Time: 01 hour.

Answer __ALL__ Questions

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1. Describe the function of a bipolar junction transistor. Sketch and explain the input and output characteristics curves of a transistor.
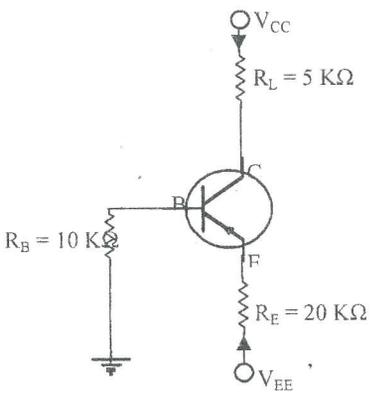
In the above common emitter *npn* transistor circuit, R_B=10 KΩ, R_L=05 KΩ, R_E=20 KΩ, V_{CC}=30 V, V_{EB}= -30V and common-emitter forward transfer ratio β = 200. Neglect the voltage drop between base and emitter terminals and find:

   i. Emitter current
   ii. Base current
   iii. Collector current
   iv. Voltage drop between collector and emitter terminals.

2. Briefly explain the characteristics of an ideal Operational Amplifier.

   Why an open loop configuration of an op-amp is not suitable for linear applications?

   Find the relationship between input and output voltages of the following Operational Amplifiers:

(a) Integrator

(b) Adder

(c) Differentiator

The figure shows an operational amplifier circuit using feedback.
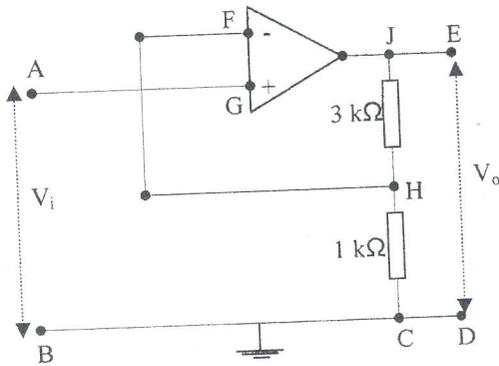
(a) Explain the advantages of using negative feedback in the circuit.

(b) Using the letters on the circuit diagram, write the path of the negative feedback.

(c) Write down the feedback factor β.

(d) Op-amp in the diagram has a gain of 80,000, what will be the output voltage V_o when input voltage V_i is 0.2 V?