

**R16**

Code No: 132AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, August/September - 2017

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

(25 Marks)

- 1.a) Define Independent and dependent sources. [2]
- b) What is complex power? Explain. [3]
- c) What is Q-factor? Explain. [2]
- d) State and explain Norton's theorem. [3]
- e) Define Forward and Reverse Resistances of a diode. [2]
- f) What are the advantages of bridge rectifier? [3]
- g) Substantiate the need of biasing a BJT. [2]
- h) Explain how a BJT acts as an current amplifier. [3]
- i) Compare BJT and JFET. [2]
- j) Explain Zener Breakdown mechanism. [3]

**PART-B**

(50 Marks)

- 2.a) Write short notes on Star – Delta transformation. [5+5]
- b) Find the equivalent resistance across the terminals A-B as shown in Figure 1. [5+5]

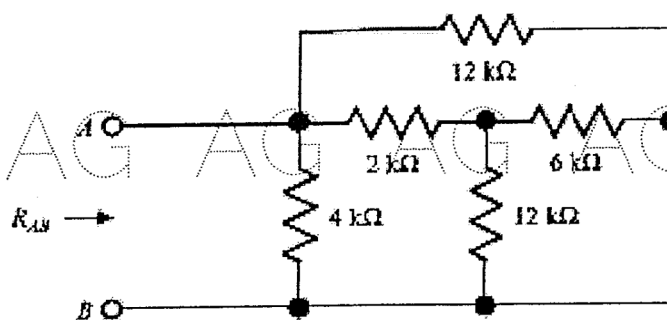


Figure: 1  
-OR-

- 3.a) Illustrate following terms:  
i) Impedance ii) Reactance iii) Phase difference iv) Power factor.
- b) Find the impedance of series R-L-C circuit with  $R=100\Omega$ ,  $X_L=50\Omega$  and  $X_C=20\Omega$ . [6+4]

- 4.a) What is parallel resonance? Explain.  
b) Derive an expression for the resonant frequency for a parallel circuit shown in below Figure 2. [4+6]

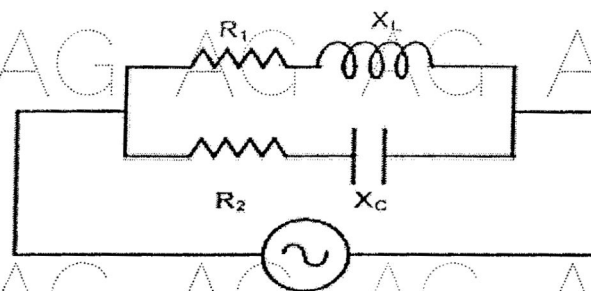


Figure: 2  
OR

- 5.a) State and Explain Tellegen's theorem.  
b) Find the value of  $R_L$  that will absorb the maximum average power for the circuit shown in Figure 3. Calculate that power. [4+6]

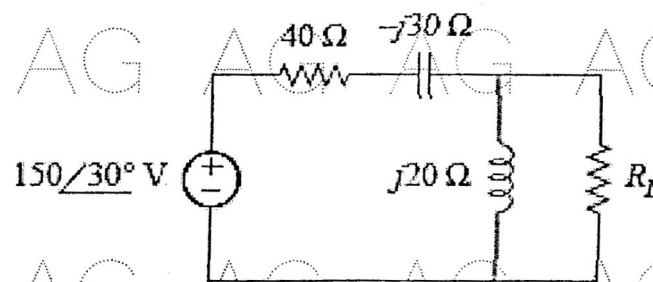


Figure: 3

- 6.a) Draw load line on the V-I characteristics of a PN junction diode and highlight its significance in diode operation.  
b) Differentiate between transition and diffusion capacitances of a diode. [6+4]  
OR  
7.a) Compare the characteristics of L section, capacitor and  $\pi$ -filters.  
b) Derive an expression for the ripple factor of a full-wave rectifier using Induction filter. [3+7]  
8.a) Explain about Fixed Bias Circuit. List its deficiencies.  
b) Derive the expression for the stability "S" of a voltage divider bias Circuit. [5+5]  
OR  
9.a) Determine the h-parameters from the characteristics of BJT in CB configuration.  
b) Compare the performance of a transistor in different configurations. [6+4]  
10.a) Draw JFET small signal model. Establish a relation between  $\mu$ ,  $g_m$  and  $r_d$ .  
b) Explain the significance of pinch-off voltage on JFET operation. [5+5]  
OR  
11.a) Explain the operation of Tunnel diodes with the help of its V-I characteristic curve.  
b) Justify the statement 'A zener diode can be used as a voltage regulator'. [6+4]