

**BACHELOR OF CONSTRUCTION ENGINEERING EXAMINATION, 2017 (OLD)**  
**(2nd Year, 2nd Semester)**  
**BASIC ELECTRONICS**

**Time : Three hours**

**Full Marks: 100**

**Answer any five questions**

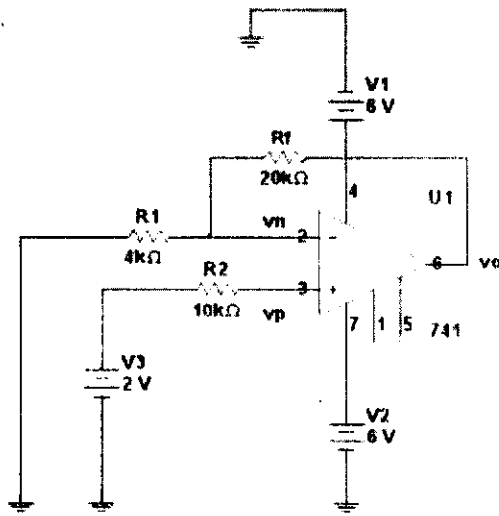
1. a) Why does a pure semiconductor behave like an insulator at absolute zero temperature?  
b) Differentiate between P-type and N-type Semiconductors. Also name the doping materials used for their formation?  
c) Why Silicon is mostly proffered as a Semiconductor material. Explain by giving at least five reasons.  
d) Explain Zener Diode as a Voltage Regulator.  

5+5+5+5=20
  2. a) Draw the circuit of a Half-wave rectifier using capacitor filter and explain its working by drawing input and output waveforms.  
b. A Zener diode with Zener voltage of 30 V is used in a regulator circuit with a series resistance of  $200\Omega$  connected across the Zener diode. Over what range of input voltage will the circuit operate? Maximum and Minimum Zener currents are 25 mA and 0 mA respectively.  

10+10=20
  3. a) Compare Characteristics of Transistors in its Various modes of Operation. Also state which is best Configuration among these.  
b) With a neat circuit diagram, explain the Voltage Divider Bias circuit using approximate analysis.  

10+10=20
  4. a) Why are the h-parameters preferred to analyse a circuit using Bipolar Transistor?  
b) Draw the h-Parameter equivalent circuit of a CB transistor amplifier and derive an expression of (i) its Voltage Gain and (ii) Current Gain.  

5+15=20
  5. a) What is a DC load line? Explain Base biased method with necessary equations. Explain the characteristics of an ideal Op-amp. Mention two applications of Op-Amp.  
b) In the Circuit Given Below, determine the Output Voltage
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$$2+5+4+4+5=20$$

6. a) Design the voltage divider bias circuit to operate from 12 V supply. The bias conditions are  $V_{CE}=3V$ ,  $V_E=5V$ , and  $I_c = 1mA$ .  
 b) Derive the expression of 3 input summing amplifier.  
 c) Explain op-amp as Differentiator and Integrator. Also draw the output Waveforms?

$$5+5+(5+5)=20$$

- 7) Write Short notes on (any four):  
 a. Intrinsic and Extrinsic Semiconductors  
 b. Clipper and Clampers using Diode  
 c. Instrumentation amplifier  
 d. Differential amplifier  
 e. Summing amplifier using operational amplifier

$$4 \times 5=20$$

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