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Code No: R21026 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Compare the motion and trajectories of electron when placed
   i) Only in electric field
   ii) Only in Magnetic field
   iii) Combined electric and magnetic fields. (15M)

2. a) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closer to conduction band.
   b) Explain the concept of Hall Effect. (9M+6M)

3. a) Compare the characteristics of a P-N Junction diode, and Zener diode.
   b) Explain the formation of depletion region in an open-circuited PN-junction with neat sketches. (7M+8M)

4. a) Define the terms as referred to FWR circuit.
   i) PIV ii) Average DC voltage iii) RMS current iv) Ripple factor.
   b) In a full wave rectifier the required DC voltage is 10V and the diode drop is 0.5V. Calculate AC r.m.s input voltage required in case of bridge rectifier circuit and centre tapped full wave rectifier circuit. (8M+7M)

5. a) With neat diagram explain the various current components in a PNP transistor.
   b) Explain the input and output characteristics of a transistor in CB configuration. (8M+7M)

6. a) Describe the operation of UJT. Draw its equivalent circuit and hence define the Intrinsic Standoff ratio. Draw its characteristic curve and explain the various Parameters.
   b) Write a note on Silicon-Controlled Rectifier. (9M+6M)

7. a) Derive the condition to avoid the thermal runway.
   b) Draw the circuit diagram of a fixed bias and self bias circuits and derive the expressions for stability factors. (7M+8M)

8. a) Write a short note on Miller's theorem.
   b) Analyze a single stage transistor amplifier using h - parameters. (6M+9M)
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1. a) List out the advantages and disadvantages of both electrostatic and electromagnetic deflection systems
   b) Explain the terms:
   i) Potential ii) Electron Volt. iii) Charge density iv) Current density. (7M+8M)

2. a) What is Fermi-level? Prove that the Fermi level in a 'p'-type material is much closer to valency band.
   b) What do you mean by step graded junction? Derive the expression for diffusion capacitance. (8M+7M)

3. a) Explain the concept of tunneling with energy band diagrams.
   b) Explain the principle of operation of Varactor diode and photo diode. (7M+8M)

4. a) Define the following for a HWR:
   i) Ripple factor ii) PIV iii) TUF iv) Rectification efficiency
   b) Compare Full wave and Bridge rectifiers with respect to ripple factor, regulation, Rectification efficiency and PIV ratings. (8M+7M)

5. a) With neat diagram explain the various current components in a PNP transistor.
   b) Explain the input and output characteristics of a transistor in CE configuration. (8M+7M)

6. a) Define intrinsic standoff ratio and Draw the symbol and equivalent circuit of a UJT.
   b) Explain principle of the operation of UJT with the help of its V-I characteristics. (8M+7M)

7. a) Explain how self biasing can be done in a BJT, draw the equivalent circuit and find the stability factor for it.
   b) Explain the term "Thermal Runaway" and how to overcome it. (9M+6M)

8. With the help of exact and approximate hybrid model, derive expressions for current gain (A_I), input Impedance (Z_i), output impedance (Z_o) and voltage gain (A_V) of CE amplifier. (15M)
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1. a) List out the advantages and disadvantages of both electrostatic and electromagnetic deflection system?
   b) Explain the terms: (i) Potential (ii) Electron Volt (iii) Charge density (iv) Current density (7M+8M)
2. a) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closer to conduction band
   b) Define Hall Effect, Diffusion and Continuity Equation. (9M+6M)

3. a) Explain the Zener diode characteristics in Reverse biased condition.
   b) Explain Zener diode as voltage regulator. (8M+7M)

4. a) Define the following terms of a rectifier and filter: i) Ripple Factor ii) Regulation iii) Rectification Efficiency iv) Form Factor v) Peak factor
   b) Explain full wave rectifier with capacitor filter with help of wave forms. (7M+8M)

5. a) With neat sketches explain the cut off region, active region and saturation region of CE output characteristics.
   b) The current gain of transistor in CE circuit is 49. Calculate CB current gain and find the base current where the emitter current is 3 mA. (8M+7M)

6. a) Explain MOSFET V-I characteristics in Enhancement and depletion mode.
   b) What are the advantages JFET over BJT? (8M+7M)

7. a) Define stability factors S, S' and S''' and determine stability factor for collector to base bias
   b) Explain the term "Thermal Runaway" and suggest methods to overcome it. (9M+6M)

8. With the help of exact and approximate hybrid model. Derive the expressions for current gain, input Impedance, output impedance and voltage gain of a CB amplifier. (15 M)
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1. Compare the motion and trajectories of electron when placed (15M)
   i) Only in electric field ii) Only in Magnetic field iii) Combined electric and magnetic fields.

2. a) What is Fermi-level? Prove that the Fermi level in an 'p'-type material is much Closed to conduction band
   b) Explain the concept of tunneling with energy band diagrams. (9M+6M)

3. a) Explain how a variable capacitance can be built using a Varactor diode.
   b) Explain the principle and operation of photo diode with help of neat diagram. Also draw the V-I characteristics. (7M+8M)

4. a) Derive the expression for ripple factor, regulation, rectification efficiency for half wave rectifier.
   b) Define the terms as referred to FWR circuit: i) PIV ii) Average DC voltage iii) RMS current iv) Ripple factor. (7M+8M)

5. a) With neat diagram explain the various current components in an NPN transistor.
   b) Explain the input and output characteristics of a transistor in CB configuration. (8M+7M)

6. a) Describe the operation of UJT. Draw its equivalent circuit and hence define the intrinsic standoff ratio. Draw its characteristic curve and explain the various Parameters.
   b) Explain principle of operation of SCR using its V-I characteristics. (8M+7M)

7. a) Derive the expressions for stability factors in the case of self bias of a CE mode transistor.
   b) Explain biasing compensation techniques. (8M+7M)

8. a) Write a short note on Miller's theorem.
   b) Analyze a single stage transistor amplifier using h - parameters. (7M+9M)
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II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL CIRCUIT ANALYSIS - I
(Electrical and Electronics Engineering)

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1. a) Define ohm's law & KCL.
   b) Calculate the voltage across a 5H Inductor at t = 1 s and 3 s, when a current having the variation shown in Figure 1, is flowing through the inductor. Plot the voltage across inductor against time. (3M+12M)

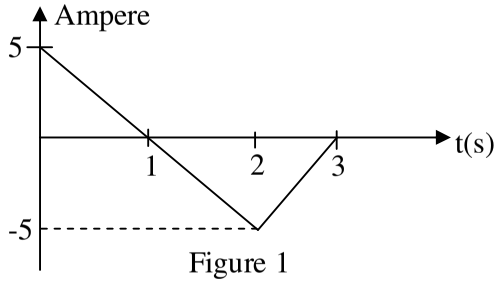

Figure 1

2. a) Compare series and parallel circuits?
   b) Use mesh analysis to find currents in the circuit shown in Figure 2. (3M+12M)

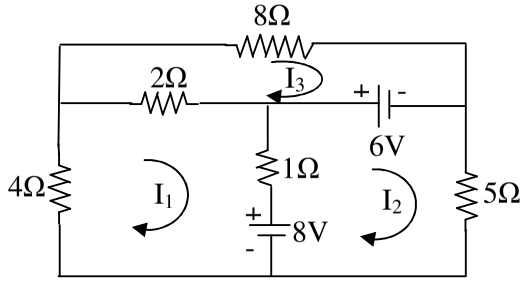

Figure 2

3. a) Determine R.M.S and Average value of the waveform shown in Figure 3.

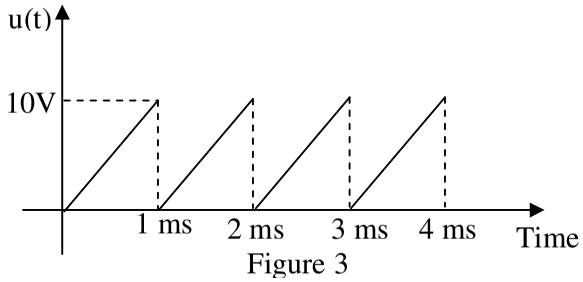

Figure 3

   b) In a series RL circuit R= 5 ohms and L= 0.06H and the voltage across Resistor is V_R=15 sin200t. Find the current and total voltage across the circuit. (7M+8M)
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4. a) For a given series RLC circuit with R=100Ω, L=0.5H and C=40μF, Calculate the resonance, lower & upper half power frequencies.
   b) For the circuit shown in figure 4 below, draw the admittance locus and state whether resonance is possible. (7M+8M)

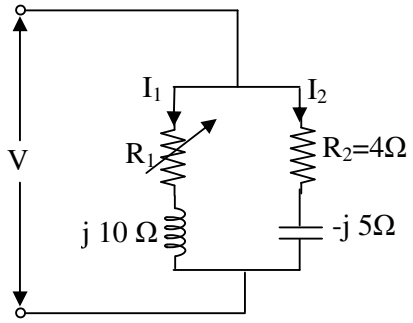

Figure 4

5. a) The self Inductance of one of the mutually coupled coils is 300mH and the mutual inductance between them is 100mH. Determine: i) Self inductance of the other coil and ii) turns ratio. Assume a Co-efficient of coupling equal to 0.7.
   b) What are the faraday's laws of Electromagnetic Induction? Explain.
   c) Define Co-efficient of coupling. (8M+5M+2M)

6. a) For the given network shown in Figure 5, draw the graph and chose a possible tree. Construct the basic tie set schedule. Write the equation for the branch currents and interns of the link current & write separately the independent equations.
   b) Define: i) Graph ii) Path iii) Connected graph.
   c) Geometrically formulate the dual network shown in Figure 6. (7M+3M+5M)

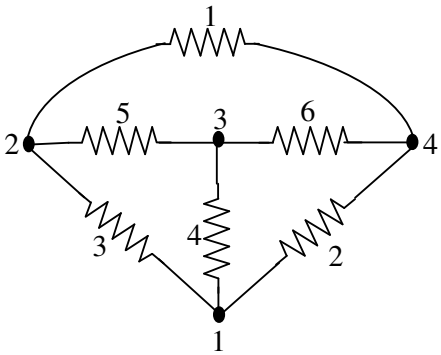

Figure 5

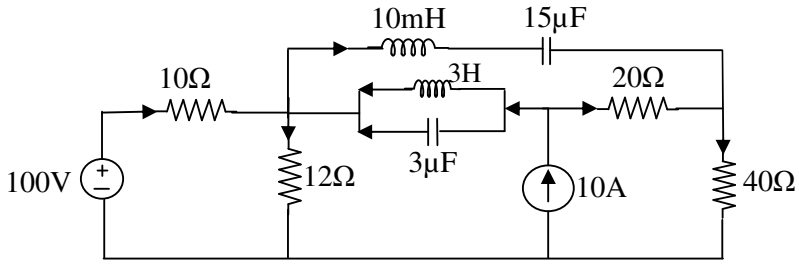

Figure 6

7. a) Find the Maximum power dissipated in R_L for the circuit shown in Figure 7.
   b) Write down the statement of Millman's theorem with example. (10M+5M)

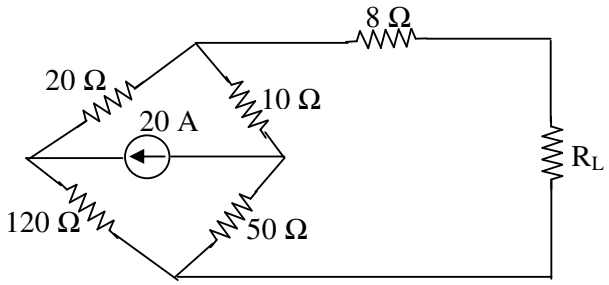

Figure 7

8. Find the value of source E_2 in Figure 8, using Tellegen's theorem if the power absorbed by E_2 is 20W. (15M)

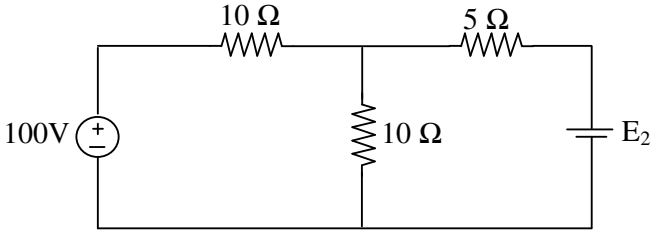

Figure 8

Code No: R21023 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL CIRCUIT ANALYSIS - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

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1. a) Write down the properties of inductor and capacitor.
   b) Using source transformation approach, find the voltage across the 10Ω resistor in the circuit of Figure 1? (5M+10M)

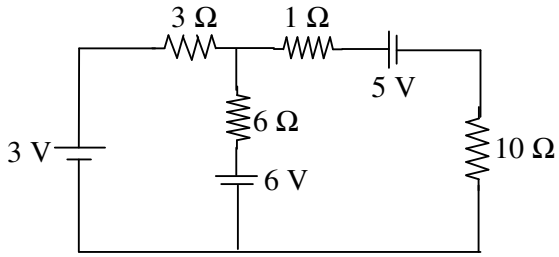

Figure 1

2. a) Explain Kirchhoff's law with example. (6M+9M)
   b) Determine the resistance between the points A and B of the network shown in Figure 2.

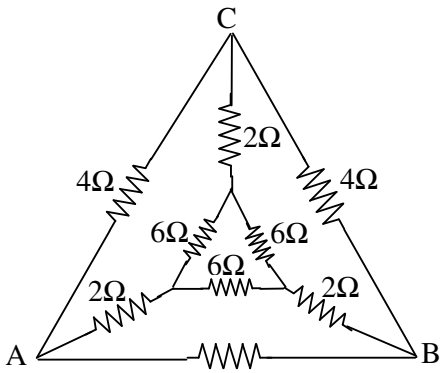

Figure 2

3. a) Determine the peak factor and form factor of the waveform shown in Figure 3.
   b) A Resistor of 100Ω in series with a capacitance of 50μF is connected to a supply of 200V, 50Hz. Find: i) impedance ii) current iii) phase angle and iv) voltage across the resistor & capacitor. (8M+7M)

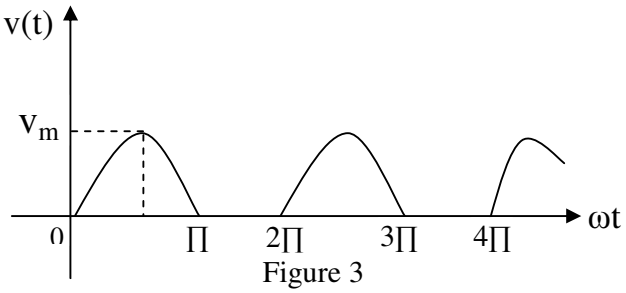

Figure 3
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4. a) Two coils, one with $R_1 = 0.51\Omega$, $L_1 = 32mH$, the other with $R_2 = 1.3\Omega$ and $L_2 = 15mH$ and two capacitors of 25μF and 62μF are all in series with a resistance of 0.24Ω. Determine the following for this circuit.
   i) Resonant frequency ii) Q of each coil
   iii) Q of the circuit iv) Cut off frequencies.
   b) Obtain the current locus for the circuit of Figure 4, and find the value of R_c which results in a phase angle of 45° between V & I. (8M+7M)

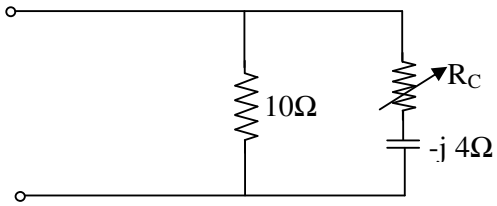

Figure 4

5. a) For the circuit shown in Figure 5, compute the load impedance Z_L for the maximum transfer of power. What is the maximum power transferred and efficiency?
   b) Define self and mutual inductances with neat sketch.
   c) Define: i) MMF ii) Flux iii) Reluctance. (8M+4M+3M)

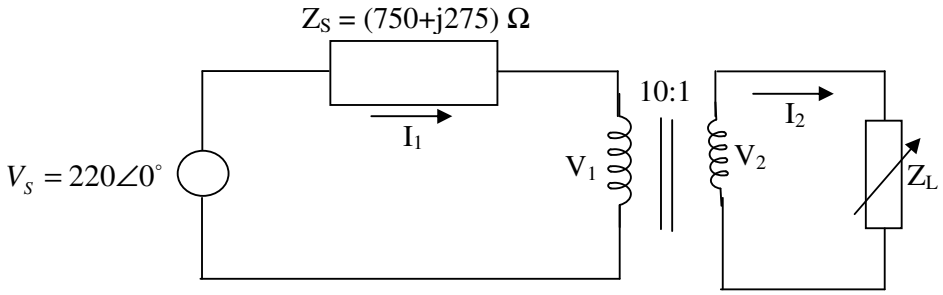

Figure 5

6. a) Determine the basic cutest matrix for the oriented graph given in Figure 6 where the elements 1, 2, 3 are free branches.
   b) Define: i) Loop ii) Planar graph and iii) Oriented graph
   c) For the Network shown in Figure 7, formulate its dual network. (7M+3M+5M)

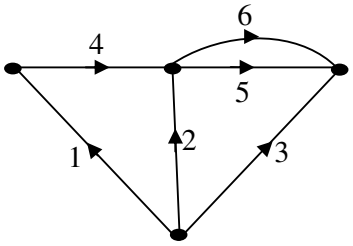

Figure 6

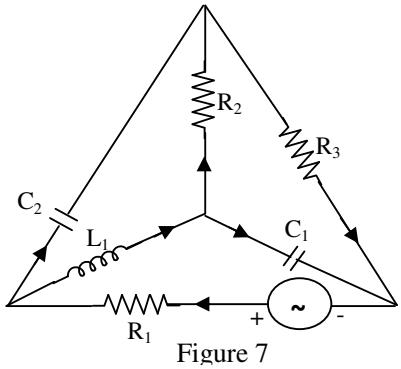

Figure 7

7. Find the Thevenin's and Norton's equivalent circuits for the network shown in Figure 8.(15M)

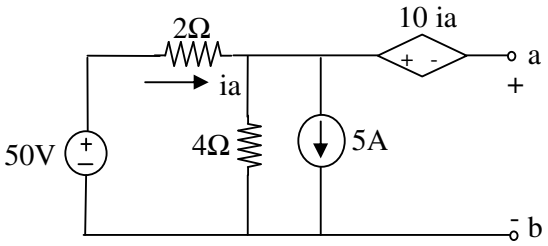

Figure 8

8. a) Write down the statement of compensation theorem with example.
   b) Find the current through 2Ω resistor in the circuit shown in Figure 9, and verify the reciprocity theorem.

(5M+10M)

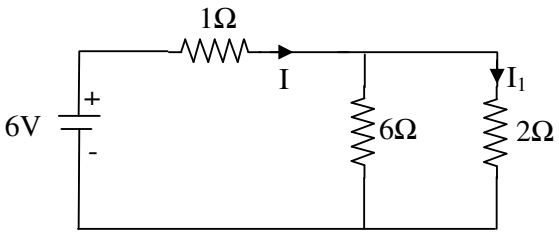

Figure 9

Code No: R21023 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL CIRCUIT ANALYSIS - I
(Electrical and Electronics Engineering)

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1. a) Explain dependent and independent sources with neat sketch.
   b) A pure inductance of 3mH carries a current of the waveform shown in Figure 1. Sketch the wave form of v(t) and p(t). Determine the average value of power. (5M+10M)

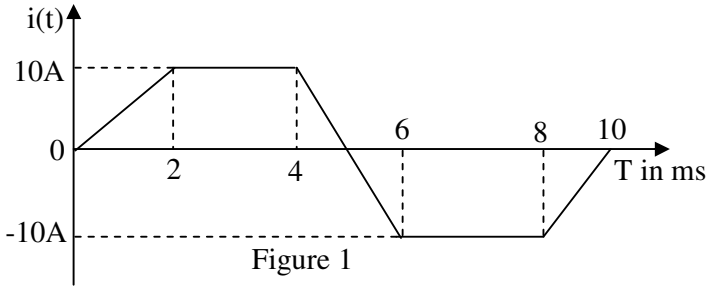

Figure 1

2. a) Refer the network shown in Figure 2a, find the current "I_0" using Nodal Analysis.
   b) Determine the resistance between terminal a-b of the network shown in Figure 2b.
   (10M+5M)

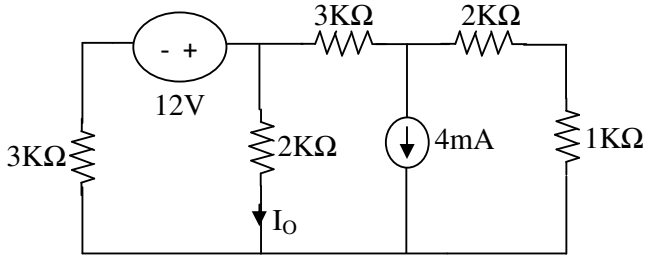

Figure 2a

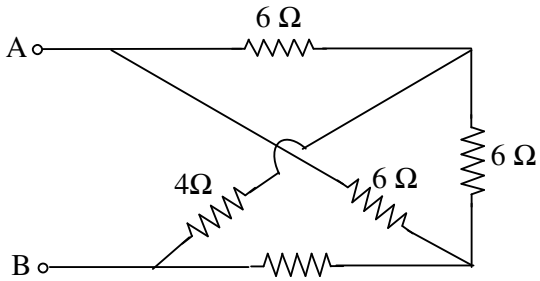

Figure 2b

3. Determine the RMS value, average value, form factor of the given waveform shown in Figure 3. (15M)

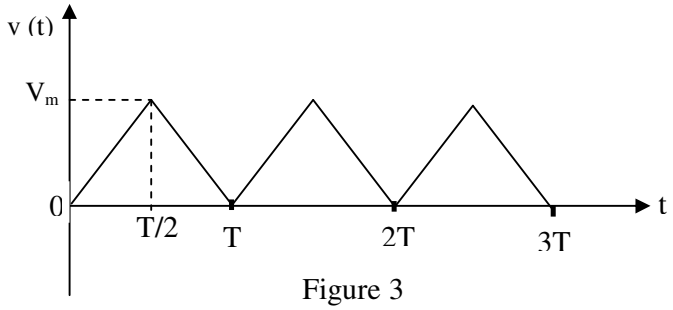

Figure 3
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4. a) Find the resonant frequency for the circuit shown in Figure 4.
   b) An RLC series circuit consists of resistance of 10 ohms, inductance of 0.3H and a capacitance of 10μF. Calculate:
   i) resonance frequency ii) the maximum current
   iii) Q-factor of the circuit iv) half power frequencies. (5M+10M)

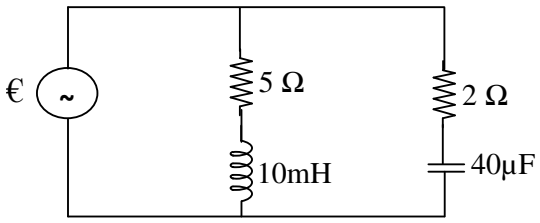

Figure 4

5. a) A circular iron, having a cross-sectional area of 10 cm^2 and a length of 4π cm in iron, has an air gap of 0.4π mm made of a saw-cut. The relative permeability of iron is 10^3 and permeability of free space is $4\pi \times 10^{-7} H/M$. The ring is wound with a coil of 2000 turns and carries 2mA current. Determine the air gap flex, neglecting leakage and fringing.
   b) Two coils having 750 and 1200 turns, respectively, are wound on a common non- magnetic core. The leakage flux and mutual flux, due to a current of 7.5A in coil 1, is 0.25mwb, and 0.75 mwb, respectively. Calculate: i) Self Inductance ii) Mutual Inductance
   iii) Coefficient of coupling. (8M+7M)

6. a) Define: i) Graph ii) Oriented Graph iii) Planar Graph.
   iv) Loop v) Path vi) Connected graph vii) Link.
   b) For the bridge Network shown in Figure 5, draw its dual. Write Integro-differential form of mesh equations for the given network & node equations for its dual. (7M+8M)

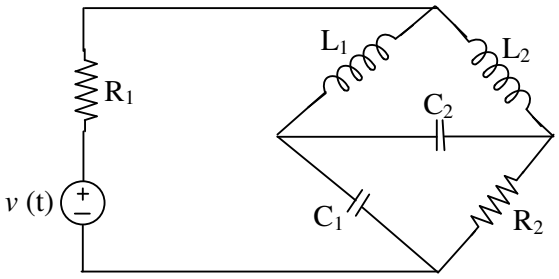

Figure 5

7. a) Find the voltage across 10Ω resistance in the network shown in Figure 7a, using the Thevenin's theorem.
   b) Find the current through 2Ω resistor in Figure 7b, using Millman's theorem. (7M+8M)

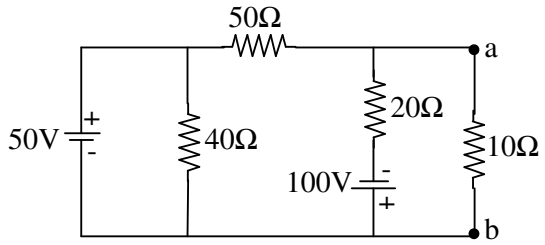

Figure 7a

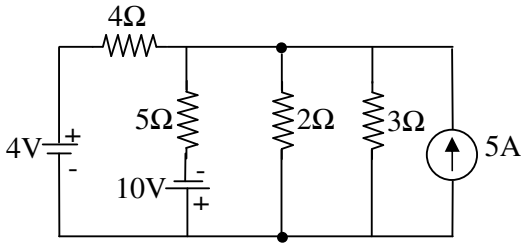

Figure 7b

8. a) Write down the statement of reciprocity theorem with example.
   b) Using Super position theorem, find the current through x-y branch in the circuit of Figure 8. (7M+8M)

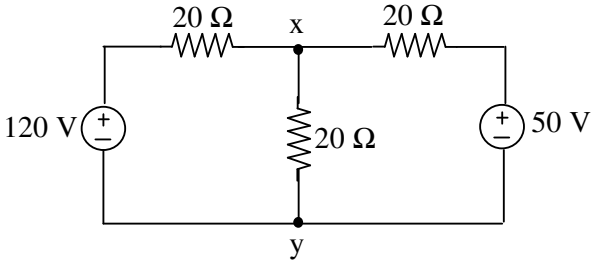

Figure 8

Code No: R21023 **R10** SET - 4

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ELECTRICAL CIRCUIT ANALYSIS - I
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1. a) Distinguish between the given below elements with suitable examples.
   i) Active and passive elements.
   ii) Unilateral and Bilateral elements.
   iii) Linear and Non-linear elements.
   b) Find the voltage drop across 1 Ω resistor and power loss across 2Ω resistor in Figure 1. (7M+8M)

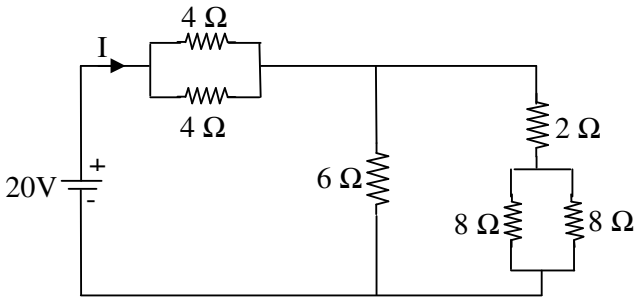

Figure 1

2. a) Write short notes on source transformation.
   b) Use nodal analysis to determine "V_1" and power being supplied by the dependent current source in the circuit shown in Figure 2. (3M+12M)

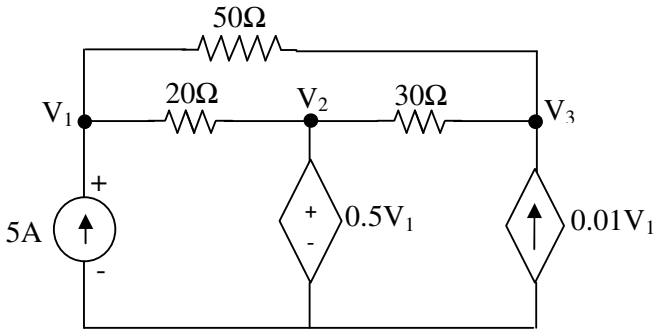

Figure 2
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Code No: R21023 **R10** SET - 4

3. a) Derive an expression for RMS value, average value, from factor and peak factor for the given square wave form shown in Figure 3.
   b) A series R-L-C circuit consists of 100Ω resistor and an inductor of 0.318 H and a capacitor of unknown value. This circuit is supplied by 230V, 50Hz supply and draws a current of 2.3A and the current is in phase with the supply voltage. Find:
   i) the value of the capacitor. ii) the power supplied by the source. (8M+7M)

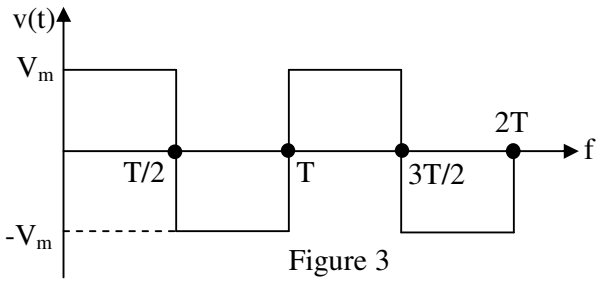

Figure 3

4. a) A series RC circuit having variable R and C = 20μF is supplied from AC source having voltage V= $200\angle 0^\circ$ volt at ω = 2000 rad/sec. Draw current locus for sample values of R = 0, 5, 15, 25, 35, 50Ω.
   b) A resistance of 20 Ω and a coil of inductance 31.8mH are connected in parallel across 230V, 50Hz supply as shown in figure 4. Find: i) the line current ii) power factor iii) power consumed by the circuit. (8M+7M)

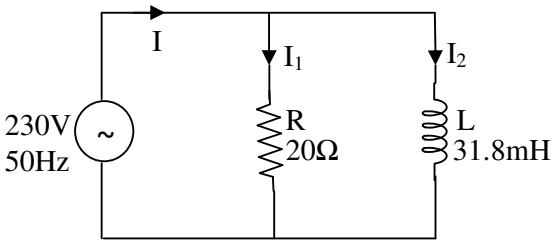

Figure 4

5. a) Compare electric and magnetic circuits with respect to similarities and dissimilarities.
   b) An air cored toroidal coil has 450 turns and a mean diameter of 30cm and a cross sectional area of $5cm^2$. Calculate the inductance of the coil and average induced emf, if a current of 4A is reversed in 60ms. (5M+10M)

Code No: R21023 **R10** SET - 4

6. a) Draw the dual of the network shown in Figure 6a.
   b) For the circuit shown in Figure 6b, write the f-cutset matrix and hence obtain the equilibrium equation on node basic and obtain tree branch voltages. Take tree of the graph containing branches 1 and 3 and same orientation as shown in Figure 6b. (3M+12M)

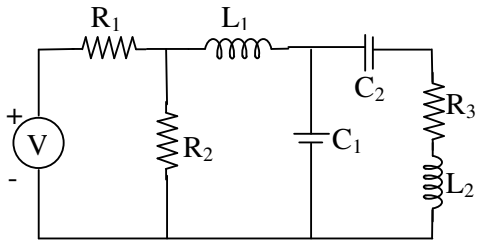

Figure 6a

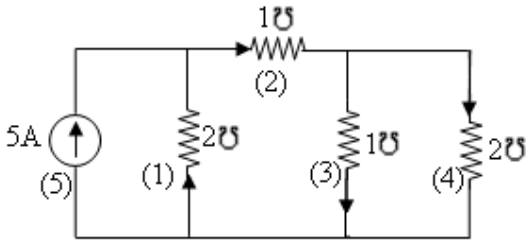

Figure 6b

7. a) Obtain Thevenin's equivalent circuit for the network shown below in Figure 7a.
   b) Find the current through the 1Ω resistor using Millman's theorem for the circuit shown in figure 7b. (9M+6M)

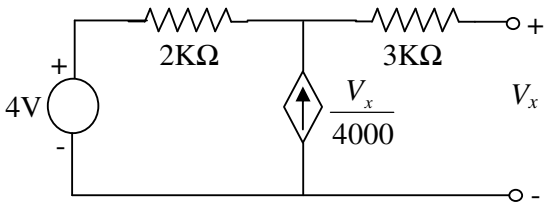

Figure 7a

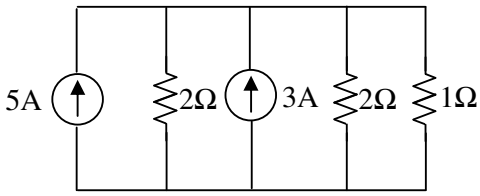

Figure 7b

8. a) Find the current through 5Ω resistor using super position theorem in the network shown in Figure 8a.
   b) In the network given in Figure 8b, check the validity of Tellegen's Theorem provided V_1 = 8V, V_2 = 4V, V_4 = 2V, Also I_1 = 4A, I_2 = 2A, I_3 = 1A. (10M+5M)

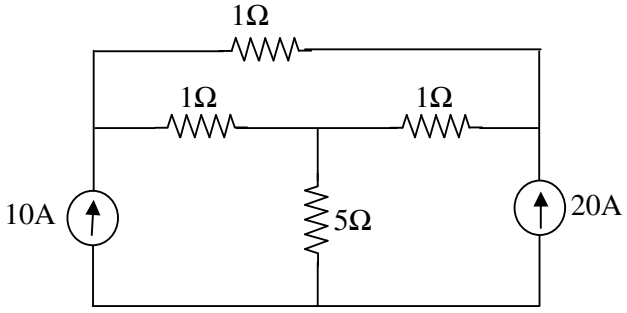

Figure 8a

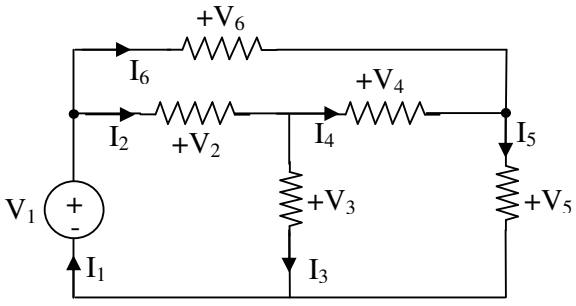

Figure 8b

Code No: R21025 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL MACHINES - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Show that the torque developed in a doubly-excited magnetic system is equal to the rate of increase of field energy with respect to displacement at constant currents.
   b) Distinguish between singly exited and multi exited magnetic field systems. (8M+7M)

2. a) Draw the neat sketch of a DC generator. State the functions of each part.
   b) A 4-pole DC generator has 1200 armature conductors and generates 250 V on open circuit when running at a speed of 500 rpm. The diameter of the pole-shoe circle is 0.35 m and the ratio of pole arc to pole pitch is 0.7 while the length of the shoes is 0.2 m. Find the mean flux density in the air gap. Assume lap connected armature winding. (7M+8M)

3. a) Explain the process of commutation in a DC machine and describe the methods to improve it?
   b) Derive the expressions for calculating the demagnetizing and cross magnetizing ampere turns per pole in a DC generator with usual notations. (8M+7M)

4. a) Explain in detail how a DC shunt generator builds up its voltage. Discuss the conditions to be satisfied for the buildup of voltage? What limits the voltage to which it can build up?
   b) Sketch the complete load characteristics of a DC series generator and indicate there in the region of operation of the machine as a voltage booster and as a constant current source. (7M+8M)

5. a) Two dc shunt generator are operating in parallel. Their no-load voltages are 260 V and characteristics are linear. At 220 V, generator-1 can deliver 310 kW and generator-2 can deliver 600 kW. Find the total load ‘P’ and load supplied by each at 250 V.
   b) List out conditions to be satisfied for running two or more DC shunt generators in parallel. (8M+7M)
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6. a) Define torque. Derive the expression for torque developed by a DC motor from fundamentals.
   b) Explain speed-current, torque-current, speed-torque characteristics of DC compound motor. (7M+8M)

7. a) What is the need of the starter? With a neat diagram explain the construction and working of 3-point stator.
   b) A 400 V DC shunt motor taking an armature current of 66.67 A on full load. Calculate number of resistance sections, and resistance of each section, when R_a=0.5 ohms and I_a should not exceed more than 100 A. (7M+8M)

8. a) Describe the Swinburne's test to determine no-load losses of a DC machine. What are the limitations of this test?
   b) A field test on two mechanically coupled DC series motors (with their field windings connected in series) gave the following test data:
   Motor: armature current=50A, voltage across armature=500V, voltage across field=38V.
   Generator: terminal voltage = 400 V, armature current = 50 A, voltage across field = 36 V.
   Armature resistance (including brushes) of each machine is 0.2 ohms.
   Calculate efficiency of each machine at this load. (7M+8M)

Code No: R21025 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL MACHINES - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain briefly an electromechanical energy conversion device with the help of a block diagram.
   b) For a singly excited magnetic system, derive the relation for the magnetic stored energy in terms of reluctance. (8M+7M)

2. a) Distinguish between self-excited and separately excited DC generators. How self-excited generators are classified? Give their circuit diagrams.
   b) An 8-pole generator has 500 armature conductors and has a useful flux per pole of 0.065 Wb. What will be the e.m.f generated if it is lap connected and runs at 100 rpm. What must be the speed at which it is to be driven to produce the same e.m.f if it is wave connected? (7M+8M)

3. a) What is the effect of armature reaction at leading and trailing pole tips of a dc generator? Explain with the help of neat sketches.
   b) What is the purpose of compensating windings and interpoles in a DC machine? Explain in detail. (8M+7M)

4. a) What is the critical field resistance of a DC shunt generator. How it is obtained. What is its significance?
   b) State the reasons for the droop in terminal voltage of the shunt generator when it is loaded. (8M+7M)

5. a) Explain clearly the importance of an equalizer bar for satisfactory parallel operation of compound generators.
   b) Two DC shunt generators with e.m.f's of 125 V and 120 V, armature resistances of 0.04 ohm and 0.03 ohm and field resistance of 15 ohms and 20 ohms respectively are in parallel supplying a total load of 25 kW. How do they share the load? (7M+8M)

6. a) Explain speed-current, torque-current, speed-torque characteristics of a DC series motor.
   b) Prove that in a dc generator, generated e.m.f and current in a conductor are in the same direction, whereas in a dc motor, generated e.m.f opposes the flow of current in a conductor. (7M+8M)

7. a) How is 4-point starter is different from 3-point starter. With a neat diagram explain the construction and working of 4-point stator.
   b) The armature and field resistances of a 320 V, dc shunt motor are 0.5 Ω and 250 Ω respectively. When driving a load of constant torque at 600 rpm, the armature current is 24 A. If it is required to increase the speed from 600 rpm to 700 rpm, calculate the resistance to be connected in the shunt field circuit. (7M+8M)

8. With the help of neat circuit diagram, explain Hopkinson's test and derive the relations for efficiency (both for generator and motor). Also state the merits and demerits of this method. (15M)
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Code No: R21025 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL MACHINES - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Derive an expressions for field energy and co-energy in a singly-excited electromechanical unit.
   b) Explain the mechanical energy and work done in singly excited system when actual displacement occurs? (8M+7M)

2. a) What is the principle of operation of a DC generator? Why is a commutator and brush arrangement necessary for the operation of a DC generator?
   b) A short-shunt compound DC generator delivers 100 A to a load at 250 V. The generator has shunt field, series field, and armature resistances of 130 ohms, 0.1 ohm, and 0.1 ohm respectively. Calculate the voltage generated in armature winding. Assume 1 V voltage drop per brush. (7M+8M)

3. a) What is armature reaction? Describe the effects of armature reaction on the operation of a DC machine. How the armature reaction is minimized?
   b) What do you understand by linear commutation, under commutation and over commutation in a DC machine? Explain in detail. (8M+7M)

4. a) Explain why external characteristics of a DC shunt generator is more drooping than that of a separately excited generator. Discuss their applications.
   b) What is a critical field resistance of a DC shunt generator? Explain. (8M+7M)

5. a) Why usually parallel operation of series generator is unstable? What remedial measures are taken for its successful operation?
   b) Two shunt generators run in parallel to supply together 2.5 kA. The machines have armature resistances of 0.04 ohms and 0.025 ohms, field resistances of 25 ohms and 20 ohms and induced e.m.fs of 440 V and 420 V respectively. Find the bus bar voltage and output of each machine. (8M+7M)
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6. a) Explain the armature reaction in a DC motor, indicating the remedies to its adverse effects.
   b) A 4-pole, lap wound 410 V series motor has the following data: Number of armature conductors is 960, flux per pole is 0.04 Wb, total motor resistance is 0.5 ohm, iron and frictional losses is 2 kW. If the current taken by the motor is 95 A, find: i) total torque ii) useful torque at the shaft iii) power output iv) pull at the rim of the pulley of 42 cm diameter connected to the shaft. (7M+8M)

7. a) Discuss various methods of speed control that can be used for DC series motors.
   b) Estimate the number of resistance sections and resistance of each section for the starter of 7.5 kW, 460 V DV series motor. The starting current varies from 1.5 to 2 times full-load current. The resistance of the machine measured between the terminals is 1.8 ohms and the efficiency is 80%. Assume that the flux density increases by 10% as the current rises from 1.5 to 2 times the rated full load current. (7M+8M)

8. Explain the experimental procedure to conduct Retardation Test on a dc shunt machine with the help of connection diagram. How the different losses are estimated from the test results? (15M)

Code No: R21025 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRICAL MACHINES - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) What is the significance of energy and co-energy in energy conversion system.
   b) Describe the principle of energy-conversion. From a consideration of the various energies involved, develop the model of an electro mechanical conversion device. (7M+8M)

2. a) Derive the e.m.f equation of a DC generator. Discuss the factors affecting the generated e.m.f.
   b) A six pole lap wound dc armature has 60 slots with 18 conductors/slot. The ratio of pole arc to pole pitch is 0.68. The diameter of bore of the pole shoe is 0.46 m. The length of the pole shoe is 0.3 m. If the air gap flux density is 0.3 Wb/m^2 and the e.m.f induced in the armature is 500 V, find the speed at which it runs. (7M+8M)

3. a) What is reactance voltage? How is it neutralized in a DC machine? Discuss the effect of reactance voltage on the operation of a DC machine.
   b) A 220 kW, 4-pole wave connected, 440 V shunt generator has 740 conductors and a shunt field current of 10 A. Find the demagnetizing and cross magnetizing ampere turns per pole, if the brushes are given a lead of 25 electrical degrees. Find the number of additional shunt field turns to neutralize the demagnetizing effect. (7M+8M)

4. a) Draw and explain internal and external characteristics of series and compound generator.
   b) Define the critical speed and critical resistance. Explain how these are determined from OCC of the DC shunt generator and explain the buildup of voltage? (7M+8M)
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5. a) Two shunt generators operating in parallel deliver a total current of 250 A. One of the generators is rated 50 kW and the other 100 kW. The voltage ratings of the both the machines is 500 V and have regulations of 6% (smaller one) and 4%. Assuming linear characteristics, determine i) the current delivered by each machine ii) terminal voltage.
   b) Explain with connection diagrams how two DC compound generators are operating in parallel. (8M+7M)

6. a) Explain the principle of operation of DC motors?
   b) Calculate the torque developed when a current of 15 A passes through a armature of a motor with the following particulars: 560 conductors, lap wound, 4-poles, pole shoes 15 cm long subtending an angle 60^0 at the center, core radius 14 cm and flux density in the air gap is 1.7 Tesla. (7M+8M)

7. a) Explain with neat sketch how speed control of a DC shunt motor is done by Ward Leonard control system. How the direction of rotation of the motor is usually reversed in this method of speed control.
   b) Discuss the applications of different types of DC motors. (8M+7M)

8. a) Explain the procedure to conduct Field's test on series machines in order to determine efficiency.
   b) A retardation test is made on a separately excited DC machine as a motor. The induced voltage falls from 240 V to 225 V in 25 seconds on opening the armature circuit and 6 seconds on suddenly changing the armature connection from supply to a load resistance taking 10 A (average). Find the efficiency of the machines when running as a motor and taking a current of 25 A on a supply of 250 V. The resistance of the armature is 0.4 ohms and that of its field winding is 250 ohms. (7M+8M)

Code No: R21029 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) State and explain Coulomb's law.
   b) Derive an expression for electric field intensity at a distance 'h' along the Z-axis due to an infinite sheet of charge placed in the Z=0 plane. (7M+8M)

2. a) For a physical dipole in the z-direction, located at the origin in free space, find the potential at a point $(r, \theta, \varphi = \frac{\pi}{2})$ (in spherical co ordinates).
   b) Discuss about the behavior of conductors in an electric field. (7M+8M)

3. a) Establish the electrostatic boundary conditions for the tangential components of electric field and electric displacement at the boundary of two linear dielectrics.
   b) Derive an expression for capacitance between two concentric spherical shells. (7M+8M)

4. a) A filamentary current of 15A is directed in from infinity to the origin on the positive x axis, and then back out to infinity along the position y axis. Use the Biot-Savarts law to find $\overline{H}$ at P (0, 0, 1)?
   b) Derive the expression for magnetic flux density at a point due to an infinitely long current carrying conductor. (7M+8M)

5. a) State and explain Amperes current law and derive the same in point differential form.
   b) A circular loop located on $x^2 + y^2 = 9$, z = 0 carries a direct current of 19 A along a_φ direction. Determine H at (0, 0, 6) and (0, 0, -6). (7M+8M)

6. a) State and explain Lorentz's force equation?
   b) Filamentary currents of -25 a_z and 25 a_z Amp are located in the x = 0 plane in free space at y = -1 and y = 1 m respectively. A third filamentary current of 10^{-3} a_z A is located at x = k, y = 0. Find the vector force on a 1 m length of 1 mA filament. (7M+8M)

7. a) Derive the expression for energy density in a magnetic field.
   b) A solenoid of 10 cm in length consists of 1000 turns having the cross section radius of 1 cm. Find the inductance of solenoid. What is the value of current required to maintain a flux of 1 mWb in the toroid. Take $\mu_r = 1500$. (7M+8M)

8. a) Starting from Faraday's law of electromagnetic induction, derive $\nabla \times E = -\frac{\partial \vec{B}}{\partial t}$.
   b) A parallel plate capacitor with plate area of $5cm^2$ and plate separation of 3mm has a voltage of 50 *sin* 10^3t V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_0$. (7M+8M)
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Code No: R21029 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) State and prove Gauss law. What are its limitations?
   b) Derive an expression for electric field intensity at a distance h on the z-axis due to a line charge placed along the x-axis which is extending from negative infinity to positive infinity. (7M+8M)

2. a) Derive Poisson's and Laplace equations from fundamentals.
   b) Show that the torque on a physical dipole $\overline{P}$ in a uniform electric filed $\overline{E}$ is given by $\overline{P} \times \overline{E}$. Extend this result to a pure dipole. (7M+8M)

3. a) Using the concept of energy density in an electric field, find the total energy stored in a parallel plate system. Hence find its capacitance.
   b) Define and explain the conduction and the convection current densities. (7M+8M)

4. a) Derive the expression for magnetic field intensity at the center of a circular wire.
   b) Find the expression for the magnetic flux density, 'B' at a distance 'h' above the centre of a square loop of wire 'b' meters of each side. The loop carries a current of one ampere. (7M+8M)

5. a) Show that $\nabla \times \vec{H} = \vec{J}$.
   b) A square loop 8 cm on a side has 600 turns that are closely and tightly wound and carries a current of 100 A. Determine the magnetic flux density at the centre of the loop. (7M+8M)

6. a) Derive the expression for torque exerted on a current-carrying loop by a magnetic field.
   b) Find the maximum torque on an 85 turns, rectangular coil with dimension (0.2×0.3)m, carrying a current of 5 Amps in a field $B = 6.5T$. (7M+8M)

7. a) Obtain the expression for inductance of a toroid.
   b) A very long solenoid with 6 cm^2 cross section has an iron core $\mu_r = 1000$ and 400 turns/meter. If it carries a current of 500 mA, find: i) its self inductance per meter ii) the energy per meter stored in its field. (7M+8M)

8. a) Derive the expression for displacement current and explain its significance.
   b) Derive the Maxwell's equations in point and integral form for time varying fields? (7M+8M)
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Code No: R21029 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain the terms i) Electric Potential ii) Electric Field Intensity
   b) Explain the properties of potential function.
   c) Derive an expression for the electric field intensity at an arbitrary point due to a system of point charges in a given space. (5M+5M+5M)

2. a) In spherical coordinates V=0 for r=0.1 and V=100 for r=2 m. Find the potential function. Use Laplace's equation.
   b) Determine the solution of Laplace's equation in one variable form. (7M+8M)

3. a) Derive the continuity equation in point form and explain it.
   b) Prove that the derivative of the energy stored in an electrostatic field with respect to volume is ½ D.E, where D and E are electric flux density and electric field intensity respectively. (7M+8M)

4. a) Show that the Maxwell's second equation $\nabla \bullet B = 0$.
   b) A circuit carrying a direct current of 10A forms a regular hexagon inscribed in a circle of radius of 1.5 m. Calculate the magnetic flux density at the centre of the hexagon. Assume the medium to be free space. (7M+8M)

5. a) What are the limitations of Amperes current law? How this law can be modified to time varying field.
   b) A current sheet $K_1 = \frac{8}{\mu_0}\vec{a}_y$ A/m, at x=0 separates region 1, x < 0 and μ_{r1}=3, from region 2, x > 0 and μr2=1. Given $H_1 = \frac{10}{\mu_0}(\vec{a}_y + \vec{a}_z)$ A/m. Find H_2. (7M+8M)

6. a) Two infinitely long parallel conductors are separated by a distance 'd'. Find the force per unit length exerted by one of the conductor on the other if the currents in the two conductors are I_1 and I_2.
   b) A galvanometer has a rectangular coil side of 10 mm × 30 mm pivoted about the center of shorter side. It is mounted in a radial magnetic field so that a constant magnetic field of 0.4 T always acts across the plane of the coil. If the coil has 1000 turns and carries current 2 mA, find the torque exerted on it. (7M+8M)

7. a) Derive the expression for inductance of a solenoid.
   b) Derive the expression for energy density in a magnetic field. (7M+8M)

8. a) State and explain Poynting theorem.
   b) Find the frequency at which conduction current density and displacement current density are equal in a medium with $\sigma = 2x10^{-4}$ mho/m and ϵ_R=81. (7M+8M)
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Code No: R21029 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Prove that the electric field intensity is the negative gradient of potential.
   b) A very thin , finite, and uniformly charged line of length 10m carries a charge of 10 μC/m. Calculate the electric field intensity in a plane bisecting the line at ρ = 5 m. (7M+8M)

2. a) Show that the electric field intensity due to an electric dipole represents a conservative field.
   b) Let $V_1(r,\theta,\phi) = \frac{6}{r}$ and $V_2(r,\theta,\phi) = 3$. (i) State whether V_1 and V_2 satisfy Laplace's equation. (ii) Evaluate V_1 and V_2 at r=2. (7M+8M)

3. a) Derive Ohm's law in point form.
   b) A parallel plate capacitor consists of two square metal plates of side 600 mm and separated by a 12 mm slab of Teflon with ε_r = 3 and 5 mm thickness is placed on the lower plate leaving an air gap of 4mm thick between it and upper plate. If 200 V is applied across the capacitor, find D, E, and V in Teflon and air. (7M+8M)

4. a) State and explain Biot-Savart's law.
   b) A long solenoid has a radius of 3 mm and a length of 2 cm. If the number of turns per unit length is 400 and the current is 10 A, calculate the magnetic flux density at i) the Centre and ii) the ends of the solenoid. (7M+8M)

5. a) A current sheet $K_1 = 1\vec{a}_z$ A/m lies in the x=4 m plane and second sheet $K_2 = -7\vec{a}_z$ A/m is at x=-5m. Find $\overline{H}$ in all regions.
   b) Derive the expression for magnetic flux density at a point due to an infinitely long current carrying conductor. (7M+8M)

6. a) With the help of basic definitions, prove that T = m x B.
   b) Two infinitely long parallel filaments each carry 50A in the a_z direction. If the filaments lie in the plane y = 0 and x = 5 mm, find the vector force per meter length on the filament passing through the origin. (7M+8M)

7. a) Derive an expression for mutual inductance between a straight long wire and a square loop wire in the same plane.
   b) Obtain an expression for the self-inductance of a toroid of a circular cross-section, with N closely spaced turns. (7M+8M)

8. a) Show that power loss in a conductor is given as product of voltage and current using Poynting theorem.
   b) Explain the terms: i) Motional EMF ii) Static EMF (7M+8M)
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Code No: R21021 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
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) Differentiate between; i) Absolute and gauge pressure, ii) simple manometers and differential manometers, and iii) Piezometer and pressure gauge.
   b) Two large vertical plane parallel surfaces are 5 mm apart and the space between them is filled with a fluid. A thin plate of 12.5 cm square falls freely between the planes along the central plane and reaches a steady velocity of 2 m/s. Determine the weight of the plate if the viscosity of the fluid filling the space is 0.02 Ns/m^2. (9M+6M)

2. a) What is meant by one-dimensional, two-dimensional and three- dimensional flows?
   b) Distinguish between:
   i) Steady flow and un-steady flow ii) Uniform and non-uniform flow
   iii) Compressible and incompressible flow iv) Laminar and turbulent flow (7M+8M)

3. a) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of water. The pressure at inlet is 17.658 N/cm^2 and the vacuum pressure at the throat is 30 cm of mercury. Find the discharge of water through venturimeter. Take C_d=0.98.
   b) Explain various minor losses in pipes. (8M+7M)

4. a) Derive the expression for the force exerted by a water jet on a plate moving in the same direction of the jet with a velocity less than that of the jet.
   b) A blade turns the jet of diameter 3 cm at a velocity of 20 m/s by 60°. Determine the force exerted by the blade on the fluid. (9M+6M)

5. a) Explain how hydropower plants are classified
   b) How do you estimate hydropower potential? (10M+5M)

6. What do you understand by the characteristics curves of turbine? Name and explain the important characteristics curves of a turbine. (8M+7M)

7. a) What is meant by 'cavitation'? What is Thoma's cavitation factor, and what is its significance for water turbines?
   b) What are the characteristics curves of a hydraulic turbine? How are they useful to practical engineer? (8M+7M)

8. a) What are the different efficiencies of centrifugal pump
   b) Draw and discuss the operating characteristics of a centrifugal pump (7M+8M)
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Code No: R21021 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
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) Two large planes are parallel to each other and are inclined at 30° to the horizontal with the space between them filled with a fluid of viscosity 20 cp. A small thin plate of 0.125 m square slides parallel and midway between the planes and reaches a constant velocity of 2 m/s. The weight of the plate is 1 N. Determine the distance between the plates.
   b) Derive expressions from basics for the pressure inside a droplet and a free jet. (8M+7M)

2. a) Explain the following:
   i) Path line, ii) Streak line, iii) Stream line, and iv) Stream tube.
   b) Define the equation of continuity. Obtain an expression for continuity equation for a three dimensional flow. (8M+7M)

3. a) Show that the velocity profile in laminar flow through a circular pipe is parabolic. Find the average velocity in terms of maximum velocity.
   b) Describe Reynolds experiments to demonstrate the two types of flow (8M+7M)

4. A 4 cm diameter water jet with a velocity of 35 m/s impinges on a single vane moving in the same direction at a velocity of 20 m/s. The jet enters the vane tangentially along the x direction. The vane deflects the jet by 150°. Calculate the force exerted by the water on the vane. (15M)

5. a) What do you mean by mass curve
   b) How do you estimate power developed from a given catchment area. (5M+10M)

6. a) What are the uses of a draft tube? Describe with neat sketches different types of draft tubes.
   b) A model of Francis turbine one-fifth of full size, develops 4.1 h.p at 306 r.p.m. under a head of 1.77 m. Find the speed and power of full size turbine operating under a head of 5.7 m, if i) the efficiency of the model and the full size turbine are same, ii) the efficiency of the model turbine is 76 % and the scale effect is considered. (8M+7M)

7. Explain: a) Unit speed, b) Unit discharge, c) Unit power of a hydraulic turbine. Derive expressions for each of them. (15M)

8. a) Under what headings the centrifugal pumps are classified? State the difference between a closed, semi closed and open impeller.
   b) Explain the working principles of reciprocating pump with sketches (7M+8M)
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Code No: R21021 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
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) A shaft of 150 mm dia rotates in bearings with a uniform oil film of thickness 0.8 mm. Two bearings of 15 cm width are used. The viscosity of the oil is 22 Centipoise. Determine the torque if the speed is 210 rpm.
   b) What is the difference between dynamic viscosity and kinematic viscosity? State their units of measurements. (10M+5M)

2. a) A bend in pipeline conveying water gradually reduces from 60 cm to 30 cm diameter and defects the flow through angel of 60°. At the larger end the gage pressure is 1.75 kg/cm^2. Determine the magnitude and direction of the force exerted on the bend, when flow is 876 liters per sec
   b) What are different energies of a fluid? Explain each of them. (9M+6M)

3. a) Derive an expression for the velocity distribution for viscous flow through a circular pipe. Also sketch the velocity distribution and shear distribution across a section of the pipe
   b) Define and explain the terms: i) Hydraulic gradient line and ii) Total energy line (9M+6M)

4. a) Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
   b) A blade turns the jet of diameter 2 cm at a velocity of 15 m/s by 65°. Determine the force exerted by the blade on the fluid. (9M+6M)

5. a) Describe the concept of pumped storage plants
   b) What are the various components of hydro power plants. Describe each briefly. (9M+6M)

6. a) Explain briefly the principles on which a Kaplan turbine works
   b) Estimate the maximum height of straight conical draft tube of 18000 h.p. Francis turbine running at 150 r.p.m. under a net head of 27 m. The turbine is installed at a station where the effective atmospheric pressure is 10.6 m of water. The draft tube must sink at least 0.77 m below the tail race. (8M+7M)

7. a) Brefly explain the various considerations in the selection of a proper type of turbine for a hydroelectric station, indicating also the conditions where a particular type of turbine is suitable.
   b) What do you understand by governing of hydraulic turbines? Explain with sketches the working of an oil pressure governor. (8M+7M)

8. a) What do you mean by manometric efficiency, mechanical efficiency and overall efficiency of centrifugal pump.
   b) Define slip, percentage slip and negative slip of reciprocating pump. (9M+6M)
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Code No: R21021 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
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) A U- tube mercury manometer is used to measure the pressure of oil flowing through a pipe whose specific gravity is 0.85. The center of the pipe is 15 cm below the level of mercury. The mercury level difference in the manometer is 25 cm, determine the absolute pressure of the oil flowing through the pipe. Atmospheric pressure is 750 mm of Hg.
   b) State and prove Pascal's law. Explain the consequences of the law. (9M+6M)

2. a) Define and distinguish between streamline, path line and streak line.
   b) State and derive Bernoulli's theorem, mentioning clearly the assumption underlying it. (6M+9M)

3. a) An oil of specific gravity 0.7 is flowing through a pipe of diameter 300 mm at the rate of 500 liters/s. Find the head lost due to friction and power required to maintain the flow for a length of 1000 m. Take $\nu = 0.29$ stokes.
   b) What do you understand by the terms: major energy loss and minor energy losses in pipes? (9M+6M)

4. A water jet with a velocity of 60 m/s enters a series of curved vanes at an angle of 20° to the direction of blade movement. The peripheral speed of the disc on which the blades are mounted is 25 m/s. Calculate the vane inlet angle. If at the exit the component of absolute velocity along the direction of motion is zero, determine the outlet blade angle. Assume shockless enters and exit. (15M)

5. a) Make a neat sketch of a hydropower plant and show clearly the various elements.
   b) How do you estimate hydropower potential (10M+5M)

6. a) Draw a neat sketch of Pelton turbine and Francis turbine.
   b) What are unit quantities? Define the unit quantities for turbine. (8M+7M)

7. Explain the terms 'specific speed', 'unit speed' and 'unit power' as applied to hydraulic turbines. Deduce expressions to indicate their values. (15M)

8. What is a reciprocating pump? Describe the principle and working of a reciprocating pump with a neat sketch. Why is a reciprocating pump not coupled directly to the motor? Discuss the reason in detail (15M)
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Code No: R21022 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain the exceptions to the law of demand.
   b) Discuss various determinants of demand for electronic gadgets. (8M+7M)

2. a) Explain how to forecast demand for new products.
   b) Explain point and arc elasticity of demand. (8M+7M)

3. a) Explain law of variable proportions.
   b) Discuss briefly managerial significance of break even analysis. (8M+7M)

4. Explain Price-Output determination in Perfect Competition. (15M)

5. What is business cycle? What are the various phases of business cycles? (15M)
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6. From the following Trial Balance, prepare a Trading, Manufacturing and Profit and Loss Account and balance sheet as on 31st December 2012: (15M)

TRIAL BALANCE as on 31st December 2012

Particulars	Amount Rs.	Amount Rs.
Stock on 1.1.2012		
Raw materials	20,000/-	
Work-in progress	50,000/-	
Finished Goods	100,000/-	
Manufacturing wages	100,000/-	
Purchasing of Raw materials	300,000/-	
Factory Rent	50,000/-	
Carriage of Raw materials	30,000/-	
Salary of the Works Managers	20,000/-	
Office Rent	20,000/-	
Printing and Stationery	10,000/-	
Bad Debts	10,000/-	
Sales		600,000/-
Land and Buildings	300,000/-	
Plant and machinery	200,000/-	
Depreciation on Plant	20,000/-	
Sundry Debtors	50,000/-	
Sundry Creditors		300,000/-
Cash in Hand	50,000/-	
Capital		430,000/-
Total		**13,30,000**
	13,30,000/-	

7. From the following particulars, prepare the Funds Flow Statement: (15M)

Liabilities	1 JAN Rs.	31 Dec Rs.	Assets	1 Jan Rs.	31 Dec Rs.
Creditors	36,000	41,000	Cash	4,000	3,600
Bank Loan	30,000	45,000	Debtors	35,000	38,400
Capital	1,48,000	1,49,000	Stock	25,000	22,000
			Land	20,000	30,000
			Building	50,000	55,000
			Machinery	80,000	86,000
	2,14,000	**2,35,000**		**2,14,000**	**2,35,000**

8. a) Discuss the need for Capital Budgeting.
   b) Explain i) ARR ii) NPV (7M+8M)

Code No: R21022 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain the basic economic tools in Managerial Economics.
   b) What is Law of Demand? (8M+7M)

2. Explain: a) survey Method of demand forecasting b) Trend Projection Method
   c) Delphi method (5M+5M+5M)

3. a) Explain Least cost Combination of Inputs.
   b) Distinguish between Explicit costs and implicit costs. (8M+7M)

4. a) Explain the features of Monopolistic Competition.
   b) What is Peak Load Pricing and Transaction based Pricing? (8M+7M)

5. Discuss characteristic features of Industrial organization and also business cycles. (15 M)

6. From the following balance extracted from the books of RKC Co. pass the necessary closing entries, prepare a trading and Profit and Loss account and Balance Sheet. (15 M)

Particulars	Rs.	Particulars	Rs.
Opening Stock	1,250	Plant and machinery	6,230
Sales	11,800	Returns Outwards	1,380
Depreciation	667	cash in hand	895
Commission(cr.)	211	Salaries	750
Insurance	380	Debtors	1,905
Carriage Inwards	300	Discount (Dr.)	328
Furniture	670	Bills receivable	2,730
Printing Charges	481	Wages	1,589
Carriage Outwards	200	Returns Inward	1,659
Capital	9,228	bank Overdraft	4,000
Creditors	1,780	Purchases	8,679
Bills Payable	541	Petty cash in Hand	47
		Bad Debts	180

The value of stock on 31st December 2012 was Rs.3,700
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7. From the following Balance sheets as on 31st December 2011 and 31 December 2012 , prepare a Schedule of Changes in the Working capital and a funds flow statement taking:
   i) the provision for tax and proposed dividends as non-current liabilities.
   ii) the provision for tax and proposed dividends as current liabilities. (15 M)

Balance sheet as on 31 December

Liabilities	2011 Rs.	2012 Rs.	Assets	2011 Rs.	2012 Rs.
Share capital	10,000	15,000	Fixed Assets	10,000	20,000
Profit & Loss account	4,000	6,000	Current assets	13,000	14,500
Provision for Tax	2,000	3,000			
Proposed Dividends	1,000	1,500			
Sundry Creditors	4,000	6,000			
Outstanding Expenses	2,000	3,000			
	23,000	**34,500**		**23,000**	**34,500**

Additional Information
Tax paid during 2011 Rs.2,500
Dividends paid during 2011 Rs.1,000

8. A Project initial investment is 10 lakhs and cash inflows for five years are as follows.

Year	**Cash inflows**
2008	2,00,000
2009	2,40,000
2010	3,00,000
2011	3,60,000
2012	4,00,000

The cost of Capital is 12%. Compute NPV and IRR of the Project. (15 M)

Code No: R21022 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Discuss the multidisciplinary nature of Managerial economics. Explain the scope of managerial economics. (15 M)

2. Explain types of income elasticity of demand with suitable examples. (15 M)

3. Discuss the Cobb Douglas Production function. What is opportunity cost? (15 M)

4. What is kinked Demand Curve? Explain price output determination in oligopolistic market. (15 M)

5. Outline the features of Sole Proprietorship. (15 M)

6. From the following balances, taken from the Trial Balance of SCo Ltd. Prepare a trading and Profit and Loss account for the year ending 31st December 2012 (15 M)

Particulars	Dr. Rs	Cr. Rs.
Stock on1.1.2011	2,000	
Purchases and sales	20,000	30,000
Returns	2,000	1,000
Carriage	1,000	
Cartage	1,000	
Rent	1,000	
Interest received		2,000
Salaries	2,000	
General Expenses	1,000	
Discount		500
Insurance	500	

The closing stock on 31st December 2011 is Rs.5, 000.
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7. From the following Profit and Loss account, you are required to compute cash from operations (15 M)

Profit and Loss account for the ending 31 December 2010

Particulars	Rs	Particulars	Rs
To Salaries	5,000	By Gross Profit	25,000
To Rent	1,000	By Profit on sale of Land	5,000
To Depreciation	2,000	By income tax refund	3,000
To loss on sale of Plant	1,000		
To Goodwill written off	4,000		
To Proposed Dividends	5,000		
To Provisions for Taxation	5,000		
To Net Profit	10,000		
	33,000		**33,000**

8. Explain Net Present value and payback methods of capital budgeting. (15 M)

Code No: R21022 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Explain discounting principle, incremental concept and equi-marginal concept. (15 M)

2. Discuss various forecasting demand for new products with suitable examples. (15 M)

3. Discuss the production function with all inputs variables. (15 M)

4. Explain Skimming Price policy, Marginal cost pricing and Limit Pricing. (15 M)

5. Discuss the various phases of business cycles. Explain its features. (15 M)

6. Enter the following transactions in proper subsidiary books of Ram; (15 M)

2010		
January 1	Sold goods to Ramesh	5250
January1	Bought from hari ram	7800
January2	Ramesh returned oods	750
January2	Sold to Dev	5500
January2	Purchased goods from Mangal	7000
January4	return goods to Mangal	1000
January4	Bought from Devi dayal	3250
January4	Sold to Zakeer	3500
January5	zakeer returned goods	450
January6	Sold to ram saran	5000
January6	sold to Gyan	3000
January7	ram saran returned goods	500
January7	Bought from Devi dayal	7000
January8	Return goods to Devi dayal	750
January9	Purchased goods from raghuSubject	
	To trade discount of 10%	10,000
January10	Sold to rajaram goods subject to	
	Trade discount of 5%	5,000
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7. From the following ratios draw the balance sheet of the company for the year 2012 (15 M)

Current Ratio	2.5
Liquidity Ratio	1.5
Net Working Capital	Rs.3,00,000
Stock Turnover Ratio (Cost of Sales/closing stock)	6 times
Gross Profit Ratio	20 per cent
Fixed assets Turnover ratio(on cost of sales)	2 times
Debt Collection Period	2 months
Fixed assets to shareholders net worth	0.80
Reserve and Surplus to Capital	0.50

8. Initial Investment for a project is 20 lakh. The Project life is 6 years and the cash inflows for six is as given below

Year	Cash inflow Rs.
1	3,50,000
2	4,00,000
3	5,00,000
4	5,50,000
5	6,00,000
6	5,00,000

The cost of capital of is 13%. Compute NPV, IRR and Payback period. (15 M)