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)

(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: **14**

    (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   **8**
        resistance of inverting amplifier with feedback.

    (b)   The 741C is configured as an inverting amplifier   **4**
        with $R_1 = 1k\Omega$, $R_F = 10k\Omega$ .Compute the closed loop
        voltage gain and input resistance.

<div align="center">OR</div>

2   (a)   Find out the operating point of a dual input   **6**
unbalanced output differential amplifier.

      (b)   Design a zener constant current bias circuit according   **6**
to the following specifications:

           Emitter current I_{E3} = 4mA. Zener diode with V_Z = 3.9V

           and I_{zt} = 45mA. Transistor with $\beta_{ac} = \beta_{dc} = 100$ and

           V_{BE} = 0.7V and supply voltage = ±9V.

3   (a)   Explain peaking amplifier with a neat diagram and   **7**
frequency response.

      (b)   For a peaking amplifier, R_1 = 1kΩ, L= 100μH with 3 Ω   **5**

           internal resistance, C = 0.01μF, R_F = 6.8kΩ and

           R_L = 10kΩ. Find out the peak frequency.

OR

      (a)   Explain summing and averaging amplifiers using   **6**
op-amps (non-inverting configuration).

      (b)   The 741C op-amp is connected as a voltage follower.   **6**

           Compute the values of A_F, R_{iF}, R_{oF} and f_F for it.

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4   (a)   Analyze a differential amplifier with one op-amp.   **8**
Explain its disadvantages.

      (b)   In a differential amplifier with one op-amp,   **4**

           R_1 = R_2 = 1kΩ, R_F = R_3 = 10kΩ. 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   **7**
light intensity meter.

      (b)   Discuss a basic integrator circuit and its drawbacks.   **5**