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Code No: RT21042 **R13** SET - 1

II B. Tech I Semester Regular Examinations, Dec - 2014
DATA STRUCTURES
(Com. to ECE, CSE, EIE, IT, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Define Recursion with example
   b) Differentiate between linear search and binary search
   c) Discuss about the transformation from infix to postfix.
   d) Write a short note on circular linked list.
   e) Explain about the operations on a singly linked list.
   f) Discuss post order traversal in a binary tree.
   g) What is Threaded binary tree?
   h) Explain about adjacency matrix with example. (3M+2M+3M+3M+3M+3M+2M+3M)

PART-B

2. a) Sort the following numbers using merge sort
   45, 34, 12, 46, 27, 56, 11, 87, 6, 33, 28
   b) Write an algorithm for Quick sort and also analyze the time complexity. (8M+8M)

3. a) Differentiate between stack and Queues.
   b) Write programs for implementing stacks and queues. (8M+8M)

4. a) What are the operations of a singly linked list? Discuss.
   b) Write an algorithm to sort the elements in a linked list. (8M+8M)

5. a) Write a non recursive algorithm for preorder traversal in a tree with an example.
   b) What is a balanced binary tree? How it is different from the BST? Discuss. (8M+8M)

6. a) What is a Binary Tree? How to represent binary tree? Explain.
   b) Write an algorithm for creation of binary tree using in-order traversal and post order traversals. (8M+8M)

7. a) Discuss about any one shortest path algorithm.
   b) Differentiate between DFS and BFS.
   c) How to represent graphs? Explain. (4M+4M+8M)

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Code No: RT21042 **R13** SET - 2

II B. Tech I Semester Regular Examinations, Dec - 2014
DATA STRUCTURES
(Com. to ECE, CSE, EIE, IT, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Write an algorithm for Fibonacci sequence
   b) Explain about bubble sort.
   c) What is stack? Discuss.
   d) What are the applications of singly linked list?
   e) Write a short note on doubly linked list.
   f) Explain about the Binary Tree with example.
   g) Define binary search tree with example.
   h) Write a short note on prim's algorithm. (3M+3M+3M+3M+2M+2M+3M+3M)

PART-A

2. a) Sort the following numbers using Quick sort
      45, 34, 12, 46, 27, 56, 11, 87, 6, 33, 28
   b) Write an algorithm for merge sort and also analyze the time complexity (8M+8M)

3. a) How to represent Queues? Discuss.
   b) Write an algorithm for infix to postfix conversion. (8M+8M)

4. a) Explain about the insert and delete operations in a singly linked list.
   b) Write an algorithm to reverse a given linked list. (8M+8M)

5. a) What is balanced binary tree? What are the applications of it?
   b) Write a non recursive algorithm for post order traversal with an example. (8M+8M)

6. a) What is a Binary tree? What are the properties of Binary tree?
   b) Write an algorithm for the creation of binary tree using pre-order traversal and In-order traversal. (8M+8M)

7. a) Discuss about Warshall's algorithm with example
   b) What is BFS? Which traversing technique is used in BFS and also explain the concept of BFS with example. (8M+8M)

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Code No: RT21042 **R13** SET - 3

II B. Tech I Semester Regular Examinations, Dec - 2014
DATA STRUCTURES
(Com. to ECE, CSE, EIE, IT, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Write an algorithm for the computation of GCD.
   b) What are the applications of stack?
   c) Define Circular queue with example.
   d) What is sparse Matrix? Discuss.
   e) What are the properties of Binary trees.
   f) What is the need of balanced binary trees?
   g) Explain about the warshall's algorithm.
   h) What is transitive closure? Explain (3M+2M+3M+3M+3M+2M+3M+3M)

PART-A

2. a) Sort the following numbers using heap sort
      45, 34, 12, 46, 27, 56, 11, 87, 6, 33, 28
   b) Write an algorithm for bubble sort and also analyze the time complexity (8M+8M)

3. a) How to represent stacks? Discuss.
   b) Write a program to evaluate postfix expressions. (8M+8M)

4. a) How to represent single linked list? Discuss.
   b) Write an algorithm to delete duplicates in a linked list. (8M+8M)

5. a) Explain about the insert procedure in binary search tree.
   b) Write an algorithm for deleting an element from a binary search tree. (8M+8M)

6. a) Discuss about different binary tree traversals with examples.
   b) Write a short note on Threaded Binary trees. (10M+6M)

7. a) What is minimum cost spanning Tree? Discuss with example.
   b) What is DFS? Which traversal technique is used for the DFS and also explain the concept of DFS with example. (8M+8M)

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Code No: RT21042 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Dec - 2014
DATA STRUCTURES
(Com. to ECE, CSE, EIE, IT, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Which sorting technique is efficient? Discuss.
   b) What are the applications of Queues?
   c) Define Priority Queue with example.
   d) What are the advantages of linked list?
   e) Explain about the binary tree traversals using recursion with examples.
   f) What are the applications of balanced binary trees? Explain.
   g) Explain about the delete procedure for binary search tree.
   h) Differentiate between DFS and BFS. (2M+2M+3M+2M+4M+3M+3M+3M)

PART-B

2. a) Sort the following numbers using insertion sort
   45, 34, 12, 46, 27, 56, 11, 87, 6, 33, 28
   b) Write an algorithm for heap sort and also analyze the time complexity. (8M+8M)

3. a) Discuss about the stack with examples
   b) Write an algorithm to implement queue using stack. (8M+8M)

4. a) Differentiate between doubly and circular linked lists.
   b) Write an algorithm to insert, delete and display the elements in a given doubly linked list. (6M+10M)

5. a) What is a Binary search tree? Discuss.
   b) Write an algorithm for insert an element into a binary search tree. (10M+6M)

6. a) What are the operations that can be performed on a binary tree? Discuss.
   b) Write the non-recursive procedures for tree traversals (8M+8M)

7. a) What is a Graph? How graphs can be represented? Discuss.
   b) Explain about the prim's algorithm with example. (8M+8M)

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Code No: RT21045 **R13** SET - 1

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRICAL TECHNOLOGY
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Differentiate between statically induced e.m.f and dynamically induced e.m.f
b) What is meant by co-energy?
c) What is back e.m.f?
d) Draw the equivalent circuit of a transformer.
e) What is slip and write its expression. How does the slip vary with load?
f) List the applications of Induction motors.
g) How the direction of rotation is reversed for capacitor start capacitor run motor?
h) Write any 5 differences between single phase and three phase induction motors?
(3M+2M+3M+3M+3M+2M+3M+3M)

PART-B

2. Show that the torque developed in doubly excited system is equal to the rate of increase of field energy with respect to displacement at constant current. (16M)

3. a) Explain constructional features and operation of a DC generator.
b) Draw and explain the load characteristics of series, shunt and compound generators.
(8M+8M)

4. a) Explain different speed control methods of DC motor.
b) Describe how Swinburne's test is conducted on DC machine. State its advantages and disadvantages. (8M+8M)

5. A 7 kVA 200/1000 V, 50 Hz, single-phase transformer gave the following test results:
O.C Test (L.V. Side): 2000 V, 1.2 A, 90 W
S.C Test (H.V. Side): 50 V, 5 A, 110 W
i) Calculate the parameters of the equivalent circuit referred to the L.V side.
ii) Calculate the output secondary voltage when delivering 3 kW at 0.8 p.f. lagging, the input primary voltage being 200 V and also find the percentage regulation. (16M)

6. a) Obtain the condition for maximum torque under running condition in Induction motor.
b) Describe construction and principle of operation of 3-phase squirrel cage induction motor.
(8M+8M)

7. Explain the construction and operation of single phase induction motor. (16M)

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Code No: RT21045 **R13** SET - 2

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRICAL TECHNOLOGY
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

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

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PART –A

1. a) Write the expression for energy in magnetic field.
b) List out the types of DC generators.
c) What is meant by brush voltage drop? What is its general value?
d) What is a transformer? What is its function?
e) Draw equivalent circuit of 3-phase induction motor on load.
f) What is the effect of increasing air-gap length in an induction motor?
g) Define slip and torque with respect to 3-phase induction motor?
h) List out the applications of shaded pole motor. (3M+2M+3M+3M+3M+2M+3M+3M)

PART –B

2. Discuss briefly general analysis of electromechanical system, and derive an expression for the mechanical force developed in a current excited system (16M)

3. a) A 4-pole, long-shunt lap-wound generator supplies 25 kW at a terminal voltage of 500 V. The armature resistance is 0.03 ohm, series field resistance is 0.04 ohm and shunt field resistance is 200 ohm. The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Also calculate number of conductors if the speed is 1200 rpm and flux per pole is 0.02 Wb. Neglect armature reaction.
b) How the DC generators are classified. Explain with neat circuit diagrams. (8M+8M)

4. a) Explain the flux and armature speed control methods of a DC motor and explain their merits and demerits.
b) Draw different types of characteristics of a DC shunt motor and explain. (8M+8M)

5. a) Derive the expression for induced e.m.f in a transformer in terms of frequency, maximum value of flux and number of turns on the windings
b) In a 20 kVA, 2000/200 V, single-phase transformer, the iron and full-load copper losses are 350 and 400 W respectively. Calculate the efficiency at unity power factor on (i) full load (ii) half full-load. (8M+8M)

6. Explain, in detail, various starting methods of induction motor. (16M)

7. a) Compare the operating characteristics of spit phase, capacitor start, and shaded pole motors.
b) Explain the operation of AC servo motor. (8M+8M)

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Code No: RT21045 **R13** SET - 3

II B. Tech I Semester Regular Examinations, Jan - 2015

ELECTRICAL TECHNOLOGY

(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answer **ALL** the question in **Part-A**

3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) State the principle of electromechanical energy conversion.
   b) What is the working principle of DC Generator?
   c) List out different speed control methods. Which is the more popular method?
   d) How does a transformer transfer electrical energy from one circuit to another?
   e) Define regulation and efficiency of a transformer.
   f) Is Induction motor a self starting machine? What is the necessity for starting methods on it?
   g) List out the three applications of capacitor start Induction run motor
   h) What is AC servomotor? Give its applications.

(3M+2M+3M+3M+3M+2M+3M+3M)

PART –B

2. Derive an expression for the magnetic force developed in a multiple-excited magnetic system. (16M)

3. a) Derive the emf equation of a generator.
   b) A 4-pole, lap-wound, DC shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 220 turns each of 0.004 Ω resistance. Calculate the terminal voltage when running at 900 r.p.m. if the armature current is 50 A. (8M+8M)

4. a) What are various losses in a DC machine? Explain each one in detail.
   b) A series motor whit an unsaturated magnetic circuit and 0.5 0hm total resistance when running at a certain speed takes 60 A at 500V. If the load torque varies as the cube of the speed. Calculate the resistance required to reduce the speed by 25%. (8M+8M)

5. a) Develop the equivalent circuit of a single phase transformer.
   b) Consider a 20 kVA, 2200/220 V, 50 Hz transformer. The O.C./S.C. test results are as follows :
   O.C. test : 220 V, 4.2 A, 148 W (1.v. side)
   S.C. test : 86 V, 10.5 A, 360 W (h.v. side)
   Determine regulation at 0.8 p.f. lagging and at full load. What is the p.f. on short-circuit? (8M+8M)

6. a) Draw and explain the slip-torque characteristics of a 3-phase induction motor.
   b) Explain the principle of operation of slip-ring induction motor. (8M+8M)

7. Describe the construction and principle of operation of shaded pole motor. (16M)

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Code No: RT21045 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRICAL TECHNOLOGY
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Write the energy balance equation in a electromechanical energy conversion system.
b) Give the applications of DC generators
c) How is speed of a DC motor reversed?
d) Draw the phasor diagram of an ideal transformer.
e) Write the expressions for starting and running torque of an induction motor.
f) Draw a neat sketch of slip torque characteristics of 3-phase induction motor.
g) Why short circuit test is conducted on HV side of a transformer?
h) Write the applications of shaded pole motor. (3M+2M+3M+3M+3M+2M+3M+3M)

PART –B

2. For singly excited magnetic field system, derive the relation for the magnetic stored energy. (16M)
3. a) An 8 pole D.C shunt generator with 778 wave-connected armature conductors and running at 600 r.p.m supplies a load of 15 ohms resistance and at terminal voltage of 70 V. The armature resistance is 0.3 ohms and the field resistance is 260 ohms. Find the armature current the induced e.m.f and the flux per pole.
b) Draw and explain magnetization characteristics of DC shunt and compound Generators. (8M+8M)
4. a) Draw and explain the performance characteristics of DC shunt motor.
b) Swinburne test gave the following results on a de shunt motor: Supply voltage: 500 V, no load current: 5 A, Armature resistance: 0.5 ohms and Field resistance 250 ohms. Determine the efficiency of the machine (i) as a generator delivering 100 A at 500 V (ii) as a motor having a line current of 100 A at 500 V. Neglect temperature rise during operation. Assume stray losses at 1 % of output. (8M+8M)

5. a) Derive the condition for maximum efficiency in a transformer
b) A 4 kVA, 200/400 V, single-phase transformer takes 0.7 A and 65 W on Open circuit. When the low-voltage winding is short-circuited and 15 V is applied to the high-voltage terminals, the current and power are 10 A and 75 W respectively. Calculate the full-load efficiency at unity power factor and full-load regulation at 0.80 power-factor lagging (8M+8M)

6. a) Explain the various schemes of starting squirrel cage induction motor.
b) If the e.m.f. in the stator of an 8-pole induction motor has a frequency of 50 Hz and that in the rotor 1.5 Hz, at what speed is the motor running and what is the slip?
c) A 12 pole, 3-phase alternator is coupled to an engine running at 500 rpm. It supplies an induction motor which has a full load speed of 1 440 rpm. Find the percentage slip and the no. of poles of the motor. (8M+8M)

7. Explain why the starting torque of a capacitor start induction run motor is better that that if a resistance start induction run motor (16M)

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Code No: RT21023 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Jan - 2015
BASIC ELECTRONICS AND DEVICES
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Draw the energy band diagram of an Insulator, Semiconductor and a metal.
   b) What is depletion region?
   c) Define peak inverse voltage of a rectifier.
   d) State the advantages of a bridge rectifier.
   e) What are various regions of operation of a BJT?
   f) Explain early effect.
   g) What is thermal run away?
   h) Draw the electrical equivalent of a crystal.
   i) What is pinch off voltage? (3M+2M+2M+3M+2M+3M+3M+2M+2M)

PART-B

2. a) What is Energy band theory description of a elements. Draw the energy band diagrams of metal, insulator and a semiconductor.
   b) Derive an expression for continuity equation.
   c) Find the concentration of electrons and holes in a p type Ge semiconductor at 300K if the resistivity is 60 $(\Omega\text{-cm})^{-1}$ (6M+5M+5M)

3. a) Explain the operation of Tunnel diode
   b) Explain various current components in a diode. (8M+8M)

4. a) What are the various filter circuits used in rectifiers. Compare their performance.
   b) Quantitatively explain the operation of half wave rectifier. (8M+8M)

5. a) Explain how transistor acts as a switch.
   b) Analyze CE with R_e circuit using h-parameter model. (8M+8M)

6. a) Explain the operation of a Field effect Transistor. Derive an expression for pinch-off voltage of a FET.
   b) Explain the operation of IGBT. (8M+8M)

7. a) Draw the different topologies in a negative feedback amplifier. Enumerate the steps in the analysis of negative feedback amplifiers.
   b) What is an oscillator? Derive necessary condition for the oscillator to produce oscillations. Explain about amplitude and frequency stability of oscillators. (8M+8M)

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Code No: RT21041 **R13** SET - 1

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Define forbidden energy gap.
b) What is avalanche break down mechanism in Zener diode?
c) Define punch through mechanism in BJT.
d) List the applications of tunnel diode
e) Which is the most commonly used transistor configuration. Why?
f) Draw the symbol for N-channel E-MOSFET.
g) What is PIV in case of half wave and full wave rectifier?
h) Define Thermal runaway.
i) Write the voltage and current equation for hybrid parameters.
(2M+3M+2M+2M+3M+2M+3M+2M+3M)

PART-B

2. Explain semi-conductors, insulators and metals classification using energy band diagrams. (16M)

3. a) With a neat diagram explain the working of an open circuited PN junction. Give Necessary response curves.
b) The current flowing in a germanium PN junction diode at room temperature is $9x10^{-7}$A when the large reverse voltage is applied. Calculate the current flowing when 0.1V forward bias is applied. (10M+6M)

4. a) With circuit and necessary waveforms explain the operation of bridge rectifier.
b) An ac supply of 220V is applied to a half wave rectifier circuit through a transformer with a turns ratio of 10:1. Find (i) DC output voltage (ii) PIV. Assume the diode to an ideal one. (10M+6M)

5. With the help of a neat diagram show different current components in a transistor. (16M)

6. a) Differentiate bias stabilization and compensation techniques
b) What are the drawbacks transistors fixed bias circuits. (10M+6M)

7. a) Explain A FET amplifier in the common source configuration with a neat circuit diagram.
b) A FET amplifier in the common source configuration uses a load resistance of 250kΩ and the transconductance is 0.5mA/V. What is the voltage gain of the amplifier? Given r_d =200kΩ. (10M+6M)
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Code No: RT21041 **R13** SET - 2

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Define Hall effect
b) Write diode current equation
c) Give the values of ripple factor and efficiency for full wave rectifier.
d) Define transconductance
e) Define stability factor?
f) What is the significance of h-parameters?
g) Draw the symbol for SCR.
h) List the applications of UJT
i) Define Eber's Moll model of a BJT. (2M+2M+3M+2M+2M+3M+2M+3M+3M)

PART-B

2. a) Derive the expression for drift and diffusion current for semiconductors.
b) Find the diffusion coefficients of holes and electronics for germanium at 300^{o} K. The carrier mobilities in cm^2/V-s at 300^0 K for holes and electronics respectively 3,600 and 1,700. Density of carrier is $2.5x10^{13}/cm^2$. Boltzmann constant k $=1.38x10^{-23}$ $J/^0K$, e = $1.602x10^{-19}$C. (10M+6M)

3. Sketch and explain the volt-ampere characteristics of a tunnel diode. Indicate the negative resistance portion. (16M)

4. a) Derive the expression for ripple for the circuit FWR with inductor filter.
b) A full - wave single phase rectifier employs a π - section filter consisting of two 4 μF capacitances and a 20 H choke. The transformer voltage to the center tap is 300 V_{rms}. The load current is 500mA. Calculate the dc output voltage and the ripple voltage. The resistance of the choke is 200 Ω (8M+8M)

5. a) With a neat construction diagram explain the principle of operation of a JFET. Give its characteristics.
b) An n - channel JFET has I_{DSS} =10mA and V_P = - 2V. Determine the drain source resistance r_{DS} for (i) V_{GS} =0V. (ii) V_{GS} = - 0.5V (10M+6M)

6. a) Explain the need of biasing and stabilization
b) In a silicon transistor with a fixed bias, V_{cc}= 9 V, R_c= 3 kΩ, R_B= 8kΩ, β = 50, V_{BE}= 0.7V. Find the operating point and stability factor. (10M+6M)

7. a) Compare BJT and FET amplifiers.
b) Give the approximate h-parameter conversion formulae for CC and CB configuration in terms of CE. (8M+8M)

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Code No: RT21041 **R13** SET - 3

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Define drift and diffusion current
b) How the Zener diode act as voltage regulator
c) Define radiant intensity for LED.
d) Give the ripple factor and efficiency for full wave rectifier with capacitive filter.
e) What is early effect?
f) What is the relation between α and β in BJT?
. g) What is quiescent point?
h) Compare between CS and CG in FET amplifier
i) Draw the symbol for p- channel E-MOSFET (3M+3M+2M+3M+2M+2M+2M+3M+2M)

PART-B

2. a) Explain Hall Effect in semiconductors.
b) The resistivity of doped silicon material is $9x10^{-3}$ Ω-m. The Hall coefficient is $3.6x10^{-4}$ m^3/C assuming single carrier conduction; find the mobility and density of charge carriers. e= $1.602x10^{-19}$Colomb (10M+6M)

3. a) Derive the diode current equation?
b) A silicon diode has reverse saturation current of 2.5 μA at 300^o K. Find forward voltage for a forward current of 10 mA. (12M+4M)

4. Explain the operation of half wave and full wave rectifiers with and without capacitor filter. (16M)

5. a) Explain input and output characteristics of common emitter configuration.
b) A certain transistor has a current gain of 0.99 in CB configuration. Calculate its current gain in the CE configuration another transistor has β =80, determine it's α. (12M+4M)

6. For the improvement of stability of the operating point what suggestions you would like to give for self-bias. Discuss with the help of stability factors. (16M)

7. a) Draw the hybrid parameter equivalent circuit for an n-p-n common emitter transistor and briefly explain.
b) A transistor used in CE amplifier connection has the following set of h parameters, h_{ie}=1kΩ, h_{fe}=100, $h_{re}=5\times10^{-4}$, $h_{oe}= 2\times10^{-5}\Omega^{-1}$, R_s=15kΩ, R_L=5kΩ. Determine input impedance, output impedance, current gain and voltage gain. (8M+8M)

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Code No: RT21041 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Jan - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

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PART-A

1. a) Define continuity equation
b) List the applications of Varactor diode
c) What is meant by transition & space charge capacitance of a diode?
d) What is the effect of temperature on PN junction?
e) Give the theoretical values for ripple factor and efficiency of bridge rectifier
f) What are the three configurations of a transistor amplifier?
g) In a transistor, IC=0.95mA, IE=1mA, determine base current and β in CB configuration
h) Define pinch- off- voltage of JFET.
i) What are the advantages of CE amplifier? (2M+3M+3M+2M+3M+2M+3M+2M+2M)

PART-B

2. a) Explain Fermi level in an extrinsic semiconductor with energy diagrams.
b) In an N-type semiconductor, the Fermi-level lies 0.3 eV below the conduction band at 27^0C, if the temperature is increased to 55^0C, find the new position of the Fermi- level. (12M+4M)

3. Write short notes on i) SCR ii) Photo diode iii) LED (6M+6M+4M)

4. a) For a full wave rectifier with shunt capacitance filter derive expression for ripple factor using approximate analysis.
b) Give the list of different filters used in rectifier and their merits and demerits. (8M+8M)

5. a) Explain the operation of N-channel enhancement type MOSFET with the help of it's (I_D-V_{DS}) and (I_D-V_{GS}) characteristics.
b) Distinguish between JFET and MOSFET. (10M+6M)

6. a) Draw the transistor biasing circuit using fixed bias arrangement and explain its principle with suitable analysis.
b) Calculate the quiescent current and voltage of collector to base bias arrangement using the Following data: V_{cc}= 10 V, R_b= 100 K, R_c = 2 K, β = 50 and also specify a value of R_b so that V_{ce} = 7 V. (10M+6M)

7. a) Define h-parameters along with its units.
b) Given I_E= 2.5mA, h_{fe}= 140, h_{oe}= 20μs and h_{ob}= 0.5μs. Determine the common-emitter hybrid equivalent circuit. (4M+12M)
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Code No: RT21043 **R13** SET - 1

II B. Tech I Semester Regular Examinations, Jan - 2015
ENVIRONMENTAL STUDIES
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

1. a) What is greenhouse effect?
   b) What is a food chain?
   c) Mention two reasons for floods.
   d) Mention hotspots of biodiversity in India.
   e) What is the pollutant responsible for Bhopal gas tragedy?
   f) What is meant by bio-medical waste?
   g) What is the purpose of rainwater harvesting?
   h) What is EIA? (2M+3M+3M+3M+2M+3M+3M+3M)

PART – B

2. a) What are the various global impacts of air pollution?
   b) Explain the structure of an ecosystem. (8M+8M)

3. a) Write the causes and consequences of deforestation.
   b) Distinguish between renewable and non-renewable energy resources. (8M+8M)

4. a) Define species, genetic, and ecosystem diversity.
   b) Explain the various values of biodiversity. (8M+8M)

5. a) Write the sources and effects of water pollution on human health.
   b) Explain the role of an individual in prevention of pollution. (8M+8M)

6. Write the salient features of Environmental protection act. (16M)

7. What is EIA? How is it accomplished? (16M)

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Code No: RT21043 **R13** SET - 2

II B. Tech I Semester Regular Examinations, Jan - 2015
ENVIRONMENTAL STUDIES
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

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PART – A

1. a) What is acid rain?
   b) What is the importance of food web?
   c) Define biomagnifications.
   d) Mention insitu conservation measures of biodiversity
   e) What is fluorosis?
   f) Define hazardous waste.
   g) Define water pollution.
   h) What is Draft EIS? (2M+3M+3M+3M+2M+3M+3M+3M)

PART – B

2. a) What is sustainable development? Write the strategies for sustainable development.
   b) What are ecological pyramids? Explain. (8M+8M)

3. a) What are the impacts of mining on forests and tribal people?
   b) Explain the role of an individual in natural resources conservation. (8M+8M)

4. a) Explain the threats to biodiversity.
   b) Write the ex-situ and in-situ conservation measures of biodiversity. (8M+8M)

5. a) Distinguish between primary and secondary air pollutants.
   b) Define noise. Write in detail noise pollution control measures. (8M+8M)

6. Write the salient features of The Forest conservation act. (16M)

7. Explain EIA methodologies. (16M)

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Code No: RT21043 **R13** SET - 3

II B. Tech I Semester Regular Examinations, Jan - 2015
ENVIRONMENTAL STUDIES
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

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PART – A

1. a) Mention the pollutants responsible for depletion of ozone layer.
   b) Distinguish between lentic and lotic ecosystems
   c) Define soil erosion
   d) What is meant by genetic diversity?
   e) Give the drinking water standard for nitrates. What is mathemoglobinaemea?
   f) What is e-waste?
   g) Define air pollution
   h) What is environmental impact analysis? (2M+3M+3M+3M+2M+3M+3M+3M)

PART – B

2. a) Explain the multidisciplinary nature of environmental studies.
   b) Distinguish between food chain and food web.give examples. (8M+8M)

3. a) Explain the environmental impacts of major dams.
   b) What are the merits and demerits associated with nuclear energy. (8M+8M)

4. a) Define biodiversity. What are its values?
   b) Explain conservation of biodiversity. (8M+8M)

5. a) What is solid waste management? Explain.
   b) Define air pollution. What are its impacts on human health? (8M+8M)

6. Write the salient features of The Water prevention and control of pollution act. (16M)

7. Write short notes on
   a) environmental audit b) Cost benefit analysis and c) Adhoc method (16M)

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Code No: RT21043 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Jan - 2015
ENVIRONMENTAL STUDIES
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

1. a) Define sustainable development
   b) What are producers?
   c) What is meant by desertification?
   d) Mention ex-situ measures of biodiversity conservation.
   e) What is temporary threshold shift?
   f) Define solid waste management.
   g) Mention few water conservation measures.
   h) Write two environmental impacts of mining. (2M+3M+3M+3M+2M+3M+3M+3M)

PART – B

2. a) What are the functions of an ecosystem? Explain.
   b) What is global warming? What are its impacts? (8M+8M)

3. a) What are the impacts of modern agriculture?
   b) Explain reasons for land degradation. (8M+8M)

4. a) Explain the principle "To live and to let live"
   b) What are hotspots of biodiversity in India? Explain insitu conservation of biodiversity. (8M+8M)

5. a) What is solid waste? What are its components and characteristics?
   b) Write the impacts of water pollution on human health. (8M+8M)

6. Write the salient features of The Air prevention and control of pollution act. (16M)

7. Write short notes on
   a) Checklist method b) Public hearing and c) Importance of forests (16M)

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Code No: RT21034 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, Jan - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

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

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PART – A

1. a) Write a brief note about Macro Economics
b) What is Isoquants
c) What is an Optimum costs
d) Explain the Margin of safety
e) Distinguish between Public Company Vs Private Company
f) Explain the Phases of trade cycle
g) What is Accounting Cycle?
h) Write about accounting rate of return (3M+2M+3M+3M+3M+3M+3M+2M)

PART – B

2. a) Define Managerial economics and explain its nature and scope.
b) Define the law of demand. What are its exceptions? Explain (8M+8M)

3. a) Discuss the economies of scale that accrue to a firm.
b) How do you determine BEP. Show graphical presentation of BEA. (8M+8M)

4. a) Differentiate between Perfect and Imperfect markets.
b) Explain Price-Output determination in Monopolistic competition. (7M+9M)

5. a) Evaluate Sole trader form of organisation.
b) Explain the Innovations theory of business cycles. (7M+9M)

6. a) Journalise the following transactions.

2003 Jan.1	ABC firm commenced business with Rs.40,000
Jan.2	Deposited into bank Rs.30,000
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Code No: RT21034 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, Jan - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

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

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PART – A

1. a) Economics as a science of wealth: Discuss
b) How to calculate Demand forecasting in case of new products
c) Explain the Cobb-Douglas production function
d) Define the Long-run average cost curve
e) What are the objectives of pricing?
f) Write about Partnership deed
g) What is Current Ratio?
h) Explain the Internal rate of return (3M+3M+3M+2M+3M+2M+3M+3M)

PART – B

2. a) What is Demand function? How do you determine it?
b) What do you understand by elasticity of Demand? Explain the factors governing it.
(8M+8M)

3. a) Explain the laws of returns with appropriate examples.
b) Explain how Cost-Output relationship helps the entrepreneurs in expansion decisions.
(8M+8M)

4. a) Differentiate between Perfect competition and Monopoly.
b) Explain any four methods of Pricing based on Strategy. (7M+9M)

5. a) What do you understand by Joint Stock Company? Explain its features.
b) Discuss the measures to control business cycles. (9M+7M)

6. a) A firm sold goods worth Rs.5,00,000 and its gross profit is 20 percent of sales value. The inventory at the beginning of the year was Rs.16,000 and at end of the year was Rs.14,000.
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Code No: RT21034 **R13** SET - 3

II B. Tech I Semester Supplementary Examinations, Jan - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

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

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PART – A

1. a) Define the Law of equi-marginal utility
   b) Explain Significance of advertising elasticity of demand
   c) What is Diseconomies of scale?
   d) Write about Angle of Incidence
   e) What is Penetration Pricing?
   f) Explain the Prosperity or Full employment
   g) What is Trial Balance?
   h) Describe the Profitability Index (3M+3M+3M+2M+2M+3M+3M+3M)

PART – B

2. a) Explain how do you measure elasticity of demand.
   b) Explain different methods of demand forecasting. (7M+9M)

3. a) Define Production function? How can a producer find it useful?
   b) Explain the features of short-run average cost curve and long-run average cost curve. (8M+8M)

4. a) Discuss the factors those influence price decisions.
   b) Explain Williamson's Managerial Discretionary theory. (8M+8M)

5. a) Discuss the problems faced by the Public enterprises in India.
   b) Explain the Modern theory of Trade cycles. (8M+8M)

6. a) Prepare ledger posting for the following transactions.

2003	Jan.5	Paid rent Rs.4,000
	Jan.6	Sold goods worth Rs.50,000 to Suresh
	Jan.7	Bought goods from Devi Rs.14,000
	Jan.8	Paid salaries Rs.1,000

   b) Differentiate between cash flow and funds flow statements. (8M+8M)
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Code No: RT21034 **R13** SET - 4

II B. Tech I Semester Supplementary Examinations, Jan - 2015
MANAGERIAL ECONIMICS AND FINANCIAL ANALYSIS
(Com. to ME, ECE, CSE, IT, ECC, MTE)

Time: 3 hours Max. Marks: 70

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

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PART – A

1. a) Explain the Features of Robbins definition of economics
   b) What is Income Elasticity?
   c) Explain the Law of increasing returns
   d) What is Contribution?
   e) Write about Oligopoly
   f) Define the Articles of Association
   g) Explain the Debt-equity ratio
   h) Describe the Capital rationing (3M+3M+3M+2M+2M+3M+3M+3M)

PART – B

2. a) Explain how managerial economics is linked with other academic disciplines.
   b) Describe how point elasticity is more focussed than arc elasticity. (8M+8M)

3. a) Explain how short-run and long-run influence the costs.
   b) A company makes a single product with a sales price of Rs.10 and a variable cost of Rs.6 per unit, fixed costs are Rs.60,000. Calculate i) Number of units to break even ii) Sales at break even. (7M+9M)
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6. a) Calculate Net profit ratio from the following data.

Sales returns Rs.1,00,000	Administration expenses Rs.10,000
Gross profit Rs.40,000	Selling expenses Rs.10,000
Income from Investment Rs.5,000	Loss on account of fire Rs.3,000

b) Explain different accounting concepts and accounting conventions. (9M+7M)

7. a) Explain the nature of capital budgeting.

b) Radhika enterprises ltd is contemplating the purchase of a machine. Two machines A and B are available each at Rs.2,50,000.

Net Cash Inflows (Amt. in Rs.)

Year	Machine A	Machine B
1	75,000	25,000
2	1,00,000	50,000
3	1,25,000	1,00,000
4	75,000	1,50,000
5	50,000	1,00,000

Calculate Net Present Value Method @10%. (7M+9M)

Code No: RT21044 **R13** SET - 1

II B. Tech I Semester Regular Examinations, Jan - 2015
SIGNALS AND SYSTEMS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

1. a) Define and sketch sinusoidal signal.
   b) Explain the Concept of Negative Frequency.
   c) What is the condition to be satisfied for the existence of Laplace transform?
   d) Define line spectrum.
   e) What is the effect of half wave symmetry on Fourier coefficients of a signal?
   f) Define linear system. When the system is said to be LTI system.
   . g) Give the condition for Poly – Wiener criterion.
   h) Define signal bandwidth and system bandwidth.
   i) Find the energy of the signal $x(t)= e^{-at} u(t)$.

(2M+3M+2M+2M+3M+3M+2M+2M+3M)

PART – B

2. a) Explain how a function can be approximated by a set of orthogonal functions.
   b) Discuss the concept of trigonometric Fourier series and derive the expressions for coefficients. (6M+10M)

3. a) Find the Fourier transform of the signum function and plot its amplitude and phase spectra.
   b) State and prove the following properties of Fourier Transform
   i) Time shifting ii) Convolution in time domain (6M+10M)

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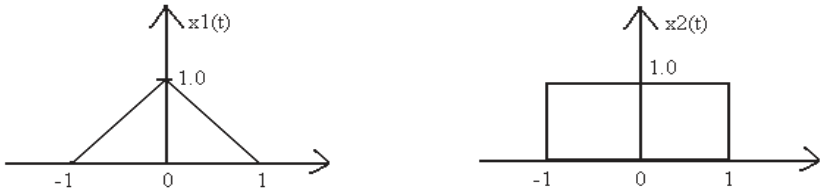
4. a) What is an LTI system? Explain its properties. Derive an expression for the transfer function of an LTI system.
   b) Obtain conditions for the distortion less transmission through a system. (10M+6M)

5. a) State the properties of convolution.
   b) Find the Cross correlation between triangular and gate function as shown in below figure. (6M+10M)



6. a) State the properties of ROC of Laplace Transform.
   b) Find the Laplace transform of the following signals
      i) Impulse function ii) unit step function iii) A sin w_0t u(t) (4M+12M)

7. a) Distinguish between Fourier transform, Laplace transform and z transforms.
   b) Prove that the sequences $x_1(n)=a^n u(n)$ and $x_2(n)= -a^n u(-n-1)$ have the same X(z) and differ only in ROC's. Plot their ROC's. (4M+12M)

Code No: RT21044 **R13** SET - 2

II B. Tech I Semester Regular Examinations, Jan - 2015
SIGNALS AND SYSTEMS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

1. a) Define and sketch real exponential signal in different cases.
   b) Define complex frequency.
   c) List any three properties of impulse function.
   d) Define the transfer function of an LTI system.
   e) Write the Parseval's relation for continuous time periodic signals.
   f) What is impulse invariant transformation?
   g) What is aliasing, how to eliminate aliasing effect.
   h) Give the relation between autocorrelation and ESD.
   i) Obtain Fourier transform of signum function. (3M+2M+3M+2M+2M+2M+3M+2M+3M)

PART – B

2. a) Define orthogonal functions. Give some examples of orthogonal functions.
   b) Obtain the condition under which two signals f1 (t) and f2 (t) are said to be orthogonal to each other. Hence prove that cos $n\omega_0 t$ and cos $m\omega_0 t$ are orthogonal over any interval $(t_0, t_0+\frac{2\pi}{\omega_0})$ for integer values of n and m. (4M+12M)

3. a) Explain how Fourier transform is developed from Fourier series.
   b) Obtain the Fourier transform of the following functions.
   i) Impulse function ii) DC signal iii) Unit step function. (4M+12M)

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4. a) Explain the characteristics of an ideal LPF. All ideal filters are physically not realizable: justify.
   b) Explain how Impulse Response and Transfer Function of a LTI system are related.
   c) Let the system function of a LTI system be 1/jw+2. What is the output of the system for an input (0.8)t u(t). (6M+4M+6M)

5. a) State and prove the relation between convolution and correlation.
   b) State the properties of auto correlation function.
   c) A signal x(t) has energy E, calculate the energy of the signal x(3t). (5M+4M+7M)

6. a) Define Laplace transform of signal x(t) and its region of convergence.
   b) When a function x(t) is said to be Laplace transformable?
   c) Find the Laplace transform of the following signal and its ROC.
   $x(t) = e^{-5t}\ [u(t) - u(t-5)]$ (4M+2M+10M)

7. a) Distinguish between one-sided and two sided z-transforms and its region of convergence.
   b) Find the inverse z- transform of $X(z) = \frac{z}{(z+2)(z-3)}$ when the ROC is
   i) ROC: $|z| < 2$ ii) ROC: $2 < |z| < 3$ (4M+12M)

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Code No: RT21044 **R13** SET - 3

II B. Tech I Semester Regular Examinations, Jan - 2015
SIGNALS AND SYSTEMS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

1. a) Define causal and non causal signal. Give some examples.
   b) Write the expression for mean square error.
   c) List the properties of convolution.
   d) Give the importance of convolution and deconvolution operations using z-transform.
   e) State sampling theorem.
   f) What is the condition for stability of an LTI system?
   g) Give the relation between autocorrelation and PSD.
   h) What is impulse invariant transformation?
   i) Define signal bandwidth and system bandwidth. (3M+2M+3M+3M+2M+2M+2M+2M+3M)

PART – B

2. A rectangular function defined by f(t)= 1; $0 < t < -1$; $\pi < t < 2\pi$
   approximate the above function by a single sinusoid sin t, Evaluate mean square error in this approximation. Also show what happens when more number of sinusoidal are used for approximations. (16M)

3. a) State and prove sampling theorem for band limited signals using graphical approach.
   b) What is aliasing? Explain its effect on sampling. (10M+6M)

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4. a) Define the following properties for a continuous time system
   i) Causal or non causal ii) Time variant or time invariant
   iii) Linear or non linear iv) Stable or unstable.
   b) Examine the following systems with respect to the above properties
   i) $y(t)= \cos[x(t)]$ ii) $y(t)= \log_{10}|x(t)|$ (8M+8M)

5. a) Explain briefly detection of periodic signals in the presence of noise by correlation.
   b) Explain briefly extraction of a signal from noise by filtering. (8M+8M)

6. a) Define Laplace transform of signal x(t) and its region of convergence.
   b) State and prove initial value and final value theorems of Laplace transform.
   c) List the advantages and Limitations of Laplace transform. (4M+8M+4M)

7. a) What are the fundamental differences between continuous and discrete time signals?
   b) Explain the properties of the region of convergence of X (z).
   c) What are the methods by which inverse z-transform can be found out? (4M+6M+6M)

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Code No: RT21044 **R13** SET - 4

II B. Tech I Semester Regular Examinations, Jan - 2015
SIGNALS AND SYSTEMS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 70

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

1. a) State the condition for orthoganality of two complex functions.
   b) Write the expressions for trigonometric Fourier series coefficients a_0, a_n and b_n.
   c) List the properties of convolution.
   d) Write any two properties of Laplace transform.
   e) Find the Fourier transform of impulse function.
   f) Define transfer function of a system.
   g) Define correlation of a signal; give the expression for Auto and cross correlation.
   h) When a function x(t) is said to be Laplace transformable?
   i) Define periodic signal. Give the condition for periodicity of a discrete time periodic signal.
   (2M+3M+3M+3M+2M+2M+3M+2M+2M)

PART – B

2. a) Define and sketch the following elementary continuous time signals.
   i) Unit impulse signal ii) Signum function iii) unit step function
   b) Evaluate the following integrals
   i) $\int_{-\infty}^{\infty} \delta(t)\sin 2\pi t\, dt$ ii) $\int_{-\infty}^{\infty} [\delta(t)\cos t + \delta(t-1)\sin t]\, dt$
   c) Determine the power and rms value of the signal x(t)= u(t). (6M+6M+4M)

3. a) Define Fourier series and derive the relationship between trigonometric Fourier series and exponential Fourier series.
   b) Find the Fourier transform of the following functions.
   i) A single symmetrical triangular pulse. ii) A single symmetrical gate pulse.
   c) State the conditions for the existence of Fourier transform of a signal. (4M+10M+2M)

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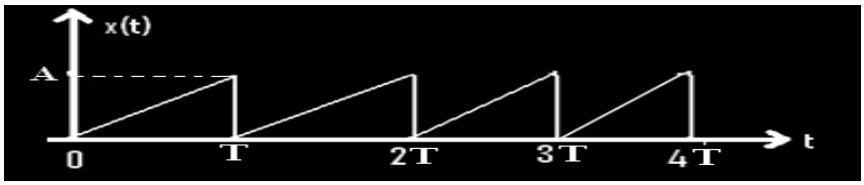
4. a) What is an ideal filter and Find impulse response of an ideal Low Pass Filter?
   b) Obtain the relationship between the bandwidth and rise time of ideal low pass filter.
   (8M+8M)

5. a) Prove that autocorrelation function and energy spectral density function forms a Fourier transforms pair.
   b) Determine the autocorrelation function and energy spectral density function of $x(t) = e^{-at}u(t)$ (8M+8M)

6. a) Define Laplace transform of signal x(t) and its region of convergence
   b) Find out the Laplace transform of the signal shown in below figure.



   c) List the advantages and Limitations of Laplace transform. (4M+8M+4M)

7. a) State and prove time shifting and time convolution properties of z- transform.
   b) Find the inverse Z-transform of (8M+8M)

$$X(Z) = \frac{z}{z(z-1)(z-2)^2} \qquad |Z| > 2$$

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