$. Find out the peak frequency.

   OR
   (a) Explain summing and averaging amplifiers using op-amps (non-inverting configuration).
   (b) The 741C op-amp is connected as a voltage follower.
       Compute the values of $A_F$, $R_{iF}$, $R_{oF}$ and $f_F$ for it.

4. (a) Analyze a differential amplifier with one op-amp. Explain its disadvantages.
   (b) In a differential amplifier with one op-amp, $R_1 = R_2 = 1k\Omega$, $R_F = R_3 = 10k\Omega$. and the op-amp is 741C. What are the gain and input resistance of the amplifier?

   OR
   (a) Explain how instrumentation amplifier is used as light intensity meter.
   (b) Discuss a basic integrator circuit and its drawbacks.