Code :9A02305

1

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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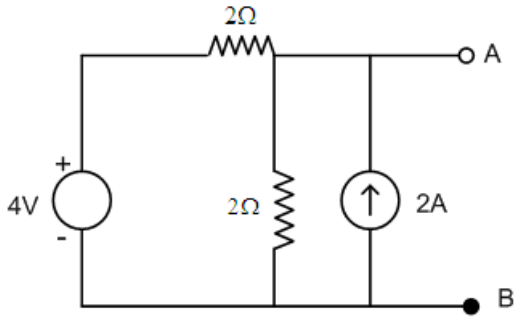
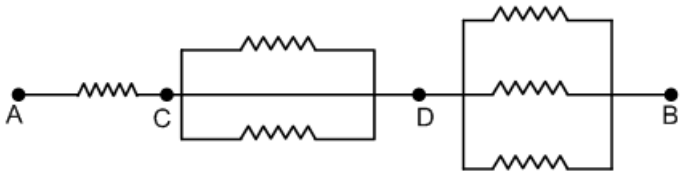
1. (a) Differentiate between active and passive elements with suitable examples.
   (b) Find the equivalent voltage and current source representation of the following network across AB.



2. (a) Two resistances when they are in series have an equivalent resistance of 9 ohms and when connected in parallel have an equivalent resistance of 2 ohms. Find the resistance and the ratio of the voltage and current sharing between these elements if supply voltage is 100v.
   (b) Find the equivalent resistance between the terminals AB in the network shown in the figure, if each has a resistance of R ohms and hence find the total current, current through each element if the voltage is 45v.



3. (a) Define power factor. What is its Importance in a.c. Circuits?
   (b) The impedances of a parallel circuit are Z_1=(6+j8)Ω and Z_2 =(8-j6)Ω . If the applied voltage is 120V, find
      i. current and power factor of each branch
      ii. overall current and power factor of the circuit
      iii. Power Consumed by each impedance. Draw phasor diagram.

4. (a) What is quality factor? Explain its effect on bandwidth.
   (b) A series RLC circuit has a quality factor of 5 at 50rad/sec. The current flowing through the circuit at resonance is 10 A and the supply voltage is 100v. The total Impedance of circuit is 20 Ω. Find the circuit constants.

5. (a) Define magnetizing force and flux density.
   (b) Compare magnetic circuit with electric circuit
   (c) For the circuit shown in fig. 5 find input impedance, assume load impedance to be Z_L.

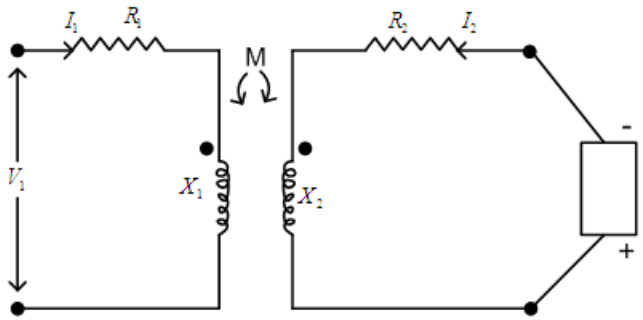


Fig5.

6. (a) Determine the voltages at each node for the circuit shown in Fig.6

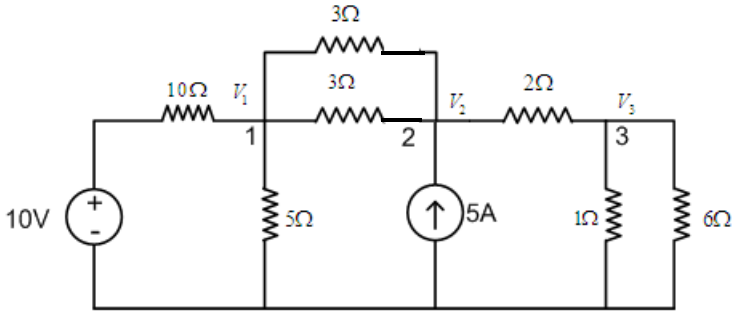


Fig.6

7. (a) State and explain maximum power transfer Theorem
   (b) In the network shown in the Fig. 7 find the value of Z_L so that the power transfer from the source is maximum. Also find P_{max}.

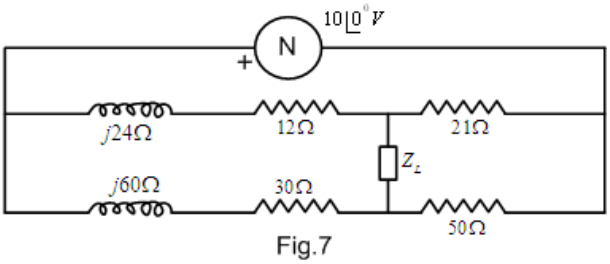


Fig.7

Figure for Question No.7

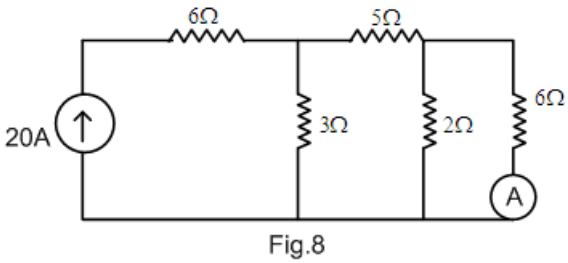


Fig.8

Figure for Question No.8

8. (a) State and explain Tellegen's theorem.
   (b) Using compensation theorem, determine the ammeter reading when it is connected to 6 Ω resistor as shown in fig.8 given above. The internal resistance of the ammeter is 2Ω .

Code :9A02305

2

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Differentiate between ideal sources and practical sources.
   (b) An inductor shown in fig 1. a is supplied with a current wave from given in fig. 1.b Draw the wave forms for the voltage and energy in the inductor .

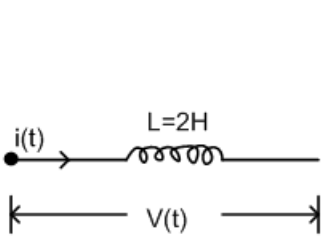


Fig. 1.a

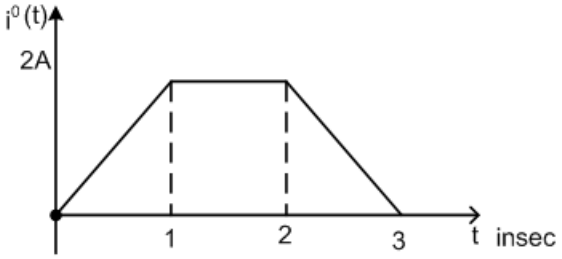


Fig.1.b

2. Find the node voltages V_1,V_2 and V_3 in the network of fig.2. And find the current I_x.

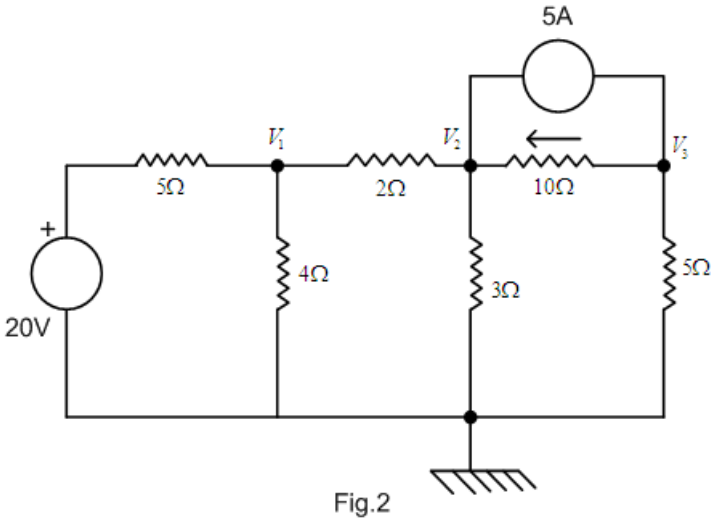


Fig.2

3. (a) Derive the expression for power in 1-∅ A.C. Circuits.
   (b) A sinusoidal 50Hz voltage of 200v supplies the three parallel circuits as shown in figure 3. Find the current in each circuit and the total current. Draw the vector diagram.

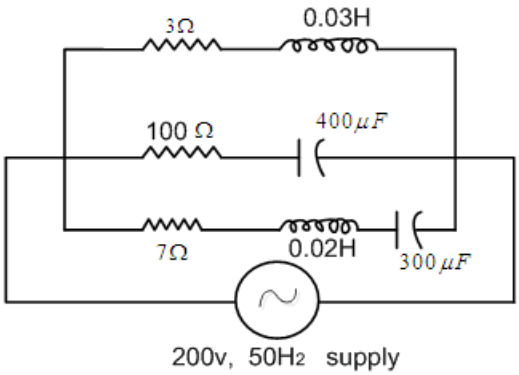


Fig.3.

4. (a) Determine the quality factor of a coil for the series circuit consisting of R=10 Ω , L=0.1 H and C=10μF.
   (b) Two impedances Z_1 = 20+j10 and Z_2=10-j30 are connected in parallel and this combination is connected in series with Z_3=30+jX. Find the value of X which will produce resonance

5. (a) Explain the terms magnetic field strength, magnetic flux and magnetic flux density.
   (b) Define coefficient of coupling. What is its range of vasiatim? In which type of circuits it is minimum and in which type of circuits it is maximum?
   (c) The combined inductance of two coils connected in series are 0.6 H and 0.1 H in series aiding and series opposing connections. If the self inductance of each coil is 0.2H, find the coefficient of coupling.

6. Using nodal analysis, find the power dissipated in the 6Ω resistor for the circuit shown in fig.6.

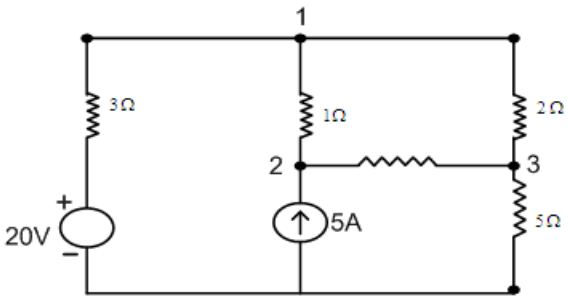


Fig.6.

7. (a) State and explain Norton's theorem.
   (b) Find the current through load resistance R_L and also find the voltage drop across load using Millman's theorem for the network as shown in fig.7.

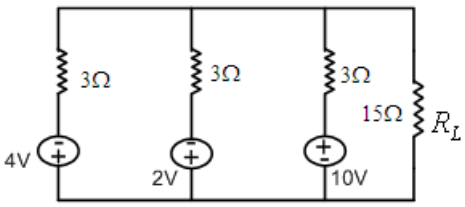


Fig.7

Figure for Question No.7

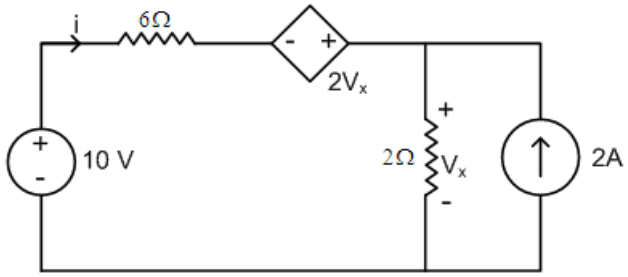


Fig.8

Figure for Question No.8

8. (a) State and explain Reciprocity theorem.
   (b) Find the current i in the circuit shown in fig. 8 given above using superposition theorem.

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Code :9A02305

3

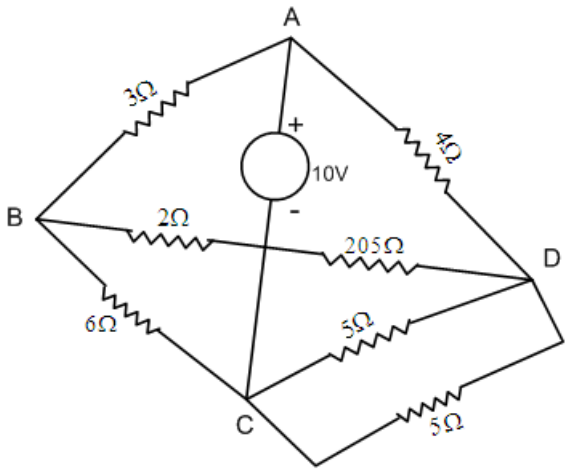
II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Derive an expression for the energy stored in an inductor and a capacitor.
   (b) When a dc voltage is applied to a capacitor, the voltage across its terminals is found to build up in accordance with $V_C = 50\left(1 - e^{-100t}\right)$. After a lapse of 0.01 s, the current flow is equal to 2 mA.
      i. Find the value of capacitance in microfarads
      ii. How much energy is stored in the electric field at this time?
2. (a) Stats and explain Kirchhoff's laws.
   (b) Find the power delivered by the source in the circuit shown in the following figure.



3. (a) Define the following
      i. RMS value
      ii. Average value
      iii. Form factor of an alternating quantity
   (b) A series circuit consisting of a 10 Ω resistor, a 100 μ F capacitor and a 10 m H inductor is driven by a 50 Hz a.c. voltage source of maximum value 100 volts. Calculate the equivalent Impedance, current in the circuit, the power factor and power dissipated in the circuit.
4. A series RLC circuit has R= 10Ω, L=0.5 H, and C= 40 μ F. The applied voltage is 100V. Find
   (a) Resonant frequency
   (b) Quality factor of coil.
   (c) Upper and lower half power frequencies
   (d) Band width
   (e) Current at half power points.
   (f) Voltage across inductance at resonance.
5. (a) write a short note on dot convention used in magnetically coupled coils.
   (b) In the network shown in Fig. 5, L_1=1H, L_2=2H, M=1.2 H. Assuming the inductance coils to be ideal, find the amount of energy stored after 0.1 sec of the circuit connected to a d.c. source of 10v.

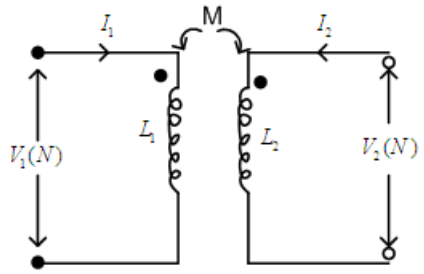


Fig.5

6. For the circuit shown in fig.6 find the voltage across the 4Ω resistor by using nodal analysis.

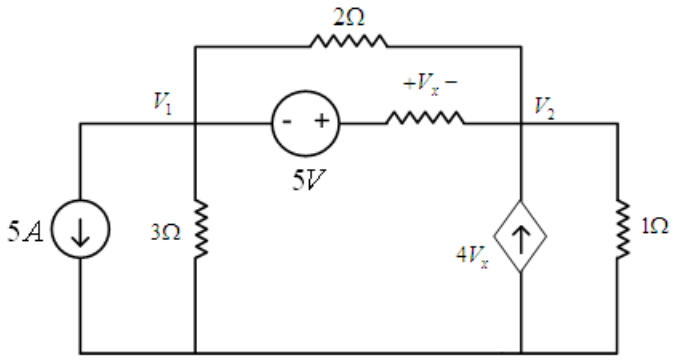


Fig.6.

7. (a) State and explain Thevinin's and Norton's theorems
   (b) Calculate the current I shown in fig. 7 using Millman's theorem.

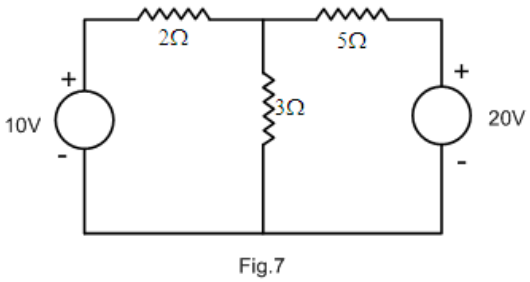


Fig.7

Figure for Question No.7

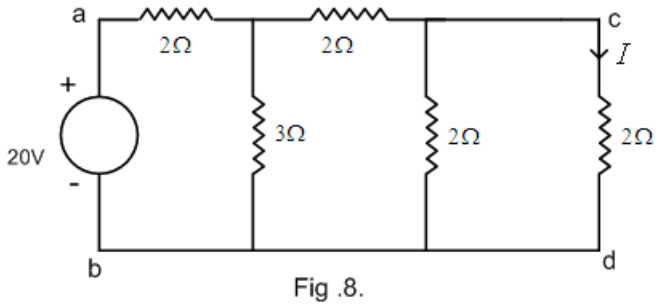


Fig .8.

Figure for Question No.8

8. (a) State and explain compensation theorem.
   (b) verify the Reciprocity theorem for the network shown in fig.8 given above.

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Code :9A02305

4

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Differentiate between independent and dependent sources.
   (b) Consider the resistor shown in fig. 1a. A voltage v(t) of the wave form given in fig. 1b is applied at its terminals. Obtain the wave form of current through it.

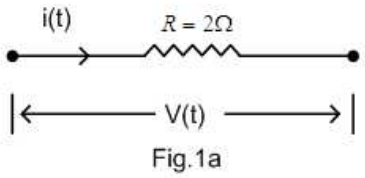

Fig.1a

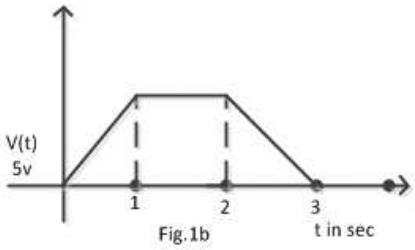

Fig.1b

2. Determine the current drawn by the circuit shown in fig 2.

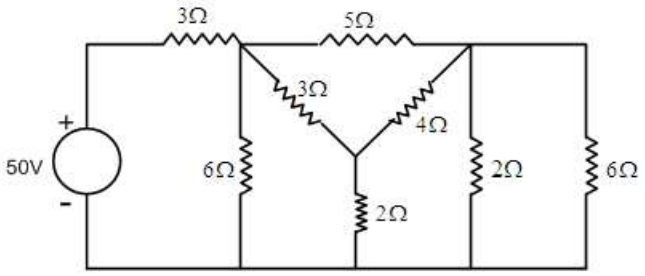

Fig.2

3. (a) Explain the following:
      i. Impedance.
      ii. Reactance.
      iii. Phase angle difference.
      iv. Power factor.
   (b) An alternating voltage (80+j60) V is applied to a circuit and current flowing is (-4+j10)A. Find the
      i. Impedance of the circuit and.
      ii. The power factor

4. (a) What is resonance? Sketch the resonance curves for a series resonant circuit with variable frequency and constant R, L and C.
   (b) A series circuit comprising R, L and C is supplied at 220V, 50 HZ. At resonance, the voltage across the capacitor is 550V. The current at resonance is 1A. Determine the circuit parameters R, L and C.

5. (a) Define MMF, Flux and Reluctance.
   (b) What is a magnetic circuit? Compare magnetic circuit with an electric circuit.
   (c) Find the total inductance of the three series connected coupled coils as shown in figure 5.

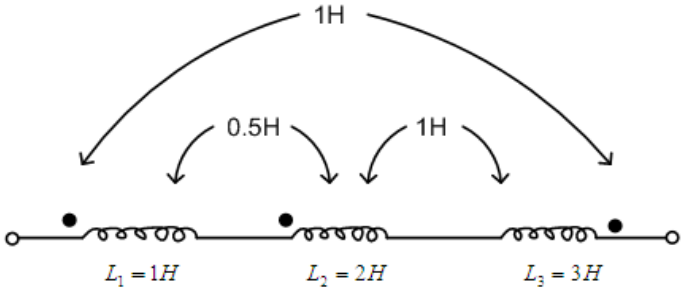

Fig.5

Figure for Question No.5

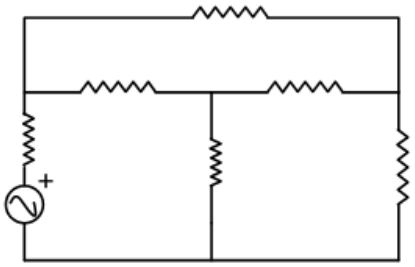

Fig.6.

Figure for Question No.6

6. (a) Explain the procedure for obtaining fundamental Tieset matrix of a given network.
   (b) For the circuit shown in fig.6. given above draw the graph and tree.

7. (a) State and explain Millman's theorem.
   (b) Determine the Thevinin's and Norton's equivalent circuits across AB for the circuit shown in fig. 7.

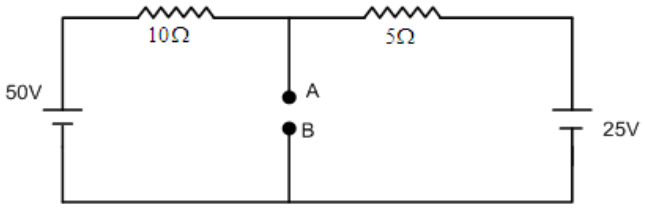

Fig.7.

8. (a) State and explain Tellegen's Theorem.
   (b) For the resistive network shown in fig. 8, find the current in each resistor, using the superposition principle.

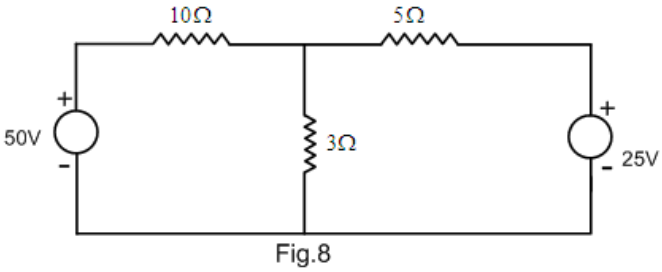

Fig.8

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Code 9A02308 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) In a rectangular electromagnetic relay, the exciling coil has 1500 turns of resistance 1Ω . The cross-sectional area of the core A=5cmx5cm, Neglecting reluctance of the magnetic circuit and fringing, if the coil is excited with 50Hz a.c having a peak to peak value of 100v and the armature is held at a distance of 1cm, find the average force on the armature.

2. (a) Derive the expression for the voltage induced in a dc generator
   (b) The lap wound armature of a 4 pole generator has 51 slots. Each slot contains 20 conductors. What will be the emf generated in machine when driven at 1500 rpm? The useful flux per pole is 0.01wb

3. (a) Explain how demagnetizing and cross magnetizing ampere-turns/pole are calculated in dc machines.
   (b) Calculate the ampere turns for each commutating pole of an 8 pole with 107 slots, each containing 1000 ampere conductors. The interpole air gap is 1.2 cm. The flux density in the air gap is to be 0.32 T. Neglect iron parts and leakage.

4. (a) Explain the process of voltage building in self excited generator. Also mention the possible causes of failure of excitation.
   (b) A short shunt compound generator delivers a load current of 30 A at 220 V and has armature, series, field and shunt field resistance of 0.05Ω , 0.03Ω and 200Ω respectively. Calculate the induced emf and the armature current. Allow 1.0v per brush for contact drop.

5. (a) Draw and explain the load characteristics of a series generator
   (b) Two shunt generators, each with a no load voltage of 200v are run in parallel. Their external characteristics can be taken as straight lines over this operation range. Generator 1 is rated at 200 kw and its full load voltage 190v. Generator 2 is rated at 100kw at 185v. Calculate the bus bar voltage when the total load is 3000A. How is the load divided between the two?

6. A 200 volts d.c. series motor runs at 1000 r.p.m when operating at its full load current of 30A. The motor resistance is 0.5Ω and the magnetic circuit can be assumed unsaturated. What will be the speed if
   (a) The load torque is increased by 44%
   (b) The motor current is 20A.

7. (a) What is a starter? Explain the necessity of starter in d.c..motors.
   (b) Explain the method to control the speed of a d.c. motor above its rated speed.

8. A 440v d.c. shunt motor takes a no load current of 25A. The resistance of the shunt field and the armature are 550 Ω and 1.2 Ω respectively. The full load line current is 32A. Find the full load output and the efficiency of the motor.

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Code 9A02308 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. In a rectangular electromagnetic relay, the exciting coil has 1200 turns. Cross-sectional area of the coil A=6cmx6cm . Neglect the reluctance of the magnetic circuit and fringing effects. With coil currents kept constant at 2A, derive expression for force on armature as a function of air gap of length x. Find the work done by the magnetic field when x decreases from 1cm to 0.5cm by integrating the force.

2. (a) Explain the action of commutator in dc generators.
   (b) A 4 pole d.c. generator has a wave wound armature with 792 conductors. The flux per pole is 0.12 Wb. Determine the speed at which it should be run to generate 240v on no load.

3. (a) What is armature reaction? Explain the effects of armature reaction. Also explain the methods to overcome the effects of armature reaction.
   (b) A 500 volts, 4-pole, wave wound, 750rpm d.c. shunt generator supplies a load of 195A. The armature has 720 conductors and shunt field resistance is 100Ω . Find the demagnetizing ampere turns per pole, if the brushes are given an actual lead of 10^0 at the load. Also calculate the extra shunt field turns required to neutralize the demagnetization.

4. (a) What is self excited generator? Explain the process of voltage building in self excited generator.
   (b) What are the causes of failure to excite a self excited generator? Also suggest the remedial measures.

5. (a) Explain the necessity of parallel operation of generators.
   (b) Two d.c. compound generators, A and B with an equalizing bar, supply a total load of 500A. The data relating to the machine are as follows.
   Armature resistance, R_A =0.05 ohms,R_B =0.03 ohms; series field winding , R_{SA} = 0.02 ohms, R_{SB} =0.01 ohms. Generated emf E_A =463V, E_B=470v
   Calculate :
      i. The current in each armature
      ii. The current in each series winding

6. (a) A 250V d.c shunt machine has line current of 80A. It has armature and field resistance of 0.1Ω and 125Ω respectively. Calculate power developed in armature when running as
      i. generator and
      ii. motor.

7. (a) What is a starter? Explain the necessity of starters in dc motors.
   (b) Explain the Ward-Leonard system of speed control of d.c. motors.

8. The no load test of a 45kw, 230v d.c. shunt motor gave the following results:
   Input current =14A
   Field current =2.55A
   Brush drop =2V
   Estimate full load current and efficiency.

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Code 9A02308 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the principle of energy conversion. From the consideration of various energies involved, develop the model of an eletromechanical conversion device.
   (b) Prove that energy and coenergy in a linear magnetic system are given by identical expressions.

2. The armature core of a 4 pole dc machine has 31 slots each designed to accommodate 4 coil sides of a simplex wave winding. The winding has total of 496 conductors. Find
   (a) total numbers of coils
   (b) turns per coil
   (c) commutator pitch
   (d) back, front and total pitches
   (e) number of commutator segments.

3. A 4 pole lap wound d.c. generator delivers full load current of 400A. It has shunt field current of 12A and 123 commutator segments in the commutator ring of the machine. If the brushes are advanced by 3 commutator segments full load , find
   (a) the demagnetizing AT/Pole
   (b) the cross magnetizing AT/Pole

4. In a 110V, d.c. compound generator, the resistance of the armature, shunt field and series field are 0.06Ω , 25Ω ,and 0.4Ω respectively. The load consists of 200 lamps each rated at 55W, 110V. Find the total emf generated and the armature current when the machine is connected in
   (a) long shunt and
   (b) short shunt

5. (a) List and explain the applications of various types of degenerators.
   (b) Two shunt generators each with an armature resistance of 0.01Ω and field resistance of 25Ω run in parallel and supply a total load of 3000A. The emfs are respectively 220V and 240V. Calculate the bus bar voltage and output of each machine.

6. A 4 pole d.c. shunt motor takes 22.5 A from a 250V supply R_a =0.5Ω and R_{SH} =125Ω . The armatures is wave wound with 300 conductors. If the flux per pole is 0.02Wb, calculate
   (a) speed
   (b) Torque developed
   (c) Cross power developed.

7. (a) Explain the scheme to control the speed of a dc shunt motor below its rated speed.
   (b) A 220 V d.c. shunt motor runs at 500rpm taking a current of 16A from the field winding in 220 ohms. The motor drives a load whose torque is constant. Find the extra resistance to be added to the field winding to increase the speed to 700rpm.

8. A 200 V d.c. shunt machine has armature and field resistances of 0.2Ω and 200 Ω respectively. The line current in 40A. Find i) Output as generator ii) Input as a motor iii) Power developed in armature and iv) Copper losses in both the cases.

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Code 9A02308 4

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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1. For a doubly excited magnetic system, the inductances are approximated as follows: L_1=11+3cos2θH; L_2=7+2 cos2θ H; M=11 cosθ H. The coils are energized with d.c. I_1=0.7A, I_2=0.8A, Find
   (a) the torque as a function of θ and its value when θ=-50^0
   (b) the energy stored in the system as a function of θ
   (c) the maximum energy stored.
2. (a) With a neat diagram explain the constructional features of a dc machine.
   (b) A six pole lap wound dc generator armature has 720 conductors, a flux of 30mwb and running at a speed of 600rpm. Calculate the e.m.f. generated on open circuit. If the same armature is wave wound, at what speed it is to be driven to generate 600 volts?
3. (a) Explain the armature reaction in a dc generator. Also explain the methods to overcome the effects of armature reaction.
   (b) A 4 pole 50kw, 250v wave wound, shunt generator has 400 armature conductors. Brushes are given a lead of 4 commutator segments. Calculate the demagnetizing AT/pole if shunt field resistance is 50Ω. Also calculate extra shunt field AT/pole to neutralize the demagnetization.
4. (a) Draw and explain occ of a dc shunt generator. Also define the critical field resistance and critical speed.
   (b) A shunt generator has an induced voltage on open circuit of 127V. When the machine is on load, the terminal voltage is 120V. Find the load current if the field circuit resistance is 15Ω and the armature resistance is 0.02Ω. Ignore armature reaction.
5. (a) Draw and explain the load characteristics of a DC shunt generator.
   (b) Eight shunt generators are running in parallel. Each generator supplies a load current of 400A at 310V. The shunt field current of each generator is 0.04Ω. If one generator is suddenly switched off, determine the percentage change of terminal voltage, the total load current being kept unchanged.
6. A 20kw, 250V dc shunt motor has a full load armature current of 85A at 1100rpm. The armature resistance is 0.18Ω. Determine:
   (a) the initial torque developed
   (b) the internal torque if the field current is suddenly reduced to 80% of its original value
   (c) the steady motor speed assuming the load torque to have remained constant.
7. What is the need for speed control of electric motors? List and explain different speed control methods for dc motors.
8. A 200v shunt motor has R_a=0.1Ω, R_f=240Ω and rotational loss= 236w on full load the line current is 9.8A with the motor running at 1450rpm. Determine:
   (a) the mechanical power developed
   (b) the power output
   (c) the load torque
   (d) the full load efficiency.

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Code 9A04301

1

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRONIC DEVICES & CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering, Information Technology, Computer Science & Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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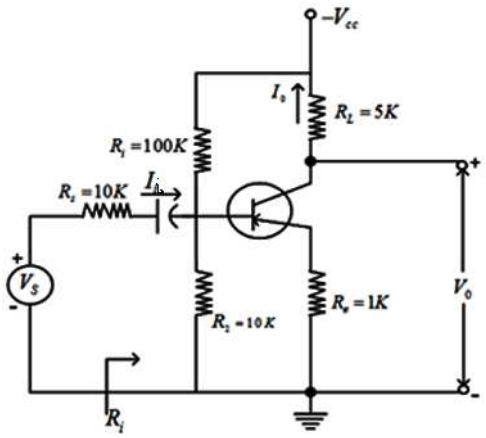
1. (a) Discuss PN diode VI characteristics with neat sketch.
   (b) Calculate the factor by which the current will increase in silicon diode operating at a forward voltage of 0.4 Volts, when the temperature is raised form 25^0C to 150^0C.
2. (a) With Circuit and necessary waveforms explain the operation of centered tapped FWR.
   (b) Derive the expression for ripple factor for the circuit FWR with inductor filter.
3. (a) With neat sketch explain the different current components of transistor.
   (b) In an NPN transistor emitter is grounded, base is connected with 4 Volts supply in series with 100 K ohms resistor and collector base is connected with 4 Volts supply in series with 2 K ohms. Assume $V_{CC} = 12Volts, V_{BE} = 0.7Volts, \beta = 100$. Find I_B, I_C *and* I_E
4. (a) What are the draw backs of transistor fixed bias circuits?
   (b) Derive an expression for stability factor S in self bias circuit.
5. (a) With neat structure explain the principle of operation of depletion MOSFET.
   (b) Explain drain characteristics of JFET.
6. (a) Derive an expression for voltage gain, Input Impedance and output impedance of CS amplifier at low frequencies.
   (b) Discuss self biasing of JFET.
7. For the transistor amplifier shown below, Compute $A_I = I_o/I_i, A_V, A_{VS}$ *and* R_i. Assume $h_{ie} = 1100\,ohms$, $h_{fe} = 50, h_{re} = 2.5 \times 10 - 4, h_{oe} = 24uA/V$



8. Discuss the principle of operation and VI characteristics of
   (a) Photo Diode
   (b) Uni Junction Transistor

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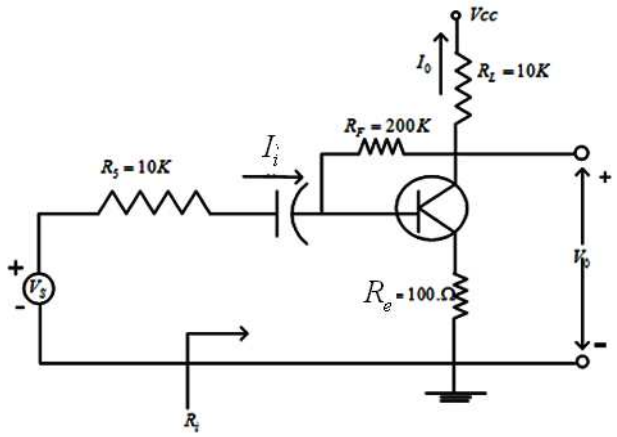
Code 9A04301 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRONIC DEVICES & CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering, Information Technology, Computer Science & Engineering)
Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Discuss energy band diagram for PN diode for the following cases
   i. Un biased
   ii. Forward biased
   iii. Reverse biased
   (b) Determine the forward resistance of PN diode, when the forward current is 5 MA at T=300K. Assume the diode is silicon.
2. (a) With circuit and necessary waveforms explain the operation of HWR
   (b) Derive the expression for ripple factor for the circuit HWR with capacitor filter.
3. (a) Explain how transistor will act as an amplifier.
   (b) Discuss in detail about early effect and its consequences.
   (c) Derive the relation base current and collector current.
4. (a) Explain diode compensation circuit for variations in V_{BE} for self bias circuit.
   (b) Derive an expression for stability factor S' in self bias circuit
5. (a) With neat structure explain the principle of operation of enhancement MOSFET
   (b) Discuss the relationship between FET parameters.
6. (a) Derive an expression for voltage gain, input Impedance and output impedance of CD amplifier at low frequencies.
   (b) Discuss voltage divider biasing of JFET
7. For the transistor amplifier shown below, Compute $A_I = I_0/I_i, A_V, A_{VS}$ *and* R_i. Assume $h_{ie} = 1100\,ohms,\ h_{fe} = 50,\ h_{re} = 2.5\,X\,10 - 4\ h_{oe} = 24\ uA/V$



8. Explain the principle of operation and VI characteristics of SCR. Also state few applications of SCR.

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Code 9A04301 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRONIC DEVICES & CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering, Information Technology, Computer Science & Engineering)
Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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1. (a) Discuss temperature dependence of PN diode VI characteristics.
   (b) Derive an expression for dynamic resistance of PN diode.
   (c) The voltage across a silicon diode at room temperature is 0.7 Volts when 2 mA current flows through it. If the voltage increases to 0.75 Volts, Calculate the diode current.
2. (a) With circuit and necessary waveforms explain the operation of Bridge Rectifier.
   (b) Design a filter for FWR circuit with LC filter to provide an output voltage of 10 Volts with a load current of 200 mA and the ripple is limited to 2%.
3. (a) Explain input characteristics transistor CB configuration.
   (b) A transistor with $\alpha = 0.97$ has a reverse saturation current of 1 uA in CB configuration. Calculate the value of leakage current in the CE configuration. Also find the collector current and the emitter current if the value of base current is 20 uA.
4. (a) Explain diode compensation circuit for variations in I_C for self bias circuit.
   (b) How self bias circuit will eliminate drawbacks in fixed bias circuit?
5. (a) With neat structure explain the principle of operation of JFET.
   (b) Explain how depletion mode MOSFET can also act as enhancement mode MOSFET.
6. (a) Derive an expression for voltage gain, Input impedance and output impedance of CG amplifier at low frequencies.
   (b) In an N - channel JFET based voltage divider common drain configuration, determine the value of resistor R_S so as to have the operating point as IDQ = 5mA, VDSQ =10 V. Given that VDD=28V, R1 1 M ohms, R2=0.5 M ohms, saturation drain current of the FFET is 10 mA and gate source pinch off voltage is '-5V'.
7. (a) Give the comparison of CE,CC and CB amplifiers with respect to voltage gain, current gain, input impedance and output impedance.
   (b) Find expressions for voltage gain, current gain, Input impedance and output impedances of CC amplifier using simplified hybrid model?
8. Discuss the principle of operation of
   (a) Varactor Diode
   (b) LED
   (c) LDR

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Code 9A04301 4

II B.Tech I semester (R09) Regular Examinations, November 2010
ELECTRONIC DEVICES & CIRCUITS
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering, Information Technology, Computer Science & Engineering)
Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Discuss zener and avalanche break down mechanisms.
   (b) Derive an expression for transition capacitance of PN diode.
2. (a) With simple circuit explain how Zener diode will act as a regulator.
   (b) In a bridge rectifier, the transformer is connected to 220 Volts, 60Hz mains and turns ratio of the step down transformer is 11:1. Assuming the diodes to be ideal, find
      i. Voltage across the load
      ii. D.C. Current
      iii. PIV
3. (a) Explain output characteristics transistor CE configuration?
   (b) The reverse leakage current of the transistor when connected in CB configuration is 0.2 uA and it is 18 uA when the same transistor is connected in CE configuration. Calculate α_{dc} and βdc .
4. (a) What is thermal runaway and what is the condition for thermal stability in CE configuration?
   (b) In an NPN transistor if $\beta = 50$ is used in common emitter circuit with VCC = 10 Volts and RC=2 K Ohms. The bias is obtained by connecting 100 K Ohms resistor from collector to base. Find the operating point.
5. (a) State advantages and disadvantages of FET's over BJT's.
   (b) Discuss the VI characteristics of depletion mode MOSFET.
6. (a) Explain how FET acts as VVR.
   (b) Discuss the concept of biasing of MOSFET's (Both Depletion and Enhancement)
7. Derive the expressions for voltage gain, current gain, Input impedance, output impedance, voltage gain with respect to source and current gain with respect to source for generalized transistor amplifier at low frequencies.
8. Explain the principle of operation and characteristics of Tunnel diode with the help of energy band diagrams.

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Code :9ABS302 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICS-III
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Show that $\int_{-1}^{1} (1+x)^{p-1} (1+x)^{q-1} dx = 2^{p+q-1} \frac{\sqrt{(p)}\sqrt{(q)}}{\sqrt{(p+q)}}$.
   (b) Show that $\frac{n}{x} J_n(x) + J_n^1(x) = J_{n-1}(x)$
2. (a) State the necessary condition for f(z) to be analytic in cartesion co-ordinates.
   (b) Prove that the function f(z) defined by $f(z) = \frac{x^3(1+i)-y^3(1-i)}{x^2+y^2}, (z \neq 0)$ $= 0 \quad , (z = 0)$ is continuous and the Cauchy-Riemann equations are satisfied at the origin, yet $f^1(0)$ does not exist.
3. (a) Find the real part of the principle value $i^{\log(1+i)}$.
   (b) Find real and imaginary parts of
      i. cos z
      ii. tan z
4. (a) Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$ if C is the square with vertices at $1 \pm i$ and $-1 \pm i$.
   (b) Evaluate $\int_c \frac{z-3}{z^2+2z+5} dz$ where C is the circle
      i. |z| = 1
      ii. |z + 1 − i| = 2
5. (a) Find Taylor's expansion of $f(2) = \frac{2z^3+1}{z^2+z}$ about the point
      i. z=i
      ii. z=1.
   (b) Obtain all the Laurent series of the function $\frac{7z-2}{(z+1)z(z-2)}$ about $z_0 = -1$
6. (a) State and prove Cauchy's Residue theorem.
   (b) Show that $\int_0^{2\pi} \frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2-b^2}} (a > |b| > 0)$
7. Show that all the roots of $z^5 + 3z^2 = 1$ lie inside the circle $|z| < \sqrt[3]{4}$.and that two of its roots lie inside the circle $|z| < 3/4$
8. (a) Show that the relation $w = \frac{5-4z}{4z-2}$ transform the circle$|z| = 1$ into a circle of radius unity in the w-plane.
   (b) Find the bilinear transformation which maps the points $(2, i, -2)$ into the points $(1, i, -1)$.

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Code :9ABS302 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICS-III
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Prove that $\int_0^1 \frac{x^2}{\sqrt{1-x^4}}dx \times \int_0^1 \frac{dx}{\sqrt{1+x^4}} = \frac{\pi}{4\sqrt{2}}$
   (b) Prove that $J_{-n}(x) = (-1)^n J_n(x)$, where n is a positive integer.
2. (a) If U(x,y) and V(x,y) are harmonic functions in a region R, prove that the function $\left(\frac{\partial u}{\partial y} - \frac{\partial v}{\partial x}\right) + i\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}\right)$ is an analytic function.
   (b) Determine the analytic function whose real part is
      i. $e^x \cos y$
      ii. $e^{2x}(x\cos 2y - y\sin 2y)$
3. (a) If $Sin(\theta + i\alpha) = cos\alpha + i\sin\alpha$, then prove that $Cos^4\theta = \sin^2\alpha$.
   (b) If $cosec\left(\frac{\pi}{4} + i\alpha\right) = u + iv$, prove that $(u^2+v^2)^2 = 2(u^2 - v^2)$.
4. (a) Evaluate $\int_0^{1+i}(x^2 - iy)dz$ along the paths
      i. $y = x$
      ii. $y = x^2$
   (b) Using Cauchy's integral formula, evaluate $\int_c \frac{z^4}{(z+1)(-i)}dz$ where C is the ellipse $9x^2 + 4y^2 = 36$.
5. (a) Show that when $|z+1| < 1, z^{-2} = 1 + \sum_{n=1}^{\infty}(n+1)(z+1)^n$
   (b) Find the Laurent series expansion of the function $f(z) = \frac{z^2-6z-1}{(z-1)(z-3)(z+2)}$
6. (a) Find the poles of $f(z)$ and the residues of the poles which lie on imaginary axis if $f(z) = \frac{z^2+2z}{(z-1)^2(z^2+4)}$.
   (b) Evaluate $\int_c \frac{(2z+1)^2}{4z^3+z}dz$ where c is the circle $|z| = 1$ using Residue theorem.
7. (a) Show that one root of the equation $z^4 + z + 1 = 0$ lies in the first quadrant.
   (b) Apply Rouche's theorem to determine the number of roots of $f(z) = z^4 - 5z + 1$ within annulus region $1 < |z| < 2$.
8. (a) Find the image of the rectangle $R: -\pi < x < \pi, \frac{1}{2} < y < 1$ under the transformation W=sinz.
   (b) Determine the bilinear transformation that maps the points 1-2i, 2+i, 2+3i respectively 2+2i, 1+3i, 4.

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Code :9ABS302 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICS-III
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Show that $\sqrt{\left(\frac{1}{2}\right)}\sqrt{(2n)} = 2^{2n-1}\sqrt{(n)}\sqrt{\left(n+\frac{1}{2}\right)}$.
   (b) Prove that $J_0(x) = 1 - \frac{x^2}{2^2} + \frac{x^4}{2^2.4^2} - \frac{x^6}{2^2.4^2.6^2} + - - - - -$
2. (a) Prove that Z^n (n is a positive integer) is analytic and hence find its derivative.
   (b) Show that the function $u = e^{-2xy}\sin(x^2 - y^2)$ is harmonic, find the conjugate function 'v' and express $u + iv$ as an analytic function of z.
3. (a) Separate the real and imaginary parts of
      i. cosec z
      ii. cot z
   (b) Find all principal values of $\left(1 + i\sqrt{3}\right)\left(1 + i\sqrt{3}\right)$
4. (a) Evaluate $\int_0^{3+i} z^2 dz$, along
      i. The line $y = \frac{x}{3}$
      ii. Parabola $x = 3y^2$
   (b) Evaluate $\int_c \frac{z^2-2z-2}{(z^2+1)^2 Z} dz$ where C is $|Z - i| = \frac{1}{2}$ using cauchy's integral formula.
5. (a) Find the Laurent series of $\frac{7z-2}{(z+1)z(z-2)}$ in the annulus $1 < |Z + 1| < 3$.
   (b) Expand $f(z) = e^{1+z}$ in powers of (Z - 1).
6. (a) Evaluate $\oint_c \frac{zdz}{(z-1)(z-2)^2}$ where $C : |z - 2| = \frac{1}{2}$.
   (b) Evaluate $\int_0^{2\pi} \frac{d\theta}{(5-3\sin\theta)^2}$ using residue theorem.
7. (a) Determine the number of roots of the equation $2z^5 - 6z^2 + z + 1 = 0$ in the region $1 \le |z| < 2$.
   (b) Use Rouche's theorem to show that the equation $z^2 + 15z + 1 = 0$ has one root in the disk $|z| > \frac{3}{2}$ and four roots in the ammulus $\frac{3}{2} < |z| < 2$.
8. (a) Find the image of the infinite strip bounded by x = 0 and $x = \frac{\pi}{4}$ under the transformation $w = \cos z$.
   (b) Find the bilinear transformation which maps vertices $(1 + i, -i, 2 - i)$ of the triangle T of the Z- plane into the points (0,1,i) to the w-plane.

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Code :9ABS302 **4**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICS-III
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering, Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Evaluate $4\int_0^\infty \frac{x^2}{1+x^4}dx$ using $\beta-\Gamma$ functions.
   (b) Prove that $P_n(x)=\frac{1}{2^x n!}\frac{d^n}{dx^n}(x^2-1)^n$.
2. (a) Show that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\log|f^1(z)|=0$ where f(z) is an analytic function.
   (b) Prove that $u=e^{-x}[(x^2-y^2)\cos y+2xy\sin y]$ is harmonic and find the analytic function whose real part is u.
3. (a) Find all the roots of sinz=2.
   (b) If tan(x+iy)=A+iB, show that
      i. $A^2+B^2+2A\cot 2x=1$
      ii. $A^2+B^2-2B\coth 2y+1=0$
4. (a) Show that $\int_c (z+1)dz=0$ where c is the boundary of the square whose vertices at the points z = 0, z = 1, z = 1 + i, z = i.
   (b) Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz$, where C is the circle $|z|=3$.
5. (a) Expand $f(z)=\frac{z^2-4}{z^2+5z+4}$ valid for $|z|<1$.
   (b) obtain the Laurent's series which represents the function $\frac{1}{(1+z^2)(z+2)}$ when
      i. |z| < 1
      ii. 1 < |z| < 2
6. (a) Evaluate $\int_c \frac{z-2}{z(z-1)}dz$ where c is $|z|=2$ using Residue theorem.
   (b) Evaluate $\int_0^{2\pi}\frac{\sin 3\theta}{5-3\cos\theta}d\theta$ using Residue theorem.
7. (a) Show that the equation $z^4+4(1+i)z+1=0$ has one root in each quadrant.
   (b) State and prove fundamental theorem of algebra.
8. (a) Find the image of the line x = 4 in z-plane under the transformation $w=z^2$.
   (b) Find the bilinear transformation that maps the points 1, i, -1 into the points 2, i, -2.

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Code 9ABS303 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
ENVIRONMENTAL SCIENCE
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communications Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. Write a detailed note on the role any four organizations in the field of environment and there contribution to better management.
2. Discuss the following:
   (a) Biosphere
   (b) Environment
   (c) Pollution
   (d) Municipal solid waste
3. (a) Discuss about energy cycle integration of cycles in nature.
   (b) Write short note on ecological succession.
4. (a) Discuss about consumptive use value and productive use value.
   (b) Discuss about genetic diversity with examples.
5. (a) Discuss about definition, cause, effects and control measures of nuclear hazards pollution.
   (b) Discuss about air pollution.
6. Write the issues and possible solutions of environmental ethics.
7. (a) What are the risks involved due to utilization of chemicals in food?
   (b) Discuss about climate and health.
8. Discuss the water polluted site in your field work.

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Code 9ABS303 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
ENVIRONMENTAL SCIENCE
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communications Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. What are the different activities that can be taken up to increase public awareness of environment issues? Explain how they help in better environmental management.
2. Discuss the following:
   (a) Growing energy needs
   (b) Renewable and non-renewable energy sources
   (c) Use of alternate energy sources
3. (a) Discuss about producers, consumers and decomposers with examples.
   (b) Write short note on ecosystem.
4. Discuss about in-situ and ex-situ conservation of biodiversity.
5. (a) Discuss about definition, cause, effects and control measures of thermal pollution.
   (b) Discuss about water pollution.
6. Discuss about rainwater harvesting, and water shed management.
7. Write short notes on:
   (a) Infectious diseases.
   (b) Water related diseases.
8. Write a detailed explanation about local polluted site of your choice.

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Code 9ABS303 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
ENVIRONMENTAL SCIENCE
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communications Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. Discuss about environmental crisis and sustainable development.
2. (a) Discuss role of an individual in conservation of natural resources.
   (b) Discuss the environment effects of extracting and using mineral resources.
3. (a) Write short notes on ecosystem.
   (b) Discuss about ecosystem degradation and resources utilization.
4. (a) Discuss about habitat loss, poaching of wild life.
   (b) Discuss about endangered and endemic species of India with examples.
5. (a) Discuss about definition, cause, effects and control measures of water pollution.
   (b) Discuss about characteristics of municipal solid waste, and vermicomposting.
6. What control measures be taken to develop unsustainable to sustainable development?
7. Write detailed explanation on environment and human health.
8. Write the report of your field work on ecosystem of your choice.

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Code 9ABS303 4

II B.Tech I semester (R09) Regular Examinations, November 2010
ENVIRONMENTAL SCIENCE
(Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communications Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Write reasons for studying the state of environment.
   (b) Define Environmental studies.
   (c) Discuss about interrelated nature of environmental problems.
2. Discuss importance of environmental studies with respect to the following statements:
   (a) We live in the world wherein natural resources are limited.
   (b) Green space and gardens are vital to the physiological and physical health of city dwellers.
3. Discuss about forest ecosystem and explain with proper examples.
4. (a) Discuss about species and ecosystem diversity.
   (b) Write biogeography classification of India.
5. Discuss about
   (a) Floods
   (b) Earthquakes
   (c) Cyclones
   (d) Land slides
6. (a) Discuss about ethical basis of environmental education and awareness
   (b) Write the note on conservation of ethical values and traditional values of India.
7. (a) Discuss about family welfare programs in India.
   (b) Discuss about climate and health
8. Write the report of your field work on forest grassland

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Code 9A01308 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
FLUID MECHANICS & HYDRAULIC MACHINERY
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Explain absolute and gauge pressures in detail.
   (b) Calculate the specific weight, specific mass, specific volume and specific gravity of a liquid having a volume of 6m^3 and weight of 44KN.

2. 360 lps of water is flowing in a pipe. The pipe is bent by 120^0 . The pipe bend measures $360mm \times 240$mm and volume of the bend is $0.14m^3$. The pressure at the entrance is $70KN/m^2$ and the exit is 2.4m above the entrance section. Find the force exerted on the bend.

3. (a) Explain Reynold's experiment.
   (b) Derive Darcy Weisbach equation.

4. A jet of water having a velocity of 35m/s impinges on a series of vanes moving with a velocity of 20m.s. The jet makes an angle of 30^0 to the direction of motion of vanes when entering and leaves at an angle of 120^0. Find the angles of vanes tips so that water enters and leaves without shock, the work done per unit weight of water entering the vanes and the efficiency.

5. Explain the principal components of hydroelectric scheme.

6. (a) Explain the various terms associated with Pelton wheel.
   (b) A Pelton wheel is having a mean bucket diameter of 1m and is running at 1000r.p.m The net head on the pelton wheel is 700m. If the side clearance angle is 15^0 and discharge through nozzle is $0.1m^3/s$, Find the power available at the nozzle and hydraulic efficiency of the turbine.

7. What is meant by specific speed. Also derive the expression for specific speed of a turbine.

8. A three stage centrifugal pump has impellers 40cm in diameter and 2cm wide at outlet. The vanes are curved back at the outlet at 45^o and reduce the circumferential area by 10%. The manometric efficiency is 90% and the overall efficiency is 80%. Find the head generated by the pump when running at 1000 r.p.m delivering 50lps. What should be the shaft horse power?

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Code 9A01308 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
FLUID MECHANICS & HYDRAULIC MACHINERY
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. A 120mm disc rotates on a table separated by an oil film of 1.8mm thickness. Find the viscosity of oil if the torque required to rotate the disc at 60 r.p.m is 3.6×10^{-4} Nm. Assume the velocity gradient in the oil film to be linear.

2. (a) What is meant by stream line, pale line, streak line and stream tube?
   (b) What is continuity equation? Explain.

3. (a) Derive Dupuit's Equation.
   (b) Explain hydraulic gradient and total energy lines.

4. A jet of water having a velocity of 15m/s strikes a curved vane which is moving with a velocity of 5m/s in the same direction as that of the jet at inlet. The vane is so shaped that the jet is deflected through 135^0 . The diameter of jet is 100mm. Assuming the vane to be smooth find force exerted by the jet on the vane in the direction of motion, power exerted on the vane and efficiency of the vane.

5. What are the different types of hydel plants? Explain in detail.

6. (a) Explain the various efficiencies in a hydraulic turbine.
   (b) A pelton wheel is to be designed for a head of 60m when running at 200r.p.m. The pelton wheel develops 95.6475Kw shaft power. The velocity of the bullets =0.45times the velocity of the jet, overall efficiency =0.85 and coefficient of velocity =0.98. Find the diameter of jet, wheel, width and depth of buckets and number of buckets on the wheel.

7. (a) Explain the necessity of unit quantities with reference to turbines.
   (b) A turbine is to operate under a head of 25m at 200r.p.m. The discharge is 9 Cumecs. If the efficiency is 90%, find the performance of the turbine under a head of 20meters.

8. A four-stage centrifugal pump has four identical impellers keyed to the same shaft. The shaft is running at 400r.p.m and the total manometric head developed by the multistage pump is 40m. The discharge through the pump is $0.2m^3/s$. The vanes of each impeller are having outlet angle as 45^0 . If the width and diameter of each impeller at outlet is 5cm and 60cm respectively find the manometric efficiency.

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Code 9A01308 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
FLUID MECHANICS & HYDRAULIC MACHINERY
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) What is surface Tension? Explain in brief.
   (b) U-Tube Manometer containing mercury was used to find the negative pressure in the pipe containing water. The right limb was open to the atmosphere. Find the vacuum pressure in the pipe if the difference of mercury level in the two limbs was 100mm and height of water in the left limb from the centre of the pipe was found to be 40mm below.

2. A pipe line carrying oil (G=0.8) changes in diameter from 300mm at position 1 to 600mm diameter at position 2 which is 5 meters at a higher level. If the pressures at positions 1 and 2 are $100KN/m^2$ and $60KN/m^2$ respectively and the discharge is 300lps, find loss of head and direction of flow .

3. List the various minor energy losses. Also give the formula for each .

4. A jet of water having a velocity of 30m/s strikes a series of radial curved vanes mounted on a wheel which is rotating at 200 r.p.m. The jet makes an angle of 20^0 with the tangent to the wheel at inlet and leaves the wheel with a velocity of 5m/s at an angle of 130^0 to the tangent to the wheel at outlet. Water is flowing from outward in a radial direction. The outer and inner radii of the wheel are 0.5m and 0.25m respectively. Determine vane angles at inlet and outlet, workdone per unit weight of water and efficiency of the wheel.

5. Explain the principal components of hydroelectric scheme.

6. (a) Explain the classification of hydraulic Turbines.
   (b) Also explain the different efficiencies of a hydraulic Turbine.

7. (a) What is meant by governing of turbines?
   (b) A turbine is to operate under a head of 25m at 200r.p.m The discharge is 9 Cumecs. If the efficiency is 90% determine specific speed of the machine, power generated and type of turbine.

8. Explain the performance characteristic curves of a centrifugal pump.

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Code 9A01308 4

II B.Tech I semester (R09) Regular Examinations, November 2010
FLUID MECHANICS & HYDRAULIC MACHINERY
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. A thin plate of very large area is placed in a gap of height h with oils of viscosities $\mu_1$andμ_2 on two sides of the plate. The plate is pulled at a constant velocity v. Calculate the position of the plate so that the force required to drag the plate is minimum. Assume the flow is viscous and neglect all end effects.

2. Explain the classification of flows in detail.

3. Explain the similarities and differences between a venturimeter and orifice meter.

4. A jet of water of diameter 50mm, having a velocity of 20m/s strikes a curved vane which is moving with a velocity of 10m/s in the direction of the jet. The jet leaves the vane at an angle of 60^0 to the direction of motion of vane at outlet. Find the force exerted by the jet on the vane in the direction of motion and workdone per second by the jet.

5. What are the different types of hydel plants? Explain in detail.

6. (a) Explain pelton wheel with a neat sketch.
   (b) An inward flow reaction turbine has external and internal diameters as 1m and 0.5m respectively. The velocity of flow through the runner is constant and is equal to 1.5m/s. Find discharge through the runner and width of the turbine at outlet if the width of the turbine at inlet = 200mm.

7. Explain the characteristic curves of a turbine.

8. A single-stage centrifugal pump with impeller diameter of 30cm rotates at 2000r.p.m and lifts $3m^3$ of water per second to a height of 30m with an efficiency of 75%. Find the number of stages and diameter of each impeller of a similar multistage pump to lift $5m^3$ of water per second to a height of 200meters when rotating at 1500r.p.m.

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