

3<sup>rd</sup> SEMESTER

B.Tech

END TERM EXAMINATION

Nov/Dec-2022

EC251 BASIC ELECTRONICS AND INSTRUMENTATION

Time: 03:00 Hours

Max. Marks: 40

Note: All questions carry equal marks.  
Assume suitable missing data, if any.

Q.1 Determine the output voltage  $V_0$  of the inverting amplifier shown in Fig. 1 for  $v_i = 1V$ ,  $R_1 = 2k\Omega$ ,  $R_2 = 10k\Omega$ ,  $R_3 = 20k\Omega$ , and  $R_4 = 40k\Omega$ .

[M=4][CO3]

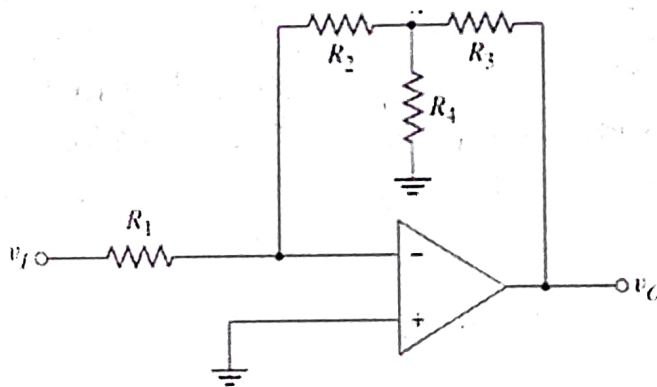


Fig.1

Q.2 An amplifier with gain  $A=80\text{dB}$  is connected to a negative feedback network. The feedback factor is 0.04. Due to replacement of active device the internal gain of the amplifier is change by 40%. What would be the percentage change in the gain of feedback amplifier. [M=3][CO2]

Q.3 Draw and explain the characteristics of junction field effect transistor. [M=2][CO1]

Q.4 (a) Draw a diagram to illustrate the operation and working of a capacitive pressure transducer. [M=3][CO5]

(b) Explain piezoelectric effect and discuss how it is applied in a transducer. [M=3][CO5]

Q.5 Drive the output voltage equation of differentiator circuit using OPAMP with the help of suitable circuit diagram. [M=4][CO3]

Q.6 Simplify the following Boolean Expression using K-map in (a) sum of product form (SOP) and (b) product of sum (POS) form. Also implement using logic gates for SOP.

$Y(A,B,C,D) = \sum m(1, 4, 6, 9, 10, 11, 14, 15)$  [M=5][CO4]

Q.7 (a) Design Ex-OR gate using NAND and NOR. [M=3][CO4]

(b) Convert the following [M=3][CO4]

$$(746.421)_8 = ( )_2 = ( )_{10} = ( )_{16}$$

Q.8 The Zener diode regulator circuit shown in Fig. 2 has an input voltage that varies between 10 and 14 V, and a load resistance that varies between  $R_L = 20$  and 100. Assume a 5.6 Zener diode is used, and assume  $I_{Z(\min)} = 0.1 I_{Z(\max)}$  [M=5][CO4]

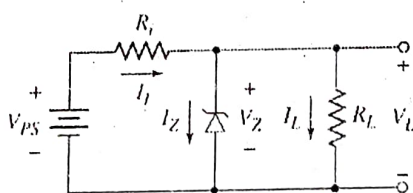


Fig. 2

- Calculate the maximum Zener current
- Find the value of  $R_i$  required
- The minimum power rating of the diode.

Q.9 (a) Draw and Explain the input-output characteristics of common base configuration of NPN transistor with the help of circuit diagram.

[M=3][CO1]

(b) Differentiate between positive and negative feedback. [M=2][CO2]