4th Sem. / EEE/ELECTRICAL/ELECTRICAL(INST & CTRL)/ 2022(S)

Th2 ANALOG ELECTRONICS AND OPAMP

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions.   2 x 10
   a. Define knee voltage of a PN junction diode. Write the values of cut in voltage for Si and Ge diode.
   b. What is the role of intrinsic (I) layer in a PIN diode?
   c. Define ripple factor and mention its values for Half Wave and Full Wave rectifier.
   d. Draw the transistor configurations for CB, CE.
   e. What are the needs for transistor biasing?
   f. Write the advantages of negative feedback in amplifier.
   g. Differentiate between BJT and FET.
   h. Define CMRR and Slew Rate of an OPAMP.
   i. If $V_i = -10V$, then find V_0 .
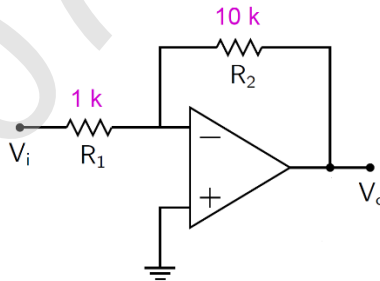
   j. Draw the simplified circuit diagram of a series clipper. Plot its output waveform for an input $v_i(t) = 5 \sin \omega t$

2. Answer **Any Six** Questions   6 x 5
   a. Explain the working of Zener diode as voltage regulator.
   b. Define a filter circuit? Draw the circuit diagram of pi (π) filter and explain its working.
   c. Draw the circuit diagram for voltage divider bias configuration. Determine its operating point and stability factor.
   d. Differentiate between voltage and power amplifier.
   e. Design a subtractor using OPAMP.

f. Find the h parameters of CE configuration and draw the simplified diagram.

g   Find the expressions for voltage gain of inverting and non-inverting OPAMP.

3   With neat circuit diagram explain the working of RC coupled amplifier with its frequency response curve.   10

4   With neat circuit diagram explain the working of Class – B push pull amplifier.   10

5   Define Barkhausen Criterion for oscillation. Draw the circuit diagrams of Colpitts and Hartley oscillator using BJT. Also specify their frequency of oscillation.   10

6   Design an integrator and a differentiator using OPAMP.   10

7   Explain the working of full wave bridge rectifier. Derive the expressions for DC and RMS values of rectifier output. Calculate its rectification efficiency and ripple factor.   10