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**B. E. (Third Semester) Examination, April-May 2020**  
**(New Scheme)**

**(IT Engg. Branch)**

**BASIC ELECTRONICS & NETWORK THEORY**

**Time Allowed : Three Hours**

**Maximum Marks : 80**

**Minimum Pass Marks : 28**

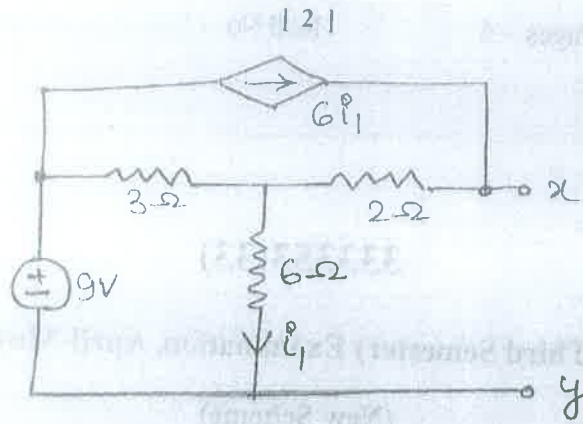
*Note : All questions are compulsory and carry equal marks. Part (a) is compulsory from each question and attempt any two parts from (b), (c) and (d).*

**Unit-I**

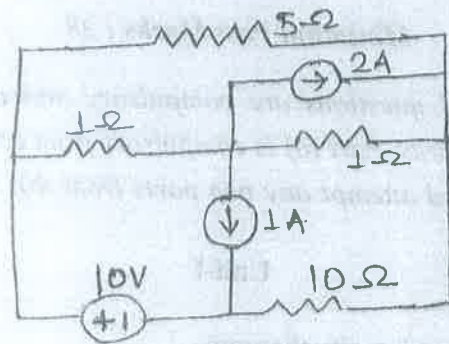
1. (a) State reciprocity theorem. 2
- (b) Find Norton's equivalent circuit to the left of x-y terminal. 7

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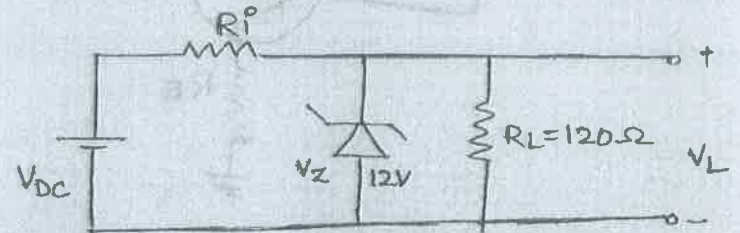
- (c) Why  $h$ -parameters are known as hybrid parameters?  
Also state the application of  $h$  parameter. 7
- (d) For the circuit shown in fig., find the current through  $10\ \Omega$  resistor using superposition theorem. 7



**Unit-II**

2. (a) What is the need of Filter in power supply? 2

- (b) Draw the circuit of full wave rectifier. Explain its operation and derive the expression for the ripple factor. 7
- (c) The zener diode regular circuit, shown in figure, has a fixed voltage drop of 12 V across it as long as  $I_z$  is maintained between 20 mA and 200 mA. Find  $R_i$  so that  $V_L$  remains 12 V while  $V_{DC}$  varies from 15 V to 19.5 V. 7



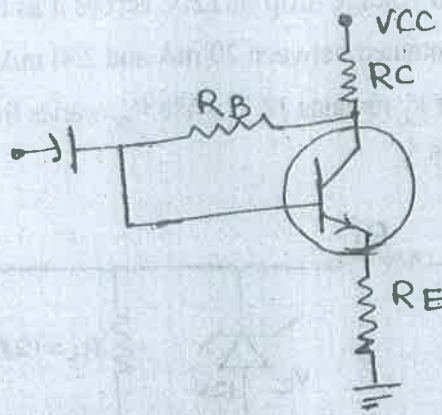
- (d) Derive the expression for transition capacitance. 7

**Unit-III**

3. (a) What is base width Modulation? 2
- (b) Explain the current component of PNP transistor. 7
- (c) Draw the common emitter configuration of transistor also explain its input and output characteristics. 7

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(d) In the circuit shown in fig,  $V_{CC} = 24\text{ V}$ ,  $R_C = 10\text{ k}\Omega$ ,  $R_E = 270\ \Omega$  if silicon transistor is used with  $\beta = 45$  and  $V_{CE} = 5\text{ V}$  find  $R_B$ . Neglect reverse saturation current.



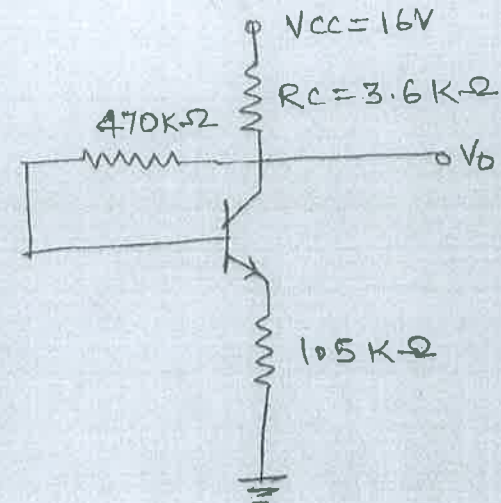
**Unit-IV**

4. (a) Why biasing of transistor is required? 2
- (b) Describe voltage divider in detail. Derive an expression for stability factor (s). 7
- (c) Explain diode compensation technique for  $V_{BE}$  and  $I_{CO}$ . 7
- (d) For the circuit shown in figure; determine  $V_{CE}$  and  $I_C$ . 7

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- (i)  $V_O$ , 7
- (ii) stability factor  $S_{I_{CO}}$  with  $\beta = 120$  7



**Unit-V**

5. (a) Write any two difference between FET and BJT. 2
- (b) Explain the working of  $n$  channel JFET and also explain its characteristics. 7
- (c) Explain the working of  $n$  channel Depletion MOSFET and draw its characteristics. 7

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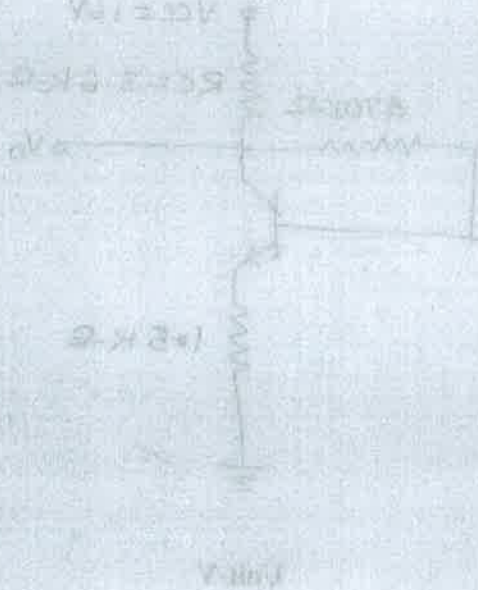
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(d) Explain transconductance  $g_m$ , and show that

$$g_m = g_{m0} \left( 1 - \frac{V_{GS}}{V_P} \right)$$

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2. (a) Write the two difference between FET and BJT.  
 (b) Explain the working of a common JFET and give its characteristics.  
 (c) Explain the working of a channel JFET and give its characteristics.