

R16

Code No: 132AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, April - 2018

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME, MCT, MMT, AE, MIE, PTM, 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) Distinguish between ideal and practical voltage source? [2]
- b) State Ohm's law and give an example. [3]
- c) What is resonance in electric circuits? [2]
- d) State the Maximum Power Transfer theorem. [3]
- e) Draw the equivalent circuit of an ideal diode and that of a piecewise linear model of it. [2]
- f) Show the current paths in a full wave bridge rectifier for a sinusoidal input during positive and negative half cycles. [3]
- g) Define operating point of a BJT. List the parameters against the variations of which the operating point needs to be stabilized. [2]
- h) Define  $h_{fe}$  and  $h_{oe}$  of a BJT in CE configuration. Mention their units. [3]
- i) What is pinch-off voltage for a JFET? [2]
- j) Draw the symbols of p-channel JFET, NPN-BJT, tunnel diode and varactor diode. [3]

PART-B

(50 Marks)

- 2.a) Making use of star/delta transformation, determine the resistance between terminals A and B as shown in figure 1.

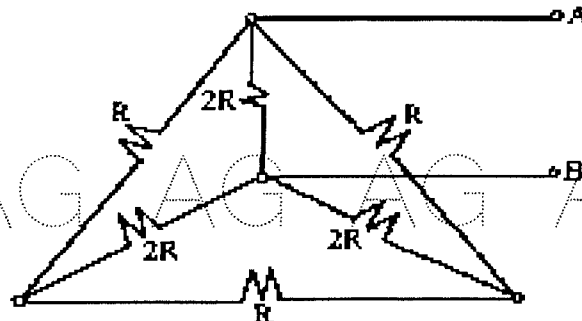


Figure: 1

- b) Derive the expression for the RMS, average values, peak factor and form factor of sinusoidal signal. [5+5]

OR

- 3.a) An inductance of  $0.5\text{H}$ , a resistance of  $5\ \Omega$ , and a capacitance of  $8\ \mu\text{F}$  are in series across a  $220\text{V}$ ,  $50\text{Hz}$  AC supply. Find the voltage across each element and total current supplied by the supply and draw the phasor diagram for the circuit.
- b) In the following circuit shown in figure 2, the effective voltage between points A and B is  $25\ \text{volts}$ . Find the corresponding effective values of  $V$  and  $I_T$ . [5+5]

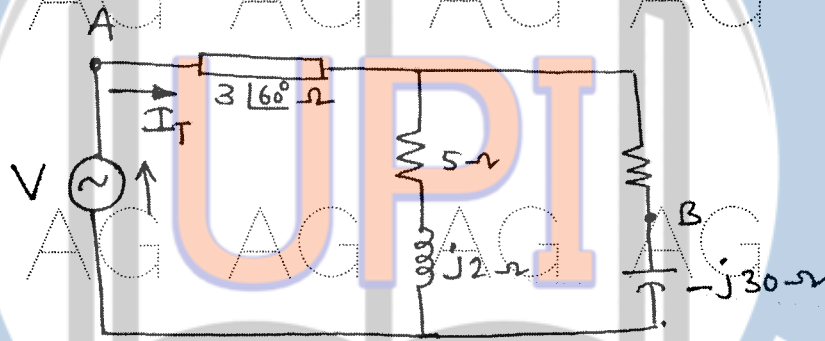


Figure: 2

- 4.a) Explain the procedure to draw the locus diagram of R-L series circuit, when L is varying.
- b) Apply super position theorem to the network shown in figure 3 and obtain current  $(3+j4)\ \Omega$  impedance. [5+5]

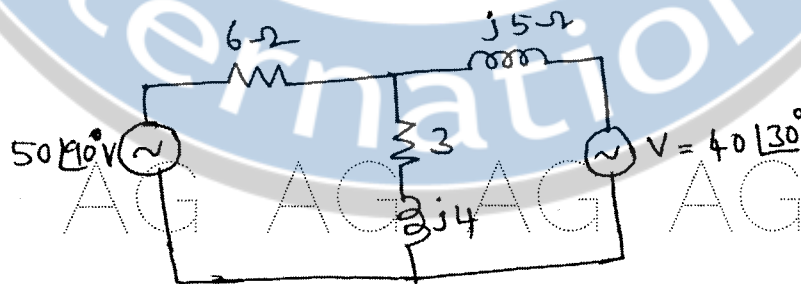


Figure: 3

OR

- 5.a) Derive the expression for resonant frequency, half power frequencies of series RLC circuit.
- b) Find the resonant frequency of the following circuit shown in figure 4. [5+5]

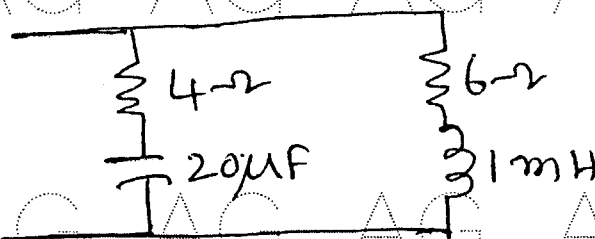


Figure: 4

- 6.a) Differentiate between:
- Static and dynamic resistances of a diode.
  - Transition and diffusion capacitances of a diode.
- b) Define Rectification efficiency of rectifier. Derive expression to show that it is 81% for a Full wave rectifier. [5+5]

OR

- 7.a) Explain how current flows in a diode under forward biased and reverse biased conditions.  
 b) Compare the performance of:  
 i) Centre tapped transformer type and bridge type full wave rectifiers.  
 ii) Capacitor and  $\pi$ -section filters. [5+5]

- 8.a) Derive an expression for the stability factor  $S$  of a BJT with voltage divider bias.  
 b) Draw the h-parameter equivalent circuit of a BJT in CE configuration. [5+5]

OR

- 9.a) For the voltage divider biased BJT shown below in figure 5, determine the operating point. Assume  $\beta$  to be 50 for the transistor.

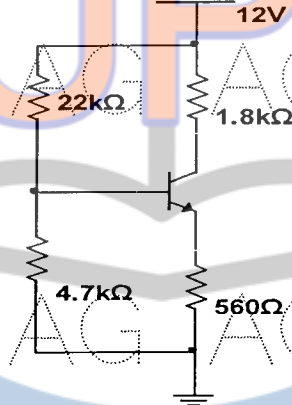


Figure: 5

- b) Compare the characteristics of CE, CB and CC configurations of a BJT. [5+5]
- 10.a) Compare BJT and JFET in all aspects.  
 b) With the help of relevant energy band diagram explain tunnelling phenomenon in a Tunnel diode. [5+5]

OR

- 11.a) Draw the characteristics of an n-channel JFET in Common source configuration. Show pinch-off region on the curves.  
 b) How and under what conditions Zener breakdown take place in a diode? Draw the V-I characteristics of Zener diode and show the breakdown region. [5+5]

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