AR18

CODE: 18BST107 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Regular Examinations, November, 2018

ENGINEERING PHYSICS

(Common to CE & ME Branches)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Derive the equation of a damped harmonic oscillator and find its solution. 8M
   b) Deduce the condition for under damped oscillation. 4M

(OR)

2. a) Derive the differential equation for forced harmonic oscillator under the influence of different forces acting on it. 8M
   b) Explain the phenomenon of resonance and give examples. 4M

UNIT-II

3. a) Find an expression for the fringe width in the interference pattern of Young's double-slit experiment. 8M
   b) In Young's experiment, let a light of wavelengths 5×10^{-7} m and 6.85×10^{-8} m be used in turn, keeping the geometry same. Compute the fringe widths in the two cases. 4M

(OR)

4. a) Derive a relation for intensity distribution in case of Fraunhofer diffraction pattern two to double slit. How this pattern is affected by a) width of the slit and b) separation of the two slits. 9M
   b) In Fraunhofer diffraction at a single slit, the first diffraction maxima falls at 15^{o} with a slit width of 2.5 micrometers. Find the wavelength of the light used. 3M

UNIT-III

5. a) Explain Absorption, Spontaneous and Stimulated emission with neat diagrams 6M
   b) With necessary theory and energy level diagram explain the working of a He-Ne LASER 6M

(OR)

6. a) Explain the terms optical resonator, population inversion. 4M
   b) Derive the relation between the probabilities of spontaneous and stimulated emission in terms of Einstein's coefficients 8M

UNIT-IV

7. a) Describe in detail the construction of an optical fibre and list its advantages over wired communication system. 8M
   b) A step index fibre has a core of refractive index 1.5. If the numerical aperture of the fibre is 0.26, calculate the refractive index of the cladding material. 4M

(OR)

8. a) Demonstrate, with a schematic diagram refractive index dependence on radial distance for a graded index optical fibre. 8M
   b) A silica optical fibre has a core refractive index of 1.50 and a cladding refractive index 1.47. Compute the critical angle at core-cladding interface, numerical aperture of the fibre and acceptance angle. 4M

UNIT-V

9. a) The magnetic flux density with in a bar of some material is 0.630 tesla at an H field of 5×10^5 A/m. Compute the following for this material: a) the magnetic permeability, and b) the magnetic susceptibility. c) What types of magnetism would you suggest is (are) being displayed by this material? Why? 5M
   b) With a neat sketch explain B Vs H curve for a ferromagnetic material. 7M

(OR)

10. a) What is meant by super conductivity? Explain its properties. 6M
    b) Justify the statement "A superconductor in its superconducting state acts as a perfect diamagnetic material from Meissner effect.. 6M

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AR18

CODE: 18BST108 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Regular Examinations, November, 2018

CHEMISTRY

(Common to EEE, CSE, IT Branches)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain the following with examples i) sp^2 hybridization ii) sp^3d^2 hybridization	6M
	b)	Explain molecular orbital diagram of O_2.	6M
		(OR)	
2.	a)	What are the salient features of VSEPR theory? Explain.	6M
	b)	Write a note on i) electronegativity ii) electron affinity	6M

UNIT-II

3.	a)	Explain the principle of NMR spectroscopy. What are equivalent and non-equivalent protons? Explain with an example.	8M
	b)	Explain the principle of fluorescence.	4M
		(OR)	
4.	a)	Define the following and give examples. i) Chromophore ii) Auxochrome iii) Bathochromic shift iv) Hypsochromic shift	8M
	b)	Mention the absorption frequency ranges in the IR region for the following functional groups i) carbonyl ii) alcohol iii) nitrile iv) amine	4M

UNIT-III

5.	a)	Explain construction and working of standard hydrogen electrode.	6M
	b)	Distinguish electrochemical series and galvanic series.	6M
		(OR)	
6.	a)	How are the following helpful in controlling corrosion? i) proper designing ii) environmental modification	6M
	b)	Explain principle and method of protection of metals by impressed current cathodic protection.	6M

UNIT-IV

7.	a)	Explain SN^1 and SN^2 reactions with mechanism.	8M
	b)	Differentiate between addition polymerization and condensation polymerization.	4M
		(OR)	
8.	a)	Write short notes on the following i) Pinacol-Pinacolone rearrangement ii) Diels-Alder reaction	8M
	b)	Distinguish functionality and degree of polymerization in polymers.	4M

UNIT-V

9.	a)	Explain any six principles of green chemistry.	6M
	b)	Distinguish batteries and supercapacitors.	6M
		(OR)	
10.	a)	Explain working of alkaline battery with chemical equations.	6M
	b)	Explain working of photovoltaic cells for conversion of solar energy to electricity.	6M

AR18

CODE: 18BST106 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Regular Examinations, November, 2018

APPLIED PHYSICS

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Define Interference of light? What are the necessary conditions to get clear and distinct interference fringes? 4

   b) Explain how Newton rings are formed? Prove that the diameters of the bright rings are proportional to square root of odd natural numbers? 8

(OR)

2. a) Give the theory of Fraunhofer diffraction due to single slit and hence obtain the condition for primary and secondary maxima. Using this obtain intensity distribution curve. 8

   b) Show that the grating 5000 lines/cm cannot give the spectrum for the fourth order for the light of wavelength 5890 Å. 4

UNIT-II

3. a) Explain the light propagation in an optical fibre 4

   b) Draw index profile of various types of fibres. Enumerate their applications. 8

(OR)

4. a) Derive the expression for numerical aperture of an optical fibre. 4

   b) Discuss the propagation of light in single mode and multimode fibres 8

UNIT-III

5. a) What are the properties of Matter waves? 4
   b) Derive the time independent Schrodinger wave equation. 8

(OR)

6. a) Explain Physical significance of wave function. 4
   b) Solve the Schrodinger wave equation for a particle confined in a one dimensional potential of width 'L' and infinite height. Obtain an expression for its energy and wave function. 8

UNIT-IV

7. a) State and explain Gauss's law in electrostatics 4
   b) What is Lenz's law of electromagnetic induction? Write Maxwell's equations of differential form. 8

(OR)

8. a) Define electric field intensity. Obtain an expression for electric field intensity at a point which is at a distance 'R' from a point charge Q. 8
   b) State and explain Biot-Savart law. 4

UNIT-V

9. a) What do you understand by drift and diffusion currents in the case of a semiconductor? Express conductivity of semi conductors. 8
   b) Find the diffusion coefficient of electrons in silicon at 300 K if μ_e is 0.19 m^2/V-s 4

(OR)

10. a) What is a semiconductor? What are the most important uses of semiconductors? Distinguish between Intrinsic and extrinsic semiconductors 8
    b) Write any four applications of Hall Effect. 4

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AR16

CODE: 16ME1001 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech. I Semester Supplementary Examinations, November-2018

ENGINEERING DRAWING

(Common to CE, ME, CSE & IT)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. Construct a diagonal scale with RF = 1/50, showing metres, decimetres and centimetres, to measure up to 5 metres. Mark a length 4. 75 m on it. 14M

(OR)

2. Draw an ellipse whose major and minor diameters are 150 mm and 100 mm respectively. Use oblong method. What is the distance between the foci? 14M

UNIT-II

3. A Line AB, 90 mm long, is inclined at 30^0 to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P. 14M

(OR)

4. A point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the VP and 40 mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90 mm. draw straight lines joining (1) their top views and (2) their front views. 14M

UNIT-III

5. Draw the projections of a rhombus having diagonals 125 mm and 50 mm long, the smaller diagonal of which is parallel to both the principal planes while the other is inclined at 30^0 to the HP. 14M

(OR)

6. A square of 125 mm long side is kept in HP, making an angle of 30^0 with the HP & the side on HP inclined at 45^0 to the VP. Draw the projections of the square. 14M

UNIT-IV

7. a) Draw the projections of a cone, base 75 mm diameter and axis 100 mm long, lying on the H.P. on one of its generators with the axis parallel to the V.P. 7M

   b) A cube of side length 60mm is resting on one of its faces on HP with a vertical face inclined at 40 degrees to VP. 7M

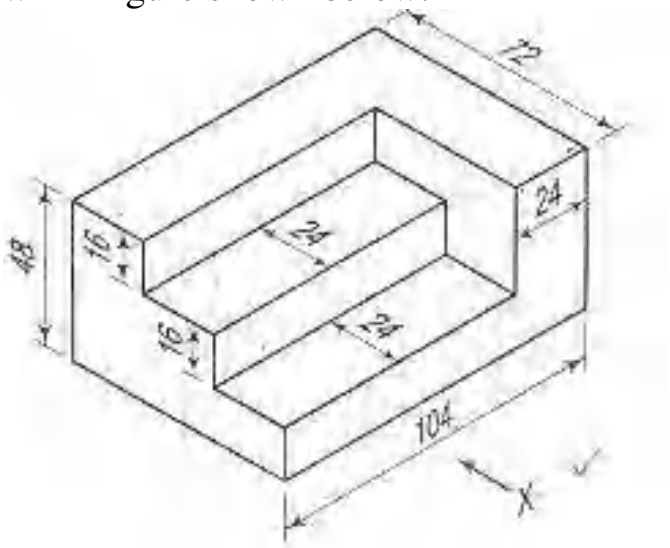
(OR)

8. a) A hexagonal pyramid resting on one of its triangular face on HP with axis parallel to VP. Side of base is 30mm and axis length 80mm. Draw its projections. 7M

   b) A cylinder 50mm base diameter 80mm long is having its axis parallel to VP and inclined 30 degrees to HP. Draw its projections. 7M

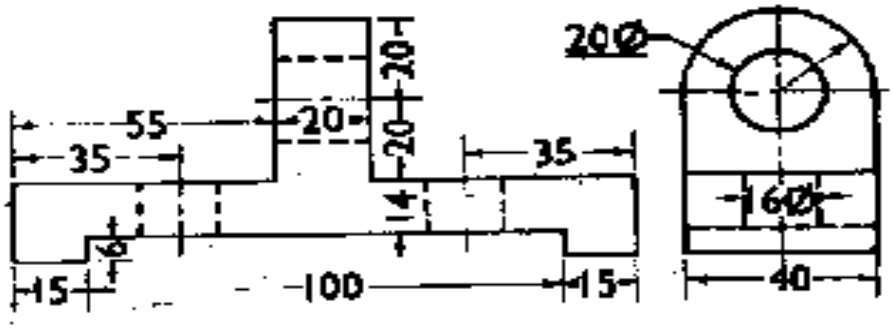
UNIT-V

9. Draw the front view, top view and left hand side view of the block shown in figure shown below. 14M



(OR)

10. Draw the isometric view of Fig. 14M



1. FIG. 1

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AR16

CODE: 16EE1001 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech. I Semester Supplementary Examinations, November-2018

BASIC ELECTRIC CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. (a) In Fig.1. Determine the equivalent resistance $\mathbf{R_{eq}}$ by using Star-Delta Transformation. 7 M

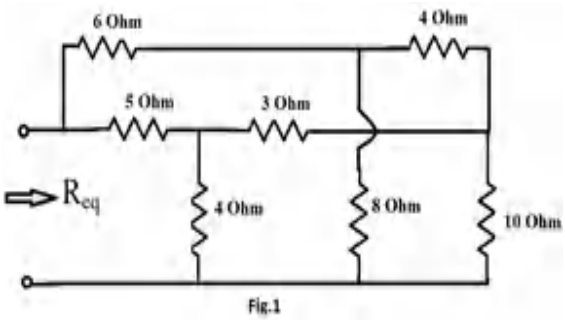

Fig.1

(b) Reduce the network shown in Fig.2, to a single loop network by successive source transformation, to obtain the current in the 7 Ω resistor. 7 M

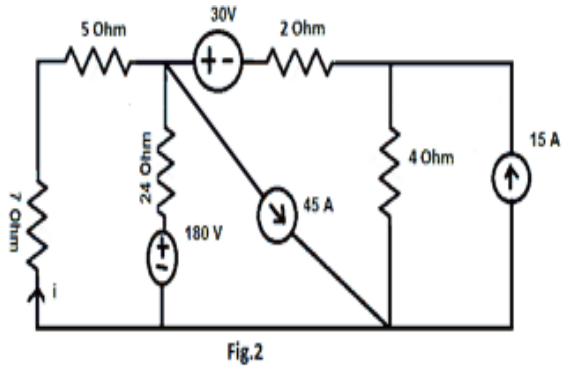

Fig.2

(OR)

2. (a) Find the equivalent resistance between the two points A and B shown in Fig.3. 7 M

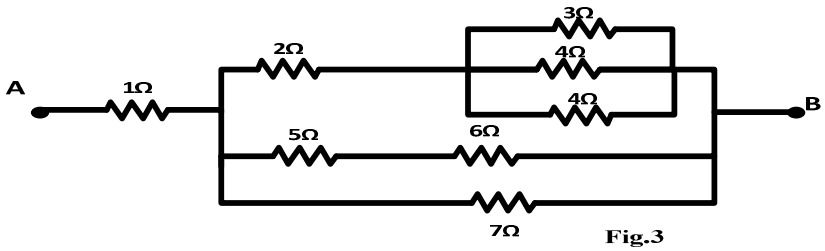

Fig.3

(b) Find the equivalent capacitance C_{eq} of the combination of capacitors shown in Fig4. 7 M

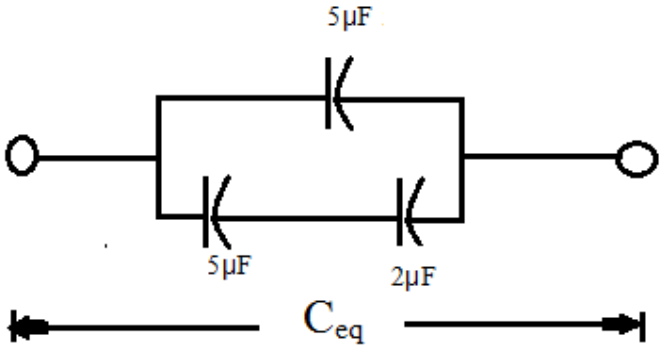

Fig.4

UNIT-II

3. (a) Two coupled coils with self-inductances L_1=0.8H and L_2=0.2H having a coupling coefficient of 0.6 has 500 turns. If the current in coil 1 is $I_1(t)$=10 sin 200t,Determine the voltage at coil 2 and the maximum flux set up by the coil 1? 6 M

(b) Determine the power dissipated by 5Ω resistor in the circuit shown in Fig.5.by using Nodal analysis. 8 M

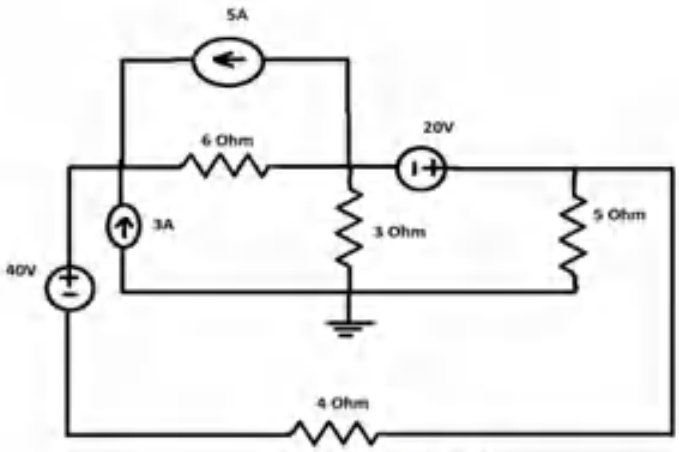

Fig.5

(OR)

4. (a) Determine the power dissipation in the 4Ω resistor of the circuit shown in Fig.6,by using Mesh analysis. 8 M

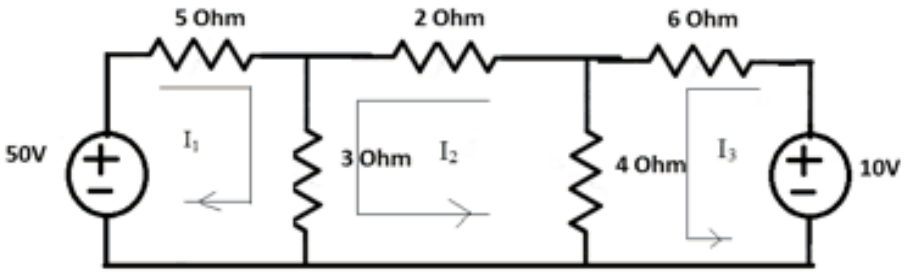

Fig.6

(b) Derive the expression for energy stored in a Capacitor and an Inductor? 6 M

UNIT-III

5. (a) What is the form factor of an Alternating quantity? Explain its significance. 6 M
   (b) Derive an expression for the current, impedance, average power for a series RC circuit excited by a sinusoidally alternating voltage and also find the power factor of the circuit. Draw the phasor diagram. 8 M

(OR)

6. (a) Obtain the form factor and peak factor for a voltage of symmetrical square wave shape whose amplitude is 10V and time period is 40 seconds. 6 M
   (b) A series RL circuit having a resistance of 4 ohm and 3 ohm of inductive reactance is fed by a 100V, 50Hz, single phase supply. Find current, power drawn by the circuit and power factor. 8 M

UNIT-IV

7. (a) A voltage $V(t)$=10 sin ωt is applied to a series RLC circuit. At the resonant frequency of the circuit, the maximum voltage across the capacitor is found to be 500V.Moreover, the bandwidth is known to be 400 rad/sec and the impedance at resonance is 100 Ω .Find the values of L and C of the circuit? 8 M
   (b) Explain the salient features of series resonant circuit when compared to parallel resonant circuit. 6 M

(OR)

8. (a) A series RLC circuit consists of a 50 Ω resistance, 0.2H inductance and 10μF capacitor with an applied voltage of 20V.Determine the resonant frequency. Find the Q factor of the circuit. Compute the lower and upper frequency limits and also find the bandwidth of the circuit? 8 M
   (b) The impendence Z_1= (5+j3) Ω and Z_2= (10-j30) Ω are connected in parallel as shown in below Fig.7. Find the value of X_3 which will produce resonance at the terminals a and b. 6 M

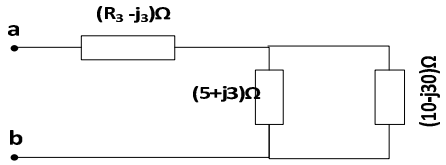

Fig.7

UNIT-V

9. (a) A symmetrical three phase, three wire, 440V supply is connected to a star connected load. The impedances in each branch are Z_1=(2+j3)Ω ,Z_2=(1-j2)Ω ,Z_3=(3+j4)Ω.Find its equivalent delta connected load.Hence,find the phase and line currents and the total power consumed in the circuits? 8 M
   (b) Explain how power is measured in a three phase delta connected load using two wattmeters. 6 M

(OR)

10. (a) Derive phase and line voltage, current relations in a balanced delta connected load with neat phasor diagrams. 6 M
    (b) Two balanced loads are connected to a 240-kV rms 60-Hz line, as shown in below Fig.8. Load 1 draws 30 kW at a power factor of 0.6 lagging, while load 2 draws 45 kVAR at a power factor of 0.8 lagging. Assuming the abc sequence, Determine: 8 M
    (i)the complex, real, and reactive powers absorbed by the combined load, (ii)the line currents

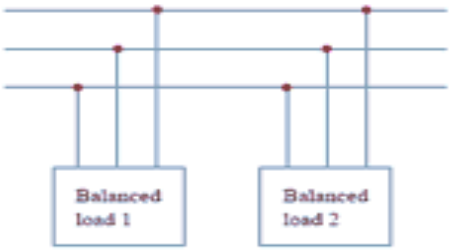

Fig.8

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AR16

CODE: 16EE1002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech. I Semester Supplementary Examinations, November-2018

NETWORK ANALYSIS

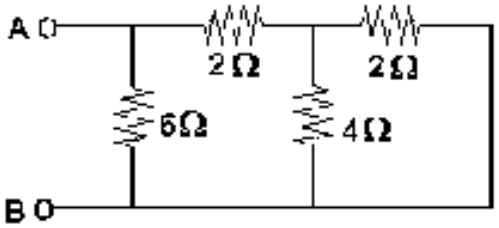
(Electronics & Communication Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

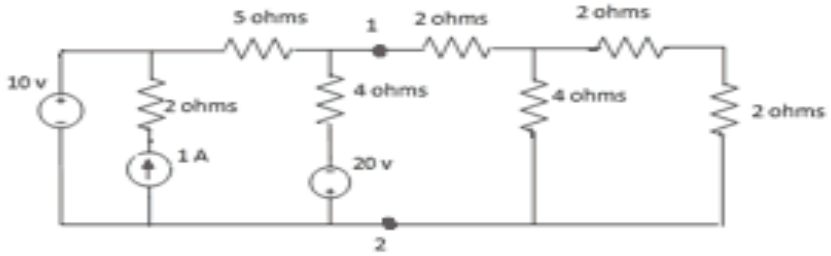
UNIT-I

1. a) Explain current and voltage division rules in a given network. 7M
   b) Determine the equivalent resistance between A and B of the network shown below. 7M



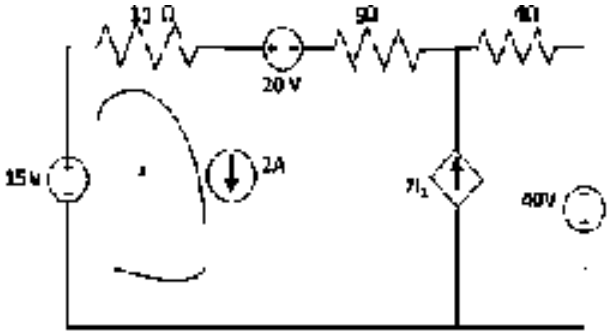
(OR)

2. a) Derive expressions for energy stored in inductor. 7M
   b) Use source transformation to simplify the network shown below and find the equivalent network containing only one voltage source and a resistance at terminals 1 and 2. 7M

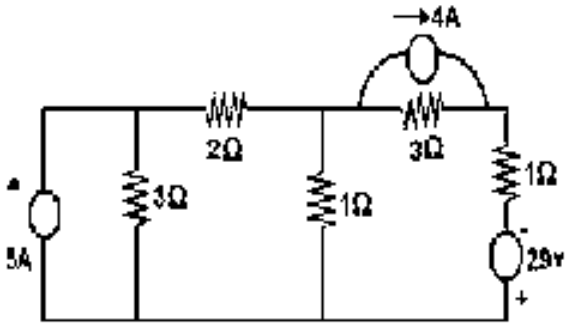


UNIT-II

3. a) For the circuit shown in below, find the current through the 10Ω resistor by using Mesh analysis. 7M



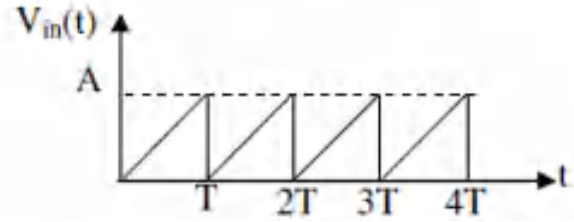
b) Determine the current in the 2Ω resistor for the circuit shown below, by using nodal analysis. 7M



(OR)

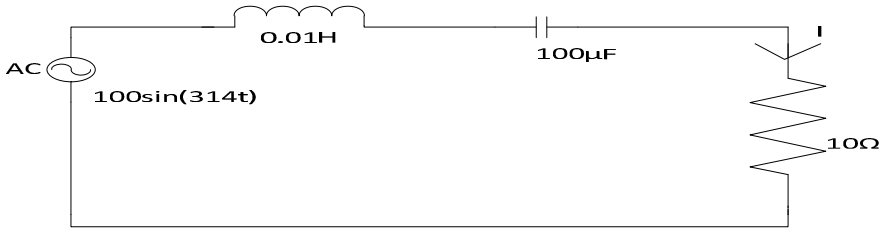
4. a) State and Explain KVL &KCL with Examples. 7M

b) Find peak factor and form factor of following waveform. 7M



UNIT-III

5. a) Find current I for the circuit shown below. 7M



b) Derive expression for bandwidth of series resonance circuit. 7M

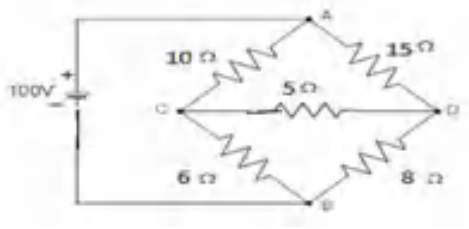
(OR)

6. a) Define electrical resonance, bandwidth and quality factor. 6M

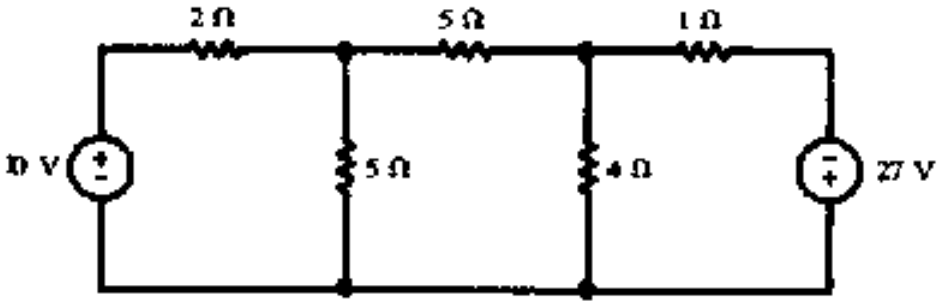
b) Design a series RLC circuit that will have an impedance of 10Ω at the resonant frequency of w_0 = 50rad/sec and a quality factor of 80. Find the B.W and half power frequencies. 8M

UNIT-IV

7. a) Find the current through 'C-D' using Norton's theorem in the circuit shown below. 7M

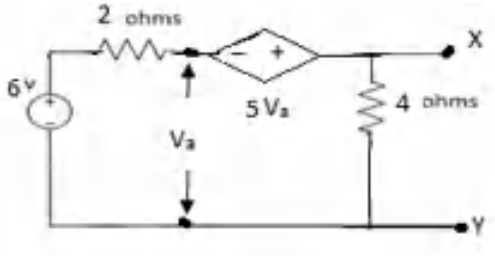


b) Using Superposition theorem find current through 4Ω resistor. 7M



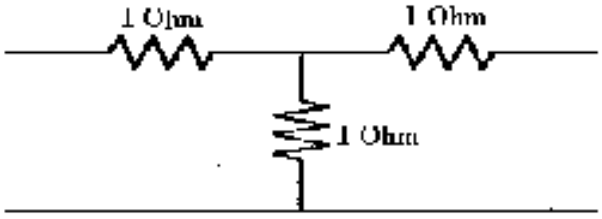
(OR)

8. a) State and prove Maximum power transfer theorem. 7M
   b) Find Thevinen's equivalent of the network shown below at X-Y terminals. 7M



UNIT-V

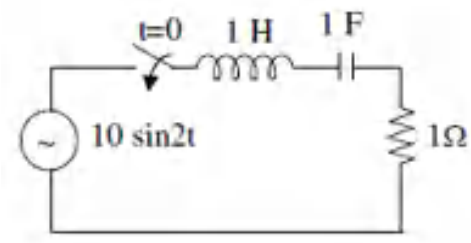
9. a) Determine Z parameters. 7M



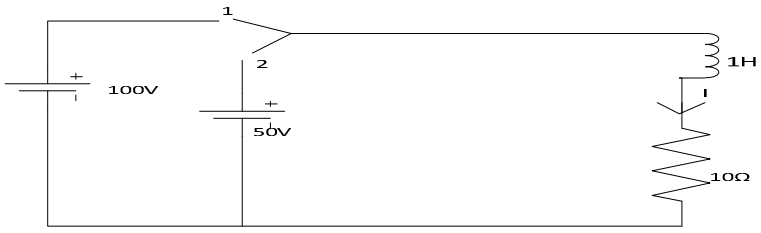
   b) Derive the relationship between Z and H parameters. 7M

(OR)

10. a) Find the current in the circuit shown for t>0. At t=0- the network was unenergized. 7M



   b) The switch is in position 1 for long time and moved to position 2 at t= 0, find current i. 7M



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AR13

CODE: 13ME1001 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech. I Semester Supplementary Examinations, November-2018

ENGINEERING DRAWING
(Common to Civil, ME, CSE, IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) List any two systems of dimensioning.
   b) List any three types of conic sections.
   c) Draw the front view and top view of a point A which is contained by both HP & VP.
   d) Where will the top view of a line lie when the line is contained by VP.
   e) List any three possible orientations of plane figures with reference to principal planes of projection.
   f) A thin set square is made perpendicular to both HP & VP. Mention in which view its true shape is seen.
   g) A square pyramid is resting with its base on HP. Mention in which view true shape of the base is seen.
   h) What are the solids of revolution?
   i) State the relation between true length and isometric length
   j) How are the invisible features of an object represented in orthographic projection?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. A real length of 10 m is represented by a line of 5 cm on a drawing. Find the R.F. and construct a vernier scale such that the least count is 2 dm and can measure up to 25 m. Mark a distance of 19.4 m on it. 12 M

(OR)

3. Draw the ellipse whose the major axis is 110mm and minor axis is 70mm by oblong method. 12 M

UNIT-II

4. A point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the VP and 40 mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90 mm. draw straight lines joining (1) their top views and (2) their front views. 12 M

(OR)

5. A straight line PQ has its end P 20 mm above HP and 30 mm in front of the VP and the end Q is 80 mm above the HP and 70 mm in front of VP. If the end projectors are 60 mm apart, draw the projections of the line. Draw its true length and true inclinations with the reference planes. 12 M

UNIT-III

6. A regular pentagonal lamina of 30 mm sides has one edge in HP and inclined at an angle of 30^0 to VP. Draw its projections when its surface is inclined at 45^0 to HP. 12 M

(OR)

7. Draw the projections of a rhombus having diagonals 65 mm and 30 mm long. The smaller diagonal is parallel to both HP and VP while the other is inclined at 30^0 to HP. 12 M

UNIT-IV

8. A hexagonal prism of side of base 20 mm and height 50 mm rests on HP on one of the edges of its base such that the edge is at 30^0 to VP and the axis is inclined at 45^0 to HP. Draw its projections. 12 M

(OR)

9. A cylinder of base diameter 50 mm and axis 65 mm rests on a point of its base circle on the HP. Draw its projections when the xais is inclined at 30^0 to the HP and top view of the axis is perpendicular to XY line. 12 M

UNIT-V

10. Draw the isometric view of Fig. 1. 12 M

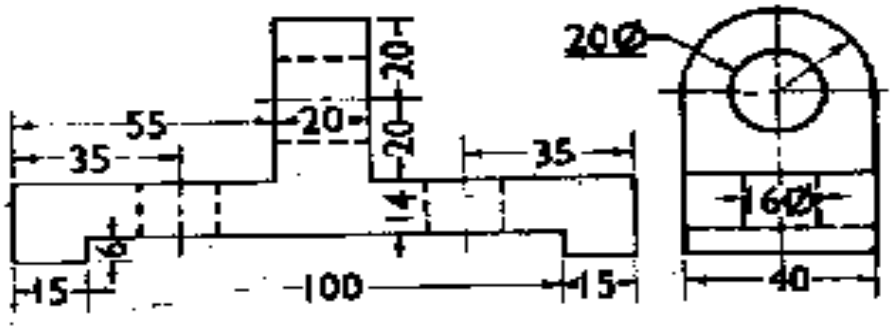
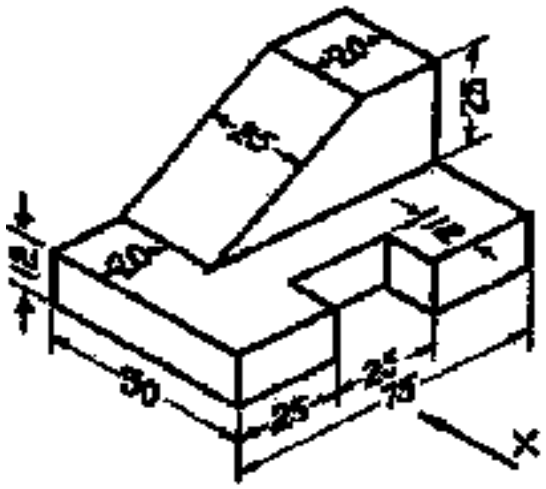


FIG. 1

(OR)

11. Pictorial view of an object is shown in Fig. 2. Draw, to the scale of full size, the following views. (a) Front view (b)Top view 12 M



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