R16

SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) How does the viscosity of air vary with temperature? (2M)

    b) State the condition for Irrotational flow (2M)

    c) Explain any one application of momentum equation (2M)

    d) Discuss the practical applications of Reynolds experiment. (2M)

    e) Write the expressions for c_v , c_c and c_d for an orifice (3M)

    f) Define displacement and momentum thickness. (3M)

PART -B

2. a) Explain the differences between manometer and mechanical gauges. What are the different types of mechanical pressure gauges (7M)

    b) A metal ball weighs 9500N in air and 8000N in water. Find out its volume and specific gravity. (7M)

3. a) Explain the terms: (i) Path line   (ii) Streak line
    (iii) Stream line   (iv) Stream tube. (7M)

    b) A pipe, through which water is flowing, is having diameters 40 cm and 20 cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is 5 m/s. Find the velocity head at the sections 1 and 2 and also rate of discharge. (7M)

4. a) State and derive Bernoulli's theorem, mentioning clearly the assumptions underlying it. (7M)

    b) A 30 cm diameter horizontal pipe terminates in a nozzle with the exit diameter of 7.5 cm. If the water flows through the pipe at the rate of $0.15m^3$/s. What force will be exerted by the fluid on the nozzle? (7M)

5. a) What are the different losses in flow through the circular pipes?. (7M)

    b) Define minor losses in pipes and obtain equation for any four losses. (7M)

6. a) What are the applications of Venturimeter? Explain the working principle of venturimeter. (7M)

    b) What are the different types of notches? Explain Rectangular and Stepped notches (7M)

7. a) What is a boundary layer? Differentiate between a laminar and turbulent boundary layer. (7M)

    b) Explain Boundary layer separation with a neat sketch. What are the conditions under which separation takes place? (7M)

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SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Explain atmospheric, gauge and vacuum pressures.   (2M)

    b) What is center of pressure?   (2M)

    c) Explain any one application of momentum equation   (2M)

    d) State Darcy-Weisbach equation.   (2M)

    e) Write the empirical formulas for discharge over a rectangular weir?   (3M)

    f) What are the characteristics of laminar boundary layer?   (3M)

PART -B

2. a) Define the following fluid properties: (7M)
        Density, weight density, specific volume and specific gravity of a fluid.

    b) An oil film of thickness 1.5 mm is used for lubrication between a square plate of   (7M)
        size 0.9 m × 0.9 m and an inclined plane having an angle of inclination 20^0. The
        weight of the square plate is 392.4 N and it slides down the plane with a uniform
        velocity of 0.2 m/s. Find the dynamic viscosity of the oil

3.   Distinguish between: (14M)
        (i) Steady flow and un-steady flow,
        (ii) Uniform and nonuniform flow,
        (iii) Compressible and incompressible flow,
        (iv) Rotational and irrigational flow (v) Laminar and turbulent flow.

4. a) What are the applications of Momentum equation? Explain.   (7M)

    b) Describe the procedure of finding the forces on pipe bend.   (7M)

5. a) Explain how the following flow problems are analyzed.   (7M)
        i)   Series pipe connection   (ii) parallel pipe connection and iii) Equivalent
                pipe connection.

    b) Explain how Reynold's experiment is conducted in the lab and bring its practical   (7M)
        uses.

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6. a) A Pitot tube was used to measure the quantity of water flowing in a pipe of 0.30m (7M)
      diameter. The water was raised to a height of 0.25m above the centre line of pipe in
      the vertical limb of the tube. If the mean velocity is 0.78 times the velocity at the
      centre and coefficient of Pitot tube is 0.98, find the discharge in the pipe line. The
      static pressure head at the centre of the pipe is 0.2 m.
   b) A Venturi-meter is provided to measure the water flowing through a horizontal (7M)
      pipe of25 cm diameter. The throat of the venture- meter is 12cm. The pressure of
      water flowing through the pipe is 1.5 bar and the vacuum measured at the throat is
      30 cm of Hg. Find the water flow rate through the pipe. Take Cd=0.975.

7. a) Derive Von Karman momentum integral equation.   (7M)
   b) Define energy thickness. Derive an expression for the energy thickness   (7M)

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II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

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2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define the terms surface tension and capillarity.　　　　　　　　　　(2M)

   b) Write about flownet analysis.　　　　　　　　　　　　　　　　　(2M)

   c) Explain how to find out the force on a pipe bend.　　　　　　　　　(2M)

   d) Discuss minor losses in pipes.　　　　　　　　　　　　　　　　(2M)

   e) Define orifice and write its classification w.r.t shape and size?　　　　(3M)

   f) Define local and average drag coefficients and write corresponding empirical　　(3M
   relations?

PART -B

2. a) What is the importance of a manometer? Explain the types of manometers in brief.　　(7M)

   b) Explain the term total pressure acting on a plane surface immersed in a fluid at any　(7M)
   angle. Obtain an expression for this, and also for the corresponding depth of the
   centre of pressure

3. a) Define stream function and velocity potential. What are their uses?　　　　(7M)

   b) Determine whether the following velocity components satisfy the continuity　　(7M)
   equation. i) u = cx, v = -cy　　ii) u = -cx/y, v = c log xy

4. a) State the assumptions made in the derivation of Bernoulli's equation. State the　(7M)
   momentum equation and explain its significance.

   b) What are the surface and body forces associated with fluid flow? How are they　(7M)
   incorporated in Euler's equation?

5. a) Define 'Hydraulic gradient line' and 'Total energy line'. The cross section of a pipe　(7M)
   carrying a given discharge is suddenly enlarged. What would be the ratio of the two
   diameters of the pipe if the magnitude of the loss of head at this change of section is
   same irrespective of the direction of flow? Assume CC = 0.64.

   b) Derive an expression for the loss of head due to friction in flow through circular　(7M)
   pipes.

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6. a) Differentiate between stagnation pressure head and static pressure head with reference to a pitot tube. Explain with the help of a neat sketch.   (7M)

b) A Venturimeter of throat diameter 5cm is fitted into a 12.5 cm diameter water pipe line. The coefficient of discharge is 0.96. Calculate the flow in the pipe line when the reading on a mercury water differential U tube manometer connected to the upstream and throat sections shows a reading of 20 cm.   (7M)

7. a) Define physically and mathematically the concept of displacement, momentum and energy thickness of a boundary layer.   (7M)

b) Water is flowing over a thin smooth plate of length 5m and width 2.7m at a velocity of1.2 m/sec. If the boundary layer flow changes from laminar to turbulent at a Reynolds number 5×10^5. Find:
     i) The distance from leading edge up to which boundary layer is laminar and
     ii) Thickness of the boundary layer at the transition point.   (7M)

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SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS
(Civil Engineering)

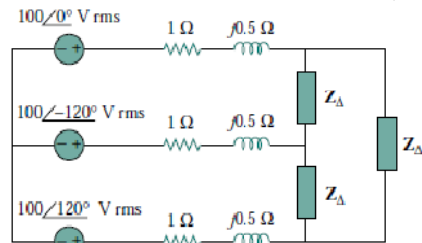Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
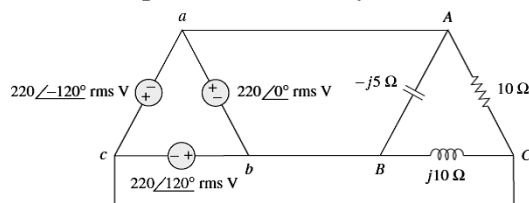3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define Pascal's law.   (2M)

    b) Derive momentum equation.   (2M)

    c) What do you mean by surface and body forces?   (2M)

    d) What are TEL and HGL? Explain.   (2M)

    e) Write a short note on Broad Crested weir?   (3M)

    f) Write a short note on Magnus effect?   (3M)

PART -B

2. a) What is metacentric height? Explain how the it is calculated.   (7M)

    b) What are the modes of measuring pressure? How can you convert the pressure in KPa   (7M)
        into the liquid columns and vice versa.

3. a) The flow field is given by $\psi = x^3y$ Check whether the given field exists or not?   (7M)
        Further check whether it is irrotational?

    b) Given that $u = x^2 - y^2$ and $v = -2xy$, determine the stream function and potential   (7M)
        function for the flow

4. a) Derive Bernoulli`s equation from Euler`s equation of motion.   (7M)

    b) A pipe through which water is flowing, is having diameters, 20cm and 10cm at the   (7M)
        cross-sections 1 and 2 respectively. The velocity of water at section 1 is given as 4
        m/s. Find the velocity head a sections 1 and 2 and also rate of discharge

5. a) Explain with neat sketch the Reynold's experiment and define Laminar and   (7M)
        Turbulent flow.

    b) A compound piping system consists of a1600m of 0.4m diameter, 1200m of 0.3m   (7M)
        diameter and 800m pipe of 0.25m diameter cast iron pipes connected in series.
        Convert the system to (i) an equivalent length of 0.4m pipe and (ii) an equivalent size
        pipe 3000m long.

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6. a) A Venturimeter has its axis vertical, the inlet and throat diameters being 150mm and   (7M)
        80 mm respectively. The throat has 220mm about inlet and coefficient discharge is
        0.96. Petrol of specific gravity 0.78 flows up through the meter at a rate of 0.029 m^3/s.
        Find the pressure difference between the inlet and the throat.
    b) A 150mm X 75mm Venturi meter with a coefficient of discharge 0.98 is to be   (7M)
        replaced by an orifice meter having a coefficient of discharge 0.60. If the both the
        meters are to give the same differential mercury manometer reading for a discharge of
        100 liters per second and the inlet diameter is to remain 150mm. what should be
        diameter of the orifice?

7. a) What do you understand by Boundary Layer? Explain the development of Boundary   (7M)
        layer over a flat plate.
    b) What do you mean by boundary layer separation? What is the effect of pressure   (7M)
        gradient on boundary layer separation?

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**
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PART –A

1. a) Why three phase systems are preferred over single phase systems for the   (3M)
        transmission of power?
    b) Determine the amplitude of the line current in a three-phase system with a line   (2M)
        voltage of 300 V that supplies 1200 W to a delta connected load at a lagging
        PF of 0.8; then find the phase impedance.
    c) A coil of inductance 0.04H and resistance 10 Ω is connected to a 120V, d.c.   (2M)
        supply. Determine (i) the final value of current, (ii) the time constant of the
        circuit,
    d) A two-port network is described by $V_1=I_1+2V_2$, $I_2= -2I_1+0.4V_2$ Write the   (2M)
        impedance matrix ?
    e) List the properties of RL impedance function?   (3M)
    f) State and explain parseval's theorem?   (2M)

PART -B

2. a) In a balanced three-phase Y-Y system, the source is an *abc* sequence of   (7M)
        voltages and $V_{an}=220\angle20^0$ V rms. The line impedance per phase is
        $(0.6+ j1.2)\Omega$ while the per-phase impedance of the load is $(10+ j14)\Omega$.
        Calculate the line currents and the load voltages
    b) For the three-phase circuit shown below, find the average power absorbed by   (7M)
        the delta-connected load with $\mathbf{Z_\Delta} = (21 +j\,24\,)\Omega$
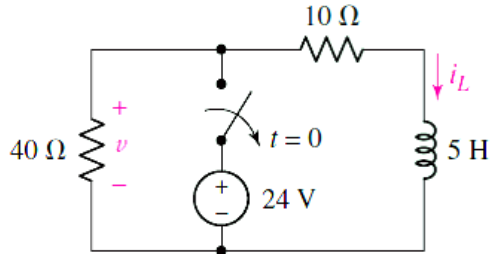

3. a) Find the line currents in the unbalanced three-phase circuit of Fig shown below   (7M)
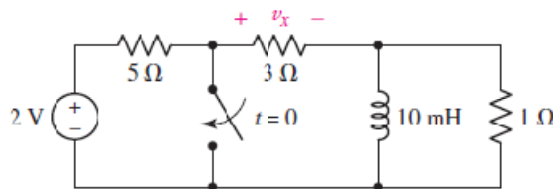   and the real power absorbed by the load.

    b) The two-wattmeter method gives P_1=1200Wand P_2= -400W for a three-phase   (7M)
        motor running on a 240-V line. Assume that the motor load is wye connected
        and that it draws a line current of 6 A. Calculate the pf of the motor and its
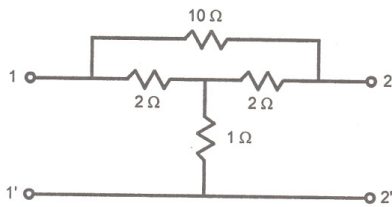   phase impedance.

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4.   a)   For the circuit shown, find the voltage labelled v at t = 200 ms.   (7M)
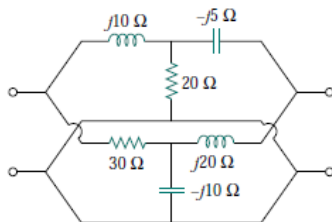

    b)   Obtain an expression for v_x as labelled in the circuit shown and evaluate v_x at t = 5   (7M)
       ms.

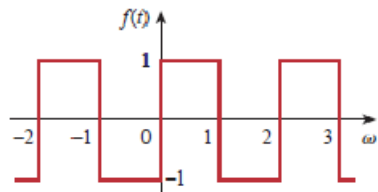5.   a)   Obtain the ABCD parameters of the circuit shown below   (7M)

    b)   Determine the y parameters of the two two-ports in parallel shown in fig.   (7M)

6.   a)   F(s) = [2 (s+1) (s+4)] / [(s+2) (s+6)] .Synthesize F(s) in two Foster forms?   (7M)
    b)   Synthesize the following driving point immittance function $Z(s) = \dfrac{(s^2 + 2s + 6)}{s(s+3)}$ (7M)

7.   a)   Find the Fourier series of the square wave shown in Fig. Plot the amplitude and   (9M)
       phase spectra.

    b)   State and explain the properties of Fourier transform?   (5M)

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II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) State the relationships between line and phase currents and line and phase   (3M)
        voltages for a star-connected system
    b) Two wattmeters connected to a 3-phase motor indicate the total power input to   (3M)
        be 12kW. The power factor is 0.6. Determine the readings of each wattmeter?
    c) Find the time constant for the *RC* circuit in Fig.   (2M)
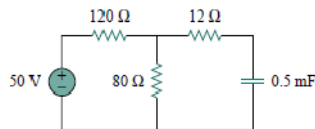

    d) Find the T parameters of two networks which are connected in cascade having   (2M)
        individual T parameters $T_a = \begin{pmatrix} 5 & 44 \\ 1 & 9 \end{pmatrix}$ and $T_b = \begin{pmatrix} 1 & 6 \\ 0.5 & 4 \end{pmatrix}$.
    e) List any two properties of Positive Real function?   (2M)
    f) List any two properties of Fourier transform?   (2M)

PART –B

2. a) A particular balanced three-phase system is supplying a Δconnected load with   (7M)
        10 kW at a leading power factor of 0.7. If the phase voltage is 208 V and the
        source operates at 50 V, (*i*) compute the line current; (*ii*) determine the phase
        impedance; (*iii*) calculate the new power factor and new total power delivered
        to the load if a 2.5 H inductor is connected in parallel with each phase of the
        load.
    b) A wattmeter is connected into the circuit shown below, so that I_1 enters the (+)   (7M)
        terminal of the current coil, while V_2 is the voltage across the potential coil.
   Find the wattmeter reading.
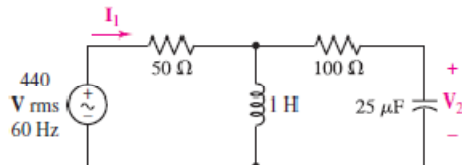
3. a) Determine the line currents for the three-phase circuit shown. $V_a = 110\angle 0^0$.   (7M)
   Assume positive phase sequence
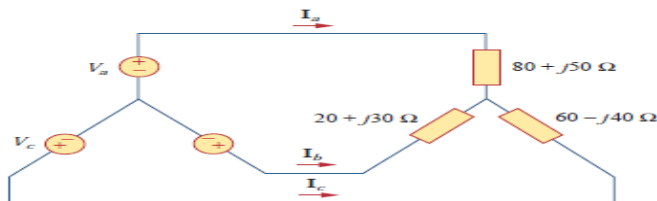
    b) A 415V, 3-phase, 4 wire, star-connected system supplies three resistive loads of   (7M)
        25kW, 20kW and 35kW in the red, yellow and blue phases respectively. Determine
        the current flowing in each of the four conductors.

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4. a) The switch has been in position **a** for a long time. At t=0 it moves to position (7M)
**b**. Calculate i(t) for all t>0.
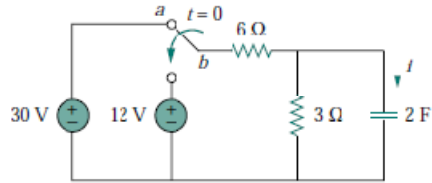
b) The switch above the 12 V source in the circuit shown has been closed for a (7M)
long time. It is finally thrown open at $t = 0$. (i) Compute the circuit time
constant. (ii) Obtain an expression for $v(t)$ valid for $t > 0$. (iii) Calculate the
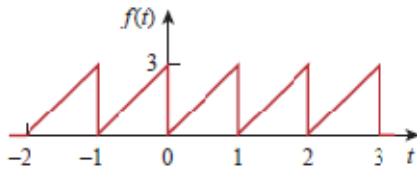energy stored in the capacitor 170 ms after the switch is opened.
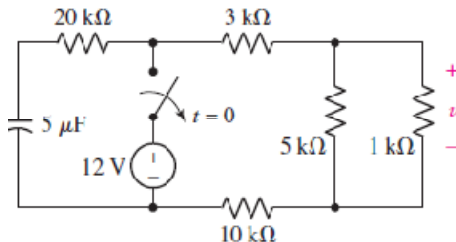
5. a) Derive the relationship between hybrid and Z parameters of two port network? (7M)
   b) Find the transmission parameters for the circuit shown below (7M)
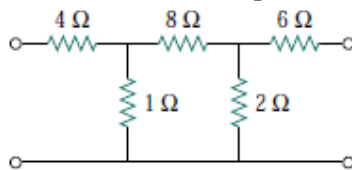
6. Realize Z(s) = [S(S²+2)(S²+4)]/[(S²+1)(S²+3)(S²+5)]in all four forms. (14 M)

7. a) Determine the Fourier series of the sawtooth waveform shown in Figure (9M)

b) (a) A series RL circuit in which R = 5 Ω and L =20 mH has an applied voltage (5M)
v =100 + 50 sin ωt +25 sin 3ωt (V), with ω= 500 rad/s. Find the current and
the average power

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II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)
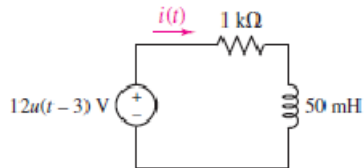
Time: 3 hours   Max. Marks: 70

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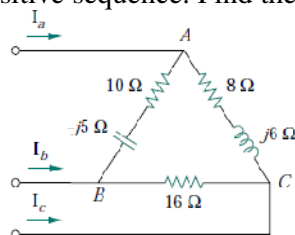3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Three loads, each of resistance 50 Ω are connected in star to a 400V, 3-phase (3M) supply. Determine (i) the phase voltage, (ii) the phase current and (iii) the line current.
   b) Explain the difference between "balanced" and "unbalanced" loads? (2M)
   c) For the circuit shown, find i(t) for t=∞, 3^- and 3^+ . (3M)

   d) Write down condition for reciprocal of a two port network in terms of (2M) transmission parameters and hybrid parameters?
   e) List any two properties of LC immittance function? (2M)
   f) The voltage and current at the terminals of a circuit are $V(t)=128+192\cos$ (2M) $120\Pi t + 96\cos(360\Pi t-30^0)$ and $i(t) = 8\cos(120\Pi t-10^0) + 3.2\cos(360\Pi t-60^0)$. Find the average power absorbed by the circuit?
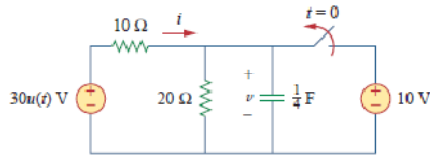
PART –B

2. a) A three-phase system is constructed from a balanced Y-connected source (7M) operating at 50 Hz and having a line voltage of 210 V, and each phase of the balanced load draws 130 W at a leading power factor of 0.75. (*i*) Calculate the line current and the total power supplied to the load. (*ii*) If a purely resistive load of 1Ω is connected in parallel with each existing load, calculate the new line current and total power supplied to the load.
   b) The two-wattmeter method produces wattmeter readings P_1=1560 W and (7M) P_2=2100 W and when connected to a delta-connected load. If the line voltage is 220 V, calculate: (i) the per-phase average power, (ii) the per phase reactive power, (iii) the power factor, and (iv) the phase impedance.

3. a) The unbalanced Δ-load of Fig. is supplied by balanced voltages of 200V in the (7M) positive sequence. Find the line currents. Take V_{ab} as reference.
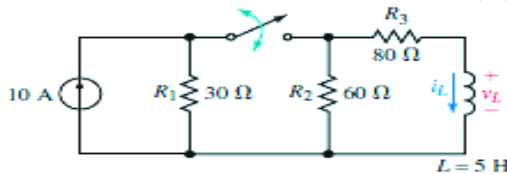

   b) Prove that two watt-meters are sufficient to measure power in three phase (7M) system?
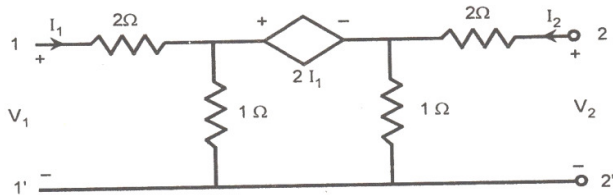
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4. a) In Fig. shown, the switch has been closed for a long time and is opened at t= 0. Find i (7M)
and v for all time.

b) Refer to the circuit shown below, the switch is closed at $t = 0$. (i) determine (7M)
equations for i_L and v_L.(ii) At $t = 300$ ms, open the switch and determine
equations for i_L and v_L during the decay phase. (iii) Determine voltage and
current at $t = 100$ ms and at $t = 350$ ms. (iv) Sketch i_L and v_L

5. a) Obtain the y parameters for the *network* shown below. (7M)

b) Find the transmission parameters for the cascaded networks shown (7M)

Network A   Network B

6. a) Synthesize the LC immittance function $Z(s)=2(s^2+1)(s^2+9)/s(s^2+4)$ in two (7M)
Foster forms?

b) State and explain the properties of positive real function. (7M)

7. a) Obtain the exponential Fourier series for the signal in Fig. (9M)

b) Find $v_o(t)$ in the circuit shown for $v_i(t)=2e^{-3t}u(t)$. (5M)

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II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
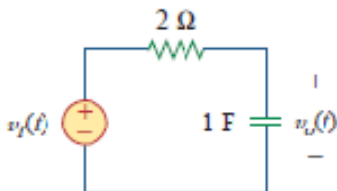　　　2. Answer **ALL** the question in **Part-A**
　　　3. Answer any **FOUR** Questions from **Part-B**
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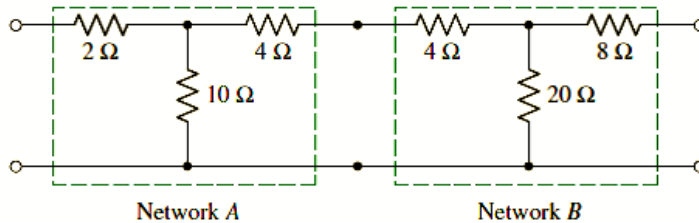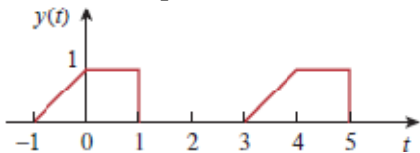
PART –A

1.　a)　Draw the complete phasor diagram for balanced delta connected load?　(2M)
　　b)　A 400V, 3-phase, 4 wire, star-connected system supplies three resistive loads　(2M)
　　　　of 15kW, 20kW and 25kW in the red, yellow and blue phases respectively.
　　　　Determine the currents flowing in red and blue phase conductors.
　　c)　Draw the transient growth and decay curves for an $L-R$ circuit ?　(3M)
　　d)　Write down the condition for reciprocity in terms of ABCD and hybrid　(2M)
　　　　parameters?
　　e)　List the properties of RC impedance function?　(3M)
　　f)　What is the condition for half wave symmetry and odd symmetry of function?　(2M)

PART –B

2.　a)　A three-phase, three-wire, ABC system, with an effective line voltage of 200　(7M)
　　　　V, has three impedances of $10\angle45^0\Omega$ in a Δ connection. Determine the line
　　　　currents and draw the voltage-current phasor diagram.
　　b)　Show that the total power in a 3-phase, 3-wire system using the two-wattmeter　(7M)
　　　　method of measurement is given by the sum of the wattmeter readings. Draw a
　　　　connection diagram. Draw a phasor diagram for the two-wattmeter method for
　　　　a balanced load. Use the phasor diagram to derive a formula from which the
　　　　power factor of a 3-phase system may be determined using only the wattmeter
　　　　readings

3.　a)　A four-wire wye-wye circuit has $\mathbf{V}an = 120\angle120°$, $\mathbf{V}bn = 120 \angle0°$ $\mathbf{V}cn = 120$　(5M)
　　　　$\angle- 120°$ V If the impedances are $\mathbf{Z}_{an} = 20\angle 60°$, $\mathbf{Z}_{bn}= 30\angle 0°$ $\mathbf{Z}cn = 40 \angle30°$ Ω
　　　　find the current in the neutral line
　　b)　Three impedances of (7+j4) Ω, (3+j2) Ω and (9+j2) Ω are connected between　(9M)
　　　　neutral and the R, Y and B phases. The line voltage is 440V, Calculate.
　　　　i. The line currents and
　　　　ii. The current in the neutral wire.
　　　　iii. Find the power consumed in each phase and the total power drawn by the
　　　　circuit

4.　a)　At t = 0.15 s in the circuit of Fig., find the value of (i) i_L; (ii) i_1; (iii) i_2.　(7M)
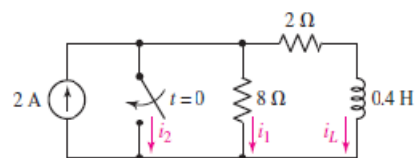
　　b)　Derive the expression for current in a series RC circuit excited by a sinusoidal source　(7M)
　　　　V=V_m Sinωt

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5. a) Obtain the z parameters for the circuit shown.   (7M)
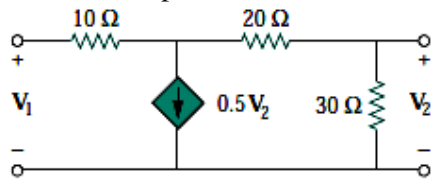
b) If h parameters of for some particular two-port is given below. Calculate y parameters.   (7M)

$$h=\begin{pmatrix} 2K\Omega & -3 \\ 5 & 0.01S \end{pmatrix}$$

6. a) Given the driving point admittance function Y (s) = $S(S^2+1)(S^2+4) / S(S^2+2)$.   (7M)
    Synthesize ladder network of the first Cauer form.
    b) Obtain the foster forms realization of $Z(s)=2(s+1)(s+3)/s(s+2)$ (7M)

7. a) Calculate the Fourier series for the function shown in fig.   (7M)
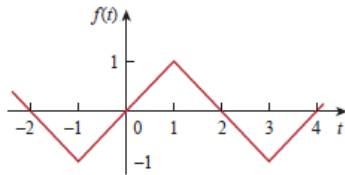
b) Determine the average power supplied to the circuit if   (7M)
    i(t)=2+10cos(t+10⁰)+6cos(3t+35⁰) A.
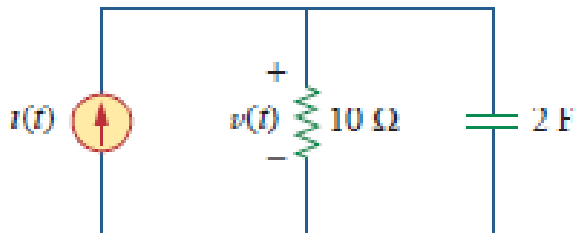
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R16

SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define crystallization of metals?   (2M)

    b) Explain isomorphous alloy system?   (2M)

    c) Compare malleable and nodular cast iron?   (3M)

    d) What are ferrite stabilizers?   (2M)

    e) What are the types of brass?   (3M)

    f) What are ceramics?   (2M)

PART -B

2. a) Explain in detail metallic bonding and its properties   (7M)

    b) Compare intermediate phases and solid solutions?   (7M)

3. a) Draw Cu-Ni phase diagram and label the important reactions and regions?   (7M)

    b) Explain different types of transformations in solid state? Illustrate with an example   (7M)

4. a) Explain the types of cast iron and their applications   (7M)

    b) Explain in detail Hadfield Manganese steel and its properties   (7M)

5. a) Compare annealing and normalizing. When do you use them   (7M)

    b) Explain in detail about different types of carburizing methods?   (7M)

6. a) Write in detail about the properties and applications of copper and its alloys?   (7M)

    b) Write the properties of alpha titanium alloy? Explain its typical applications   (7M)

7. a) Explain the properties and types of refractories   (7M)

    b) Explain carbon-carbon composite and its manufacturing procedure   (7M)

1 of 1

II B. Tech I Semester Regular Examinations, October/November - 2017
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
　　　 2. Answer **ALL** the question in **Part-A**
　　　 3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1.	a)	What is meant by an alloy?	(2M)
	b)	What is allotropy?	(2M)
	c)	What are luder bands?	(3M)
	d)	What are austenite stabilizers?	(2M)
	e)	What is admiralty brass?	(2M)
	f)	What are the types of manufacturing methods for composites	(3M)

PART -B

2.	a)	Explain crystallization of metals?	(7M)
	b)	Explain comparison method of grain size measuring technique?	(7M)
3.	a)	Find the degrees of freedom in a binary system (C=2) at single phase, double phase, and triple phase region at atmospheric pressure conditions using phase rule	(7M)
	b)	Explain metallographic method of construction of phase diagram?	(7M)
4.	a)	Explain in detail the properties and applications of low carbon steel?	(7M)
	b)	Write the properties of tool steel?	(7M)
5.	a)	Explain age hardening treatment?	(7M)
	b)	Explain carbonitriding? What are its applications	(7M)
6.	a)	Explain the properties and applications of aluminum and its alloys?	(7M)
	b)	Explain the properties of alpha-beta titanium alloys?	(7M)
7.	a)	What are cermets? Explain with examples.	(7M)
	b)	Write the classification of composites? Also indicate their typical applications	(7M)

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II B. Tech I Semester Regular Examinations, October/November - 2017
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Write the necessity of alloying?	(3M)
	b)	Write a eutectoid reaction?	(2M)
	c)	What is a dual phase steel?	(2M)
	d)	Define hardenability?	(2M)
	e)	Explain dezincification?	(3M)
	f)	What are the types of glasses?	(2M)

PART -B

2.	a)	Explain electron compounds?	(7M)
	b)	How does grain size affect the mechanical properties? Explain	(7M)
3.	a)	Write eutectic, peritectic, eutectoid and peritectoid reactions?	(7M)
	b)	Explain thermal analysis method of construction of phase diagram?	(7M)
4.	a)	Explain in detail the properties and applications of medium carbon steel?	(7M)
	b)	Explain the production of gray cast iron? Give their applications.	(7M)
5.	a)	How do you find the hardenability? Explain	(7M)
	b)	Explain cryogenic treatment? What are its advantages	(7M)
6.	a)	Write the properties and classification of aluminum alloys?	(7M)
	b)	Write the properties of beta titanium alloys?	(7M)
7.	a)	What are advanced ceramics? Explain.	(7M)
	b)	Explain the manufacture of fiber reinforced composites?	(7M)

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SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours
Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Define metallic bonding? (2M)
   b) Define equilibrium diagram? (2M)
   c) Explain the properties of white cast iron? (3M)
   d) Draw TTT diagram for eutectoid steel (3M)
   e) What is season cracking? Explain its effect (2M)
   f) What are refractories? (2M)

PART -B

2. a) Discuss the necessity of alloying in steel (7M)
   b) What are Hume-Rothery rules? Explain (7M)

3. a) Draw Fe-Fe$_3$C diagram? Explain the important phases (7M)
   b) Label the regions and mention important reactions and critical temperature lines of Fe-Fe$_3$C diagram? (7M)

4. a) Explain the production of malleable cast iron (7M)
   b) Write the classification of steel? (7M)

5. a) Write the effect of alloying elements on Fe-Fe$_3$C system? (7M)
   b) Explain hardening and tempering process (7M)

6. a) Write the classification of copper alloys? Describe the importance of brass. (7M)
   b) Explain the corrosion resistance of Al and its alloys (7M)

7. a) Write the classification of ceramics? Explain with examples. (7M)
   b) Explain the properties and applications of metal matrix composites (MMC)? (7M)

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II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
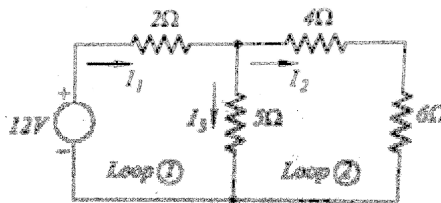(Com to ECE, EIE and ECC)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Derive an expression of the energy stored in an inductor. 2M

   b) Why an impedance represented by a complex number? How is complex impedance dependent on frequency? 3M

   c) A coil of impedance $R + jX_L$ is in parallel with a capacitor of $C = 10$ µF. If R = 10 Ω and L = 0.1 H. find the frequency at which it resonates, if connected to a variable frequency source. 3M

   d) List out the applications and limitations of Millman's theorem. 2M

   e) State driving point impedance and driving point admittance. 2M

   f) Define transient response. 2M

PART -B

2. a) Prove that in a linear graph, every cut-set has an even number of branches in common with every loop. 7M

   b) In the network shown below, find all branch currents and voltage drops across all resistors. 7M

3. a) Explain the method of representing alternating quantities as phasor quantities. What are the advantages of phasor representation? 7M

   b) A resistance of 12 Ω and an inductance of 0.025 H are connected in series across a 50 Hz supply. What values of resistance and inductance when connected in parallel will have the same resultant impedance and pf? Find the current in each case when the supply voltage is 230 V. 7M

1 of 2

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4. a) Explain about the concept of series R-L resonant circuit.   5M

   b) A series RLC circuit takes a maximum current of 0.3 A at 200 V, 50 Hz. If the voltage across the capacitor is 290V at resonance. Determine R,L,C and Q of the coil.   9M

5. a) Show that under the condition of maximum power transfer, the efficiency of the circuit is 50 %.   5M

   b) Find the value of R in the circuit shown in figure such that maximum power transfer takes place. What is the amount of this power?   9M

6. a) Derive expressions for the Y-parameters in terms of ABCD parameters of a two-port network.   7M

   b) Two two-port networks are connected in parallel. Prove that the overall y-parameters are the sum of corresponding individual y-parameters.   7M

7. a) Derive the non-homogeneous equation.   7M

   b) The following network is in steady state with S open. At t = 0, S is closed. Find $i_c(t)$ for t > 0.   7M

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R16

II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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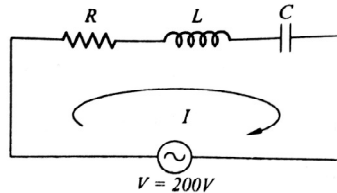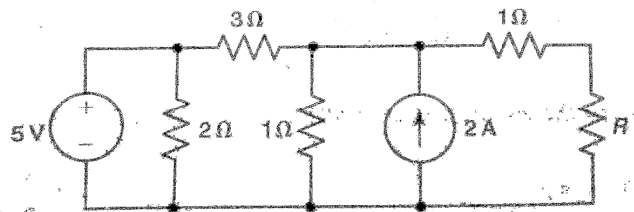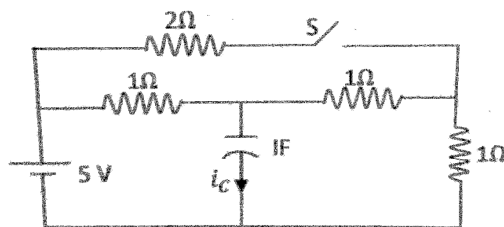
PART –A

1. a) Define V-shift and I-shift in the source transformation.   3M

   b) Why is a sinusoidal wave shape insisted for voltages and currents while   2M
      generating transmitting and utilizing ac electric power?

   c) Two coupled coils with self inductances of 1 H and 2 H are connected in series   3M
      aiding. The resulting inductance L_{eq} is 4 H. Find the coefficient of coupling
      between them.

   d) Mention some salient features of Tellegen's theorem.   2M

   e) What are the inverse transmission parameters and express their relations.   2M

   f) Define natural response   2M

PART -B

2. a) Explain the following   5M
      i)   The current through an inductor cannot change instantaneously.
      ii)   The voltage across a capacitor cannot change instantaneously.

   b) Determine the current through the impedance (2+j3) Ω in the circuit shown in   9M
      figure , where $V_b = 20\angle 0^o$ (V).

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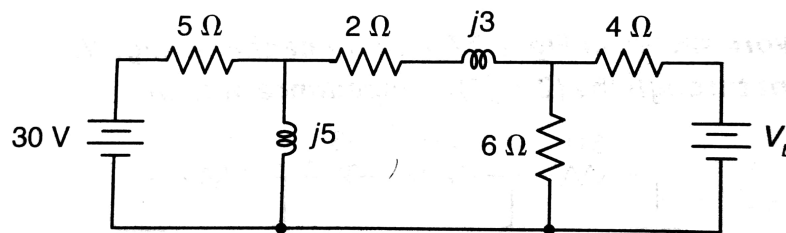
3. a) Use nodal voltage method to find the voltage of nodes 'm' and 'n' and currents through j2 Ω and – j2 Ω reactance in the network shown below   7M
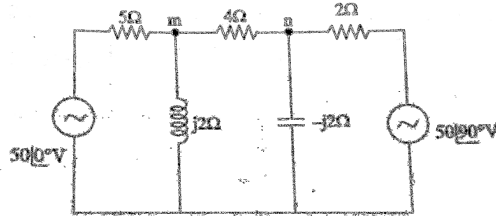
b) The impedances of a parallel circuit are $Z_1=(6+j8)\Omega$ and $Z_2=(8-j6)\Omega$. If the applied voltage is 120V, find (i) current and p.f of each branch   (ii) over all current and p.f of the combination. (iii) Power consumed by each impedance. Draw a neat phasor diagram.   7M
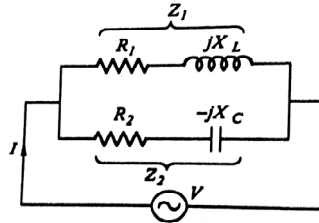
4. a) Derive the expression of the coefficient of coupling for the coupled circuit.   7M

b) Two inductively coupled coils have self inductances $L_1=50$ mH and $L_2=200$ mH. If the coefficient of coupling is 0.5 i) find the value of mutual inductance between the coils and ii) what is the maximum possible mutual inductance.   7M

5. a) Write the applications of superposition theorem.   5M

b) Find the voltage across 10 Ω resistance using superposition theorem.   9M
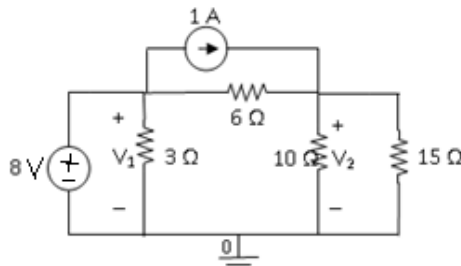
6. a) The h-parameters of a two-port network are $h_{11}=35$ ohm, $h_{12}=2.6 \times 10^{-4}$, $h_{21}=-0.98$, $h_{22}=0.3 \times 10^{-6}$ mho. The input terminals are connected to a 0.0001 V sinusoidal and a 10^4 ohm resistance is connected across the output port. Find the output voltage.   7M

b) The network shown in figure contains both dependent current source and a dependent voltage source. For this circuit, determine the y and z parameters.   7M

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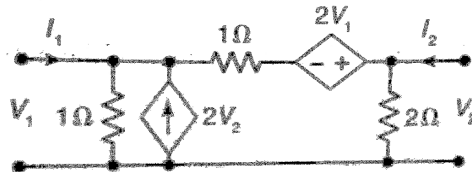
7. a) Derive the homogeneous equation.   5M

    b) In the following network the switch s is open and steady state is reached. At t =   9M
        0, S is closed. Find $i_L(t)$ for t > 0.
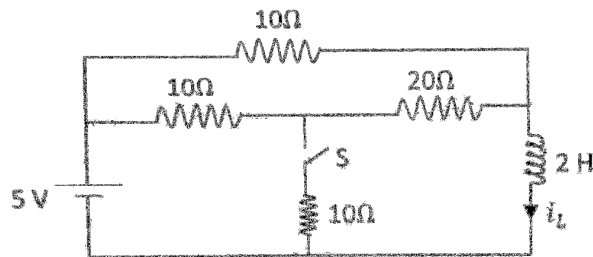
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II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
~~~~~~

PART –A

1. a) Comment briefly on the choice between loop and node methods of analyzing a network.   3M
   b) Mention some important characteristics of an ideal capacitor.   2M
   c) Compare the properties of series and parallel resonance circuits.   3M
   d) State and explain the substitution theorem.   2M
   e) What do you understand by a reciprocal network? What is a symmetrical network?   2M
   f) State the advantages of Laplace transform application to the solution of electric circuits.   2M

PART -B

2. a) Explain duality in electrical engineering. State the steps followed in finding the dual of a network.   7M
   b) For a half wave rectified alternating current find i) Average value, ii) RMS value, iii) Form factor, and iv) Peak factor. Find the average and RMS values when I_m is 3A.   7M

3. a) Obtain the star connected equivalent circuit of the delta connected circuit.   7M
   b) Obtain the delta connected equivalent for the star connected circuit shown in figure   7M

4. a) Explain the impedance transformation in an ideal transformer to achieve maximum power transfer.   7M
   b) Two coils connected in series have an equivalent inductance of 0.4H when connected in aiding, and an equivalent inductance of 0.2H when the connection is opposing. Calculate the mutual inductance of the coils.   7M

1 of 2

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5. a) State Thevenin's theorem, and write the applications.   5M

 b) Find the current through 8 Ω resistance for the network shown using Thevenin's theorem.   9M

6. a) Two two-port networks are connected in cascade. Prove that the overall transmission parameter matrix is the product of individual transmission parameter matrices.   7M

 b) Construct ABCD parameters.   7M

7. In the series circuit shown in figure the switch is closed on position 1 at t = 0. At t = 1 ms, the switch is moved the position 2. Obtain the equations for the current in both intervals and draw the transient current waves.   14M

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II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)
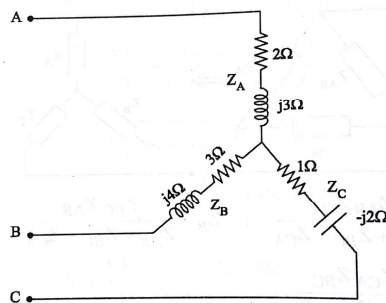
Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
　　　　2. Answer **ALL** the question in **Part-A**
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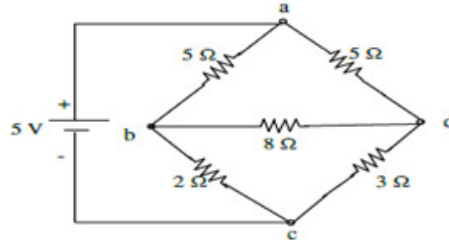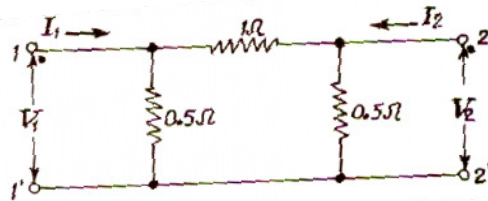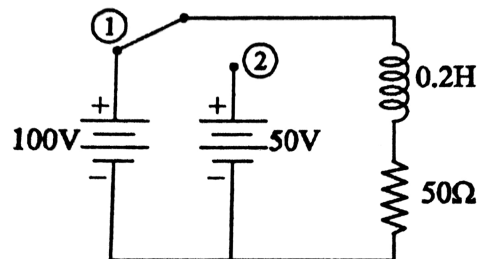
PART –A

1. a) What is the difference between circuits and networks?　　　　　　　　2M

　 b) Draw the phasor diagrams for resistor, ideal inductor and ideal capacitor.　2M

　 c) At resonance, the current is maximum in a series circuit and minimum in a parallel circuit. Why?　　　　　　　　　　　　　　　　　　　　　2M

　 d) Discuss about Norton's theorem and write its applications.　　　　　　2M

　 e) What are transmission parameters? Where are they most efficiently used.　3M

　 f) Write the expression for transient current for series RL and RC circuits?　3M

PART -B

2. a) Show that for a network graph with P separate parts, n nodes and b branches, the number of chords C is given as C = b – n + P　　　　　　　　7M

　 b) Find voltage across 12Ω resistance in the below figure.　　　　　　　7M

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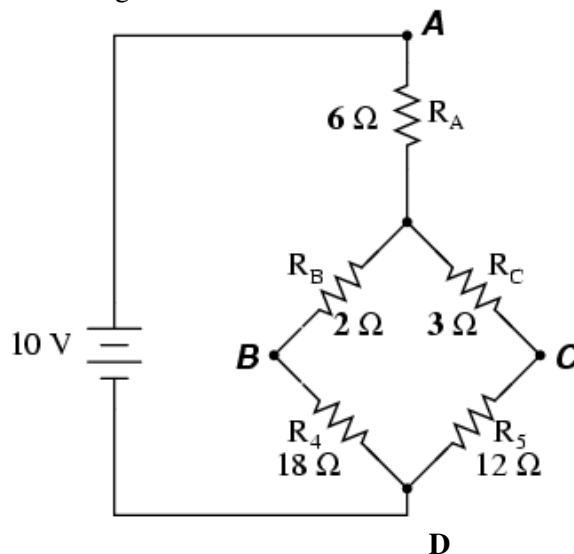
3. a) Explain about the steady state analysis of resistance in parallel combination with sinusoidal excitation.   7M

   b) A pure inductance of 3 mH carriers a current of the waveform shown in figure. Sketch the wave form of V(t) and P(t). Determine the average value of power.   7M
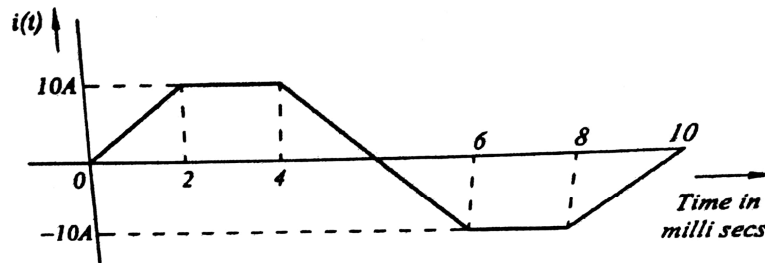
4. a) Derive the expression for bandwidth of series resonating circuit and its relation with Q.   5M

   b) An inductance of 0.5H, a resistance of 5Ω and a capacitance of 8μF are in series across a 220V ac supply. Calculate the frequency at which the current flowing through the circuit becomes maximum. Also, find bandwidth, half power frequencies and voltage across capacitance at resonance.   9M

5. a) State the reciprocity theorem as applied to a network and give a proof of the same for a general network. Mention two networks where this theorem is not applicable.   6M

   b) In the circuit shown in figure, find voltage V. Interchange the current source and resulting voltage V and show that the reciprocity theorem is verified.   8M
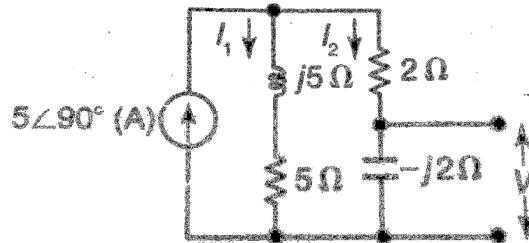
6. a) Define open circuit parameters. Explain how the open circuit parameters can be obtained for a given two port network.   7M

   b) A two port network has the following parameters: $Z_{11}=6$ Ω, $Z_{12}=Z_{21}=3$ Ω and $Z_{22}=4$ Ω. Calculate hybrid parameters   7M

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7. a) Determine the DC response of RL and RC circuit and sketch the voltage   7M
        transients.
    b) The circuit shown in figure consists of series RL elements. The sine wave is   7M
        applied to the circuit when the switch is closed at t = 0. Determine the current
        i(t).
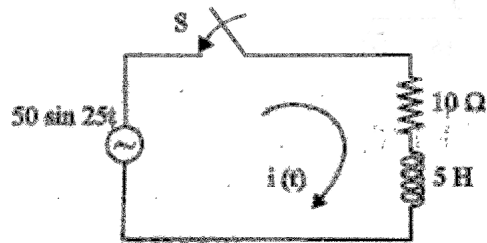
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R16

SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
STATISTICS WITH R PROGRAMMING
(Com to CSE & IT)

Time: 3 hours
Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Write about vectors in R (2M)

   b) Write about type conversions in R? (2M)

   c) Describe 3 math functions in R? (2M)

   d) Write about lines() function. (2M)

   e) Mention any two applications of t-distribution (2M)

   f) Write about logistic regression (2M)

PART -B

2. a) Explain different data structures in R. (7M)

   b) Implement binary search tree with R (7M)

3. a) Explain different types of operators inR. (7M)

   b) Write about control statements in R (7M)

4. a) Write about all summary commands in R? (7M)

   b) What is cumulative sum,product,min,max? Explain with example? Write R functions used for this purpose? (7M)

5. a) Write about scatter plot and histograms with examples? Explain its importance? (7M)

   b) How to plot multiple curves in same graph? Explain with example? (7M)

6. a) Explain about descriptive statistics? Write examples? (7M)

   b) Fit a Binomial distribution to the following data (7M)
   x=0 1   2   3 4 5
   f=2 16 28 12 9 3

7. a) Write in detail about Random Forest (7M)

   b) The students taught by 3 different methods gave the following performance(marks): (7M)
   A 19,9,12,16,7,14,11
   B 8,13,3,17,15
   C 14,11,10,9,15,16
   Calculate the analysis of variance

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PART –A

1. a) Explain the importance of dataframe?   (2M)

    b) Write about complex objects in R.   (2M)

    c) Explain about set operations in R.   (2M)

    d) Find median and mode of following numbers   (2M)
       12,13,11,10,9,11,7,11,10,15,16,11

    e) Write about polygon() function   (2M)

    f) Mention how you can produce co-relations and covariances in R?   (2M)

PART –B

2. a) Write about the following with example   (7M)
      a)Mean b)Mode c)Median d)Cumulative Sum
      e)Cumulative Max f)Cumulative Min g)Cumulative Product

    b) Write about data frame? Write about operations on data frame.   (7M)

3. a) Write R code to the function by using if else command   (7M)
      $f(x) = x$ if $x<1/2$
      $= (1-x)$ if $1/2<x<1$
      $= 0$ otherwise

    b) Write about nested functions in R.   (7M)

4. a) Write about apply method in R? write about lapply,sapply with suitable examples?   (7M)

    b) Write about different functions for statistical distribution.   (7M)

5. a) How to plot multiple curves in same graph? Explain with example?   (7M)

    b) Plot the function $g(t) = (t^2 + 1)^{0.5}$ for t between 0 and 5.(using curve and plot function)   (7M)

6. a) Write about Binomial Distribution   (7M)

    b) Explain Anova test with example   (7M)

7. a) Following are the runs scored by a batsman in 10 consecutive matches: (7M)
      22,98,13,54,77,61,45,32,19,85
      Compute coefficient of variation

    b) Fit a polynomial of degree 2 to the following data   (7M)
      X 0 1 2
      Y 1 6 17

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R16

SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
STATISTICS WITH R PROGRAMMING
(Com to CSE & IT)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are the data structures in R that is used to perform statistical analyses and create graphs? (2M)

    b) Write about linear vector algebra operations. (2M)

    c) Write syntax of if else in R. (2M)

    d) Define mean, median, mode and standard deviation. (2M)

    e) Write R script to create a linegraph. (2M)

    f) what is the use of par() function. (2M)

PART –B

2. a) How to apply same functions to all rows and columns of a matrix? Explain with example. (7M)

    b) Write R code to generate first n terms of a Fibonacci series (7M)

3. a) Write about user defined functions in R with suitable example? Explain about default values and in return statements in functions? (7M)

    b) Write a R program to implement quicksort. (7M)

4. a) Write about sort, rank and order functions with examples. Write about functions for statistical distributions. (7M)

    b) Explain about Finding Stationary Distributions of Markov Chains (7M)

5. a) What is Box plot? Explain importance of boxplot with example? (7M)

    b) Draw a pie chart for the following data (7M)
    Section   I,   II,   III ,   IV,   V
    No.of workers 220,370, 190, 70, 250

6. a) Write about Poisson Distributions (7M)

    b) Explain t-test with example (7M)

7. a) Heights(in cm) of father and son are given as follows (7M)
    Father(X)   150 152 155 157 160 161 164 165
    Son(Y)   154 156 158 159 160 162 161 164
    Fit a regression line predict the height of son given the height of father.

    b) Explain about logistic regression. (7M)

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II B. Tech I Semester Regular Examinations, October/November - 2017
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2. Answer **ALL** the question in **Part-A**
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PART –A

1. a) Explain different matrix operation function in R?   (2M)

   b) Write about Boolean operators in R.   (2M)

   c) Write about basic math in R?   (2M)

   d) Write about plot function.   (2M)

   e) Explain dnorm() function   (2M)

   f) Define Multiple Regression   (2M)

PART –B

2. a) Explain about Variables,constants and Data Types in R Programming   (7M)

   b) How to create, name ,access , merging and manipulate list elements? Explain   (7M)
      with examples.

3. a) Write about Arithmetic and Boolean operators in R programming?   (7M)

   b) How to create user defined function in R? How to define default values in R?   (7M)
      Write syntax and examples?

4. a) Explain functions for accessing the keyboard and monitor, Reading and writing   (7M)
      files
   b) Write a R function to find sample covariance.   (7M)

5. a) Write about the following functions with example   (7M)
      a)points()   b) legend()   c)text()   d) locator()
   b) Describe R functions for Reading a Matrix or Data Frame From a File   (7M)

6. a) Fit a poisson distribution to the following data   (7M)
      x 0,1,2,3,4,5
      f 3,9,12,27,4,1
      Also test the adequacy of model
   b) Calculate the coefficient of correlation to the following data   (7M)
      X 10 12 18 24 23 27
      Y 13 18 12 25 30 10

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7. a) Fit a straight line Y=a+bx to the following data   (7M)
   X 12,17,19,25,32,38,43
   Y 65,78,82,92,90,97,100
   Also estimate Y when X=35

   b) In a sample of 1000 cases, the mean of certain test is 14 and standard deviation   (7M)
   is 2.5. Assuming the distribution to be normal, find
   i)How many students score between 12 and 15?
   ii) How many score above 18?
   iii) How many score below 18?

RA

II B. Tech I Semester Regular Examinations, October/November - 2017
DATA STRUCTURES
(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Define Sparse matrix? (2M)

   b) Which Data Structure is used to handle recursion? Explain? (2M)

   c) Discuss advantages and disadvantages of linked list over arrays? (3M)

   d) What is spanning tree? (2M)

   e) Find Transitive Closure's of a graph by taking an example graph? (2M)

   f) What is Heap Sort? (3M)

PART -B

2. a) Define Polynomial ADT? Implement Polynomials using Arrays and Lists? (7M)

   b) Write a program for matrix multiplication? (7M)

3. a) Write the procedure for performing Push() and Pop() operations in a stack while the stack implemented using linked list. (9M)

   b) Discus applications of Stacks (5M)

4. a) Write the procedure for doing insertion and deletions in single linked list (7M)

   b) Discuss the advantages of circular linked list over single and double linked lists? (7M)

5. a) Explain inorder traversal of a threaded Binary Tree with an example? (7M)

   b) Define a Binary Tree? Explain the properties of binary tree? Construct a binary tree with minimum 4 levels? (7M)

6. a) Write Prim's algorithm for finding minimum cost spanning trees? (7M)

   b) Find minimum cost spanning tree from the following graph by using Prim's algorithm? (7M)

7. a) Discuss briefly insertion sort procedure with an example? (7M)

   b) Which sorting technique is best between quick sort and merge sort? Why? Explain in detail? (7M)

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R13

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours   Max. Marks: 70
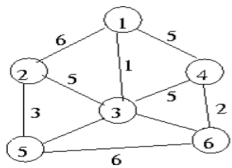
Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) List the applications of surface tension?   (3M)
   b) Differentiate between stream function and velocity potential.   (4M)
   c) How do you find force acting on a pipe bend?   (4M)
   d) Define thickness of the boundary layer for flow over a flat plate.   (4M)
   e) List Minor losses and explain briefly.   (3M)
   f) Draw a neat sketch of venturimeter and explain its parts.   (4M)

PART –B

2. a) List all fluid properties and derive Newton's law of viscosity.   (8M)
   b) What are the modes of measuring pressure? How can you convert the pressure in   (8M)
      KPa into the liquid columns and vice-versa?

3. a) What are different types of flows? Explain in detail.   (8M)
   b) A circular plate 4 m in diameter is placed in such a way that it top vertex is at 2 m   (8M)
      below free water surface and bottom vertex is 5 m below the free water surface.
      Find out the total pressure acting on the plate.

4. a) Derive the Bernoulli's equation from Euler's equation. State the assumptions
      made.   (8M)
   b) A pipe line tapers from 1.5 m in diameter at higher end to 1.0 m diameter at lower   (8M)
      end in 400 m length at a slope of 1 in 100. The pressure at the higher end is 75
      KPa. If the discharge is 60 m^3/minute, find the pressure at lower end. Neglect
      losses.

5. a) What is a boundary layer? Differentiate between a laminar and turbulent boundary
      layer.   (8M)
   b) Compare the velocity profiles in a pipe for (i) laminar and (ii) turbulent flow.   (8M)

6. a) Write Darcy's equation and explain its significance.   (6M)
   b) Two reservoirs with a difference in water surface elevations of 10 m are connected   (10M)
      by a pipe line ABC which consists of two pipes of AB and BC joined in series.
      Pipe AB is 10cm in diameter, 20m long and has a value of f =0.02. Pipe BC is of
      16cm diameter, 25m long and has f=0.018. The junctions with the reservoirs and
      between the pipes are abrupt. Calculate the discharge considering all minor losses.

7. a) Explain the working of orifice meter with neat sketches.   (8M)
   b) A pipe carries a flow of an oil of Relative Density = 0.85. A pitot-static tube is   (8M)
      inserted into the pipe to measure the velocity at a point A. If a differential
      mercury-oil gauge connected to the pitot-static tube indicates a reading of 4cm,
      calculate the velocity at A Assume the coefficient of the pitot tube as 0.99.

R13

SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) What is meant by a three phase balanced network? Give its properties.   (4M)
   b) Give comparison between balanced and unbalanced circuits.   (4M)
   c) Write about the transient response of R-L circuit?   (4M)
   d) Write the basic equations of Z and Y parameters?   (4M)
   e) Write briefly about the positive real function?   (4M)
   f) State Fourier theorem?   (2M)

PART –B

2. a) Discuss in detail about the measurement of power and power factor of a balanced   (8M)
      three phase circuit?
   b) Find the line currents provided by the balanced supply of 100V, 50Hz and each   (8M)
      phase is having an impedance of (6.5+8.1j) connected in delta?

3. a) Derive the relations for the 3 phase un balanced network?   (8M)
   b) A 20HP induction motor is supplied from 400V 3 phase 50Hz supply. The   (8M)
      efficiency being 85% the power factor of the operation is 0.8. Obtain the active
      power consumed, the apparent power, the reactive power and the line current?

4. a) Analyze the transient response of R-C series network with D.C excitation?   (8M)
   b) A D.C voltage of 100 V is applied to a coil having R=100ohms and L=10.1H.   (8M)
      What is the value of the current 0.1 sec later the switch is ON? What is the time
      taken by the current to reach half of its final value?

5. a) Derive the hybrid parameters of a two port network?   (8M)
   b) Express the relationship between Z-and h-parameters.   (8M)

6.   Synthesis all four forms (Foster form I & II, Cauer form I & II) of RC driving   (16M)
      point function $Z_{RC}(s) = \dfrac{4(s+2)(s+4)}{(s+1)(s+3)}$.

7. a) Explain about even function symmetry in Fourier series?   (5M)
   b) Explain briefly about phase angle spectra and line spectra   (6M)
   c) Explain the trigonometric form of Fourier series.   (5M)

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II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
METALLURGY AND MATERIAL SCIENCE
(Com. to ME, AME)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1.	a)	Define covalent and metallic bonds in solids.	(3M)
	b)	Explain the importance of phase rule.	(3M)
	c)	What are the advantages of heat treatment of metals?	(4M)
	d)	Write the specific properties of nano materials.	(4M)
	e)	Name a few Titanium alloys.	(4M)
	f)	Differentiate between brass and bronze.	(4M)

PART –B

2.	a)	Draw the close packed planes and directions in simple cube, BCC and FCC crystals and find out the Miller indices of the planes.	(8M)
	b)	Explain briefly the various types of crystal imperfections, with the help of neat sketches	(8M)
3.	a)	Explain Hume - Rotherys rules for the formation of substitutional solid solutions	(8M)
	b)	Discuss the application of Hadfield manganese steels.	(8M)
4.	a)	What is a eutectic temperature? Explain.	(8M)
	b)	Describe the allotropic transformations of iron and explain their important Applications	(8M)
5.	a)	How do you carry out age hardening for Al alloys?	(8M)
	b)	Explain the properties of Cu-Al alloy and applications	(8M)
6.		Explain why the two phase titanium alloys are stronger than the single phase alpha alloys.	(16M)
7.		What are the various solid state compaction processes that are used for the production of composite materials? Explain them	(16M)

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R13

SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
DATA STRUCTURES
(Com. to ECE, CSE, EIE, IT, ECC)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1.	a)	Write an algorithm for factorial of a given number	(4M)
	b)	What are the applications of Queue	(3M)
	c)	What are the advantages of double linked list	(4M)
	d)	What is the maximum length and height of a tree with 32 nodes	(4M)
	e)	Explain the searching operation of binary search tree with an example	(4M)
	f)	What is spanning tree	(3M)

PART –B

2.	a)	Sort the following list of elements by using merge sort 39, 16, 45, 11, 55, 18, 43, 88	(8M)
	b)	Explain about the Towers of Hanoi problem	(8M)
3.	a)	Write an algorithm to convert an infix expression into prefix expression	(8M)
	b)	Explain the operations of a Queue with an example	(8M)
4.	a)	Write a program for the implementation of circular linked list	(10M)
	b)	Explain the operations of singly linked lists	(6M)
5.	a)	Write an algorithm for post order traversal	(8M)
	b)	Explain the operations of binary tree with an example	(8M)
6.	a)	Write deletion algorithm of binary search tree	(8M)
	b)	Define Binary tree. Explain how to represent the Binary tree with an example	(8M)
7.	a)	Write an algorithm of BFS	(8M)
	b)	Explain about the Prim's minimum cost spanning tree with an example	(8M)

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II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
FLUID MECHANICS AND HYDRALICS MACHINES
(Com. to EEE, ME, MM)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) State and explain Newton's viscosity law. (5M)

   b) A plate, 0.5 mm distance from the fixed plate moves with 50 cm/sec and requires (10M)
   5 N/m^{2}force to maintain the speed of moving plate. Determine the viscosity of the
   oil between the plates.

2. a) Differentiate between tangential and normal acceleration and find out the (7M)
   expressions for both.

   b) A converging pipe is 20 cm inlet and 10 cm outlet and 5 m long is lying in the (8M)
   vertical plane making an angle 45^0 to the horizontal. The pipe is carrying the water
   24 m^3/ min. The pressure of the water at the inlet is 500 kPa, find the pressure of
   the water at the exit.

3. a) Describe Reynolds experiments to demonstrate the two types of flow. (6M)

   b) An oil of sp.gr. 0.9 and viscosity 0.06 poise is flowing through a pipe of diameter (9M)
   200mm at the rate of 60 liters/s. Find the head lost due to friction for a 500 m
   length of pipe. Find the power required to maintain this flow.

4. a) Obtain an expression for the force exerted by a jet of water on a fixed vertical (6M)
   plate in the direction of the jet.

   b) A jet of water of diameter 100 mm moving with a velocity of 30 m/s strikes a (9M)
   curved fixed symmetrical plate at the center. Find the force exerted by the jet of
   water in the direction of the jet, if the jet is deflected through an angle of 120° at
   the outlet of the curved plate.

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5. a) Explain load factor, utilization factor and capacity factor. What is the significance of them?   (8M)

   b) The average annual yield of a river at a dam site is 2000 ha-m. Assuming that the entire yield is available for power generation, estimate the water power potential. The average net head available is 52 m. Also estimate the available energy. Take efficiency of turbine as 80% and the efficiency of the generator as 90%.   (7M)

6. A Francis turbine is fitted with a straight conical draft tube of height 6 m and diameters 1 m at top and 2 m at bottom. The draft tube is submerged in the tail race to a height of 1.5 m. The velocity of water at the draft tube inlet is 6 m/s. Assume that the friction head lost in tube is 0.125 times the velocity head at inlet. Compute the efficiency of the draft tube and the vacuum pressure of water at the draft tube inlet. What is the head and power saved by the draft tube?   (15M)

7. a) Derive the equation of unit speed and unit discharge of a turbine.   (7M)

   b) What is cavitation? How can it be avoided in reaction turbine?   (8M)

8. a) Discuss the detailed classification of pumps   (7M)

   b) What precautions are to be taken while starting and closing the pump?   (8M)

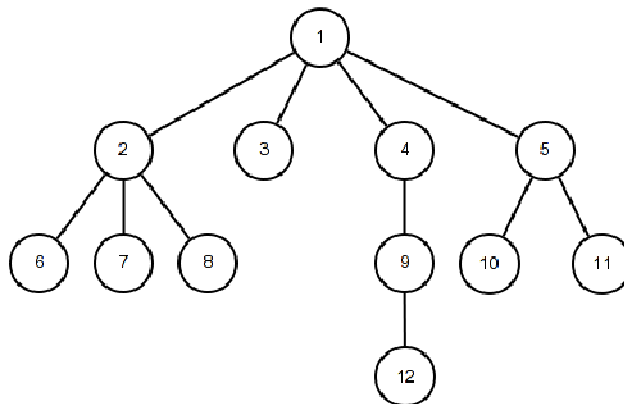|"|'|"|"|'|"|'"||

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
DATA STRUCTURES
(Com. to CSE, IT, ECC)

Time: 3 hours   Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Differentiate between recursive and iterative algorithms.   (6M)

   b) Write a recursive algorithm that counts all occurrences of a given character in a   (9M)
      string.

2. a) Write the algorithm for Radix Sort.   (8M)

   b) Using merge sort algorithm, merge the below two sorted lists.   (7M)
      6 12 29 37 87 92
      13 21 27 28 29 43 58 67 72 77

3. a) Device an algorithm to copy the contents of one stack to another preserving the   (9M)
      order of elements. (A temporary stack may be used, if required)
   b) Explain how queue operations can be implemented using stack.   (6M)

4. a) With an example explain how linked list can be used to represent polynomial   (6M)
      expressions.
   b) Write a C program that accepts a list of integers from keyboard and creates a   (9M)
      double linked list using them.

5. a) Write recursive algorithms for all tree traversal techniques.   (10M)

   b) For the tree given below, find out: (5M)
      i) Ancestors of 9
      ii) Siblings of 3
      iii) Height of sub tree 4
      iv) Degree of 2
      v) Children of 5

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6. a) What is a balanced binary search tree? Why trees are t be balanced? With (7M)
examples list different types of balanced binary search trees.
 b) Write an algorithm to find smallest and largest elements in a binary search tree. (8M)

7. a) If vertices of a graph are labeled from A to F, draw the pictorial form of graph (7M)
from the adjacency matrix given below:

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \end{pmatrix}$$

And also represent the same graph using adjacency list.
 b) State and explain Prim's algorithm with an example. (8M)

8. What is ADT? Describe the implementation of stack ADT. (15M)

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