

Code No: 132AJ

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May - 2019

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) State Kirchoff's laws. [2]
- b) Draw the wave forms for voltage, current of pure inductor when excited by a sinusoidal voltage. [3]
- c) State maximum power transfer theorem. [2]
- d) Derive the expression for resonant frequency of a RLC series circuit. [3]
- e) Draw the V-I characteristic of a PN diode and show the shift with increase in temperature. [2]
- f) What is the purpose of using filters with rectifiers? [3]
- g) Define h_{ie} and h_{re} . [2]
- h) What are the demerits of fixed bias method of a transistor? [3]
- i) Explain principle of operation of SCR. [2]
- j) Compare BJT and FET. [3]

PART-B

(50 Marks)

- 2.a) Differentiate dependent and independent sources.
- b) Find the power in 30Ω resistance using nodal analysis for the circuit shown in figure 1. [5+5]

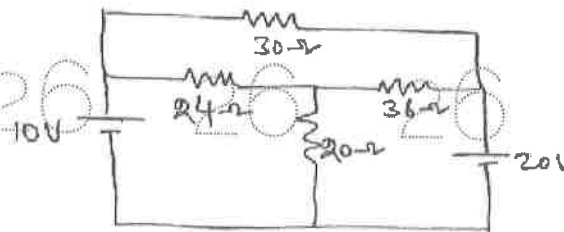


Figure: 1
OR

- 3.a) A wire carries a current, which is a combination of a d.c current of 10A and a sinusoidal current with a peak value of 10A. Determine RMS value of the resultant.
- b) An impedance $z_1 = (6 + j8)\Omega$ is connected in series with a parallel combination of impedances $z_2 = (10 + j6)\Omega$, $z_3 = (8 - j10)\Omega$ and is connected to a 300V, 50Hz supply. Find the total active power, reactive power and power factor of the circuit. [5+5]

- 4.a) A series RLC circuit with $R = 100\Omega$, $L = 0.6H$ and $C = 45\mu F$ is applied a voltage of $100\angle 0^\circ V$ with variable frequency. Calculate resonant frequency, current at resonance, voltage across R, L and C at resonance.
- b) Derive the expression for half power frequencies of a RLC series resonant circuit. [5+5]

- 5.a) For the circuit shown in the figure 2 draw current locus diagram.

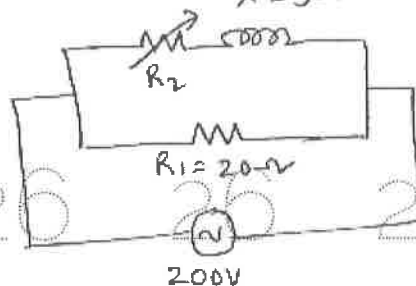


Figure: 2

- b) By using superposition theorem find the current in the 6Ω resistance of the following circuit shown in figure 3. [5+5]

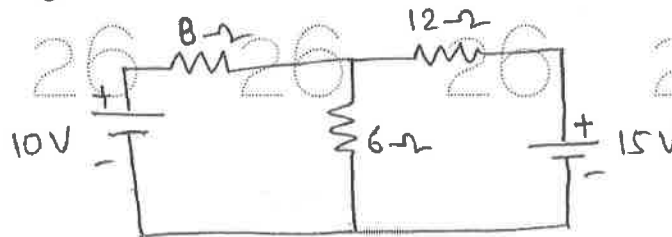


Figure: 3

- 6.a) Define the terms dynamic resistance of a diode and 'Diffusion capacitance of a diode'.
- b) Explain how capacitor filter improves the performance of a full wave rectifier. [5+5]

OR

- 7.a) Compare the characteristics of centre tapped transformer type and bridge type full wave Rectifiers.
- b) Draw the equivalent circuit and V-I characteristic of ideal and piecewise linear model of a PN junction diode. [5+5]
- 8.a) Draw the simplified h-parameter equivalent circuit of BJT in CB configuration and derive expressions for A_v , A_i , Z_i and Z_o .
- b) Explain how bias stabilization and compensation are done using diodes. [5+5]

OR

- 9.a) Explain voltage divider biasing method with relevant circuit diagrams and equations.
- b) Compare CE, CB and CC characteristics of a BJT. [5+5]
- 10.a) Explain the construction and principle of operation of JFET.
- b) Explain how zener diode acts as a voltage regulator. [5+5]

OR

- 11.a) Draw the energy band diagram of tunnel diode and explain tunneling phenomenon. Draw its V-I characteristics.
- b) Explain the working principle of varactor diode. [5+5]

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B.Tech I Year II Semester Examinations, May - 2019

ENGINEERING GRAPHICS
(Common to EEE, ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer all five questions
All questions carry equal marks

- 1.a) Construct a diagonal scale of R.F. = $(1/6250)$ to read up to 1 kilometre and to read meters on it. Show a length of 653 metres on it.
b) Show by means of a drawing that when the diameter of the directing circle is twice that of the generating circle, the hypocycloid is a straight line. Take the diameter of the generating circle equal to 50 mm. [7+8]

OR

- 2.a) An inelastic string, 100 mm long, is wound around a disc of 40 mm diameter. Trace the path of free end of the string, and name the curve.
b) Draw a vernier scale of R.F. = 5 to read $(1/5)$ cm and $(1/25)$ cm, and to measure up to 5 cm. Mark on the scale a distance of 2.12 cm. [8+7]

3. The end A of a line AB is in the H.P. and 25 mm behind the V.P. The end B is in the V.P. and 50 mm above the H.P. The distance between the end projectors is 75 mm. Draw the projections of AB and determine its true length, traces and inclinations with the two planes. [15]

OR

4. An isosceles triangle PQR having the base PQ 50 mm long and altitude 75 mm has its corners P, Q, and R 25 mm, 50 mm and 75 mm respectively above the ground. Draw its projections. [15]

5. Draw three views of a cone, base 50 mm diameter and axis 75 mm long, having one of its generators in the V.P. and inclined at 30° to the H.P., the apex being in the H.P. [15]

OR

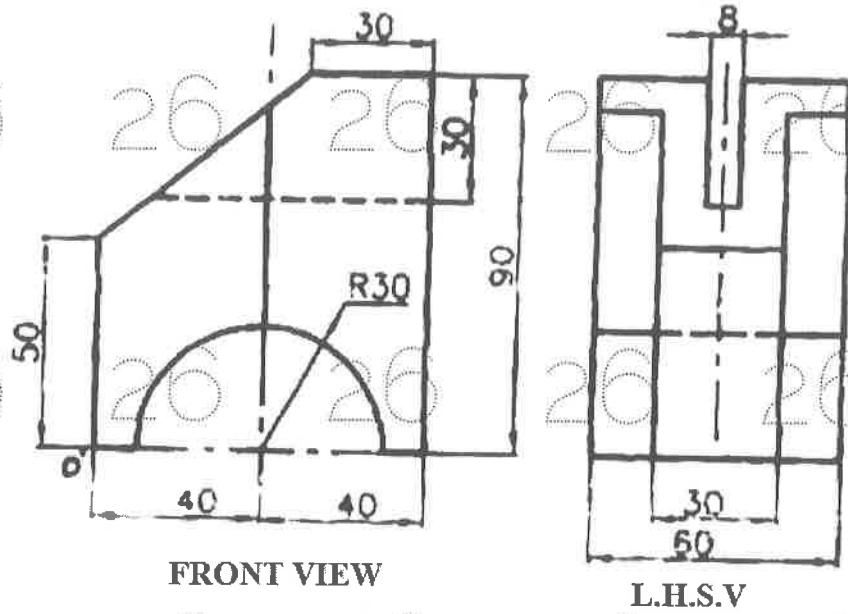
6. A square pyramid, base 40 mm side and axis 75 mm long is placed on the ground on one of its slant edges, so that the vertical plane passing through that edge and the axis makes an angle of 30° with the V.P. Draw its three views. [15]

7. A cylinder, 65 mm diameter and 90 mm long, has its axis parallel to the H.P. and inclined at 30° to the V.P. It is cut by a vertical section plane in such a way that the true shape of the section is an ellipse having the major axis 75 mm long. Draw its sectional front view and true shape of the section. [15]

OR

8. A pentagonal prism of 30 mm base edge and 70 mm height standing on its base is cut by a sectional plane inclined at 45° to HP which bisects its axis. Show the complete development of the truncated prism. [15]

9. Draw isometric projection of the object shown in figure 1, using natural scale. [15]



All dimensions are in mm.

Figure: 1

OR

10. Figure 2 shows pictorial view of an object. Draw the (a) Front view, and (b) Top view. Dimension the views. (All dimensions are in mm) [15]

