Code 9A05302 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
ADVANCED DATA STRUCTURES
(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) What are inline functions? What are its disadvantages?
   (b) Explain the properties of object oriented languages.
   (c) Give brief description about new and delete operators.
2. (a) How can we achieve runtime polymorphism? Explain it with an example.
   (b) Explain function overloading in detail.
3. (a) How to convert an infix expression to postfix form? Explain it with an example.
   (b) Explain the working of a normal queue with its primitive operations and show the underflow and overflow conditions using an example.
4. (a) Define hash table, home bucket and bucket.
   (b) What is collision? What are the popular techniques to resolve collision? Explain them.
5. (a) Explain 2- way merge sort with example.
   (b) Discuss in detail about the insertion operation in min heaps.
6. Discuss in detail about AVL Trees.
7. (a) Write a short notes on representation of B- Trees.
   (b) Explain delete operation on B- Trees with suitable example.
8. (a) Explain KMP method of pattern matching with example.
   (b) Explain compressed tries with suitable example.

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Code 9A05302 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
ADVANCED DATA STRUCTURES
(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 in detail about the different parameter passing methods with suitable examples..
   (b) What is exception? Explain the exception handling mechanism in C++.
2. (a) What is meant by inheritance? Explain multilevel and multiple inheritance.
   (b) What is generic programming? Explain function templates with example program.
3. (a) Write a template program to implement stack using arrays.
   (b) Write a short notes on de queues.
   (c) Write the applications of stacks.
4. (a) What is rehashing? How does it overcome the drawbacks of linear probing?
   (b) Define dictionary. Explain the linear representation of dictionaries.
5. (a) Define max heap and explain how to delete an element from max heap.
   (b) Explain K- way merge sort with example.
6. (a) Define AVL Trees. Explain LR and RR rotations with suitable examples.
   (b) Write an algorithm for performing deletion in AVL trees.
7. (a) Define Red - Black trees. Write the procedure to insert an element in to Red - Black trees.
   (b) Write a short notes on height of B-trees.
8. (a) Explain suffix tries with example.
   (b) Explain Boyer- Moore algorithm with example.

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Code 9A05302 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
ADVANCED DATA STRUCTURES
(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) What are destructors? Explain the role of constructors in programming languages.
   (b) Distinguish between normal variables and static variables.
   (c) Explain friend functions in detail.
2. (a) Define operator overloading. List the rules to overload the operators. Explain overloading of unary operator.
   (b) Differentiate between early binding the late binding.
3. (a) Write a short notes on asymptotic notations.
   (b) Explain the following operations on a single linked list
      i. Insertion
      ii. deletion
4. (a) What is dictionary? Explain the linear representation of dictionary with example.
   (b) What is collision? Explain separate chaining and extensible hashing methods to resolve collision.
5. (a) Write a short notes on poly phase sorting with example.
   (b) Give brief description about the max heaps.
6. (a) List the disadvantages of binary search trees.
   (b) Explain the deletion operation in Binary search trees.
7. (a) Explain in detail about Red - Black Trees.
   (b) Give the algorithms for insertion and deletion operations on splay trees.
8. (a) Explain standard tries.
   (b) Explain KMP method of pattern matching with example.

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Code 9A05302 4

II B.Tech I semester (R09) Regular Examinations, November 2010
ADVANCED DATA STRUCTURES
(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) Define constructors. What are the properties of the constructors? Explain copy constructor in detail.
   (b) Discuss in detail about the different parameter passing methods with suitable examples.
2. (a) Define polymorphism and explain in detail about virtual functions.
   (b) Differentiate between virtual functions and pure virtual functions.
   (c) Discuss in detail about the abstract classes.
3. (a) What are the drawbacks of normal queues? Explain circular queues with example.
   (b) Write a template program to implement queue using arrays.
4. (a) Explain the skip list representation of dictionaries with example.
   (b) Discuss briefly about the various hashing techniques.
5. (a) Give brief description about the priority queues.
   (b) Write a short notes on external sorting.
6. Explain in detail about the binary search trees.
7. (a) Write a short notes on representation of B- Trees.
   (b) Explain delete operation in B- Trees with suitable example.
8. (a) What is pattern matching? Explain brute force method to match the pattern with an example.
   (b) Explain compressed tries with suitable example.

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Code 9A12301 1

II B.Tech I semester (R09) Regular Examinations, November 2010
DIGITAL LOGIC DESIGN & COMPUTER ORGANIZATION
(Computer Science & Systems Engineering, Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Explain about Number representation.
   (b) Explain about addition and subtraction in the 2's complement system with examples.
2. (a) Simplify the following Boolean function in product of sums form by means of a four variable map. Draw the logical diagram with
      i. OR- AND gates
      ii. NOR gates.
      $F(w, x, y, z) = \sum(2, 3, 4, 5, 6, 7, 11, 14, 15)$
   (b) Which gates are known as universal logic gates? Why are they called so?
3. What is a programmable logic device? Explain programmable logic array along with its block diagram.
4. Discuss the addition and subtraction with signed -magnitude data and with signed 2's complement data.
5. What is an instruction? What are various types of instructions and their formats?
6. Explain about micro instruction format and show the symbols and binary code for micro instruction fields.
7. (a) Explain about Memory Management Requirements.
   (b) Explain about secondary storage devices.
8. Explain about
   (a) Asynchronous Bus.
   (b) Contralized Arbitration.
   (c) Interrupts.
   (d) Standard I/O Interfaces.

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Code 9A12301 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
DIGITAL LOGIC DESIGN & COMPUTER ORGANIZATION
(Computer Science & Systems Engineering, Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Convert the following pairs of decimal numbers to 5-bit, signal 2's -component, binary numbers and add them. State whether (or) not overflow occurs in each case.
   i. 5 and 10
   ii. 7 and 13
   iii. -14 and 11
   iv. -5 and 7
   v. -3 and -8
   vi. -10 and -13
   (b) Repeat 1(a) for the subtract operation, where the second number of each pair is to be substracted from the first numbers. State whether (or) not overflow occurs in each case.
2. (a) What is a Flip-Flop? Explain different types of Flip-Flops.
   (b) Simplify the following Boolean functions using four - variable map.
   $F(A, B, C, D) = \sum(0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$
3. (a) Define Register & shift register.
   (b) Explain about capabilities of shift register. Explain 4-bit bidirectional shift register with parallel load.
4. (a) What is a Booth Multiplication Algorithm? Explain it.
   (b) Implement Booth algorithm for a multiplicand and 10111 and multiplies 10011.
5. What is an addressing mode? Explain in detail about the type of addressing modes.
6. (a) Explain the steps involved in instruction cycle.
   (b) Discuss the multiple bus organization.
7. (a) Explain the Memory hierarchy.
   (b) Explain about RAM and ROM chips.
8. Explain
   (a) Interrupts
   (b) DMA
   (c) Bus
   (d) Standard I/O Interfaces.

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Code 9A12301 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
DIGITAL LOGIC DESIGN & COMPUTER ORGANIZATION
(Computer Science & Systems Engineering, Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) What are the basic operational concepts of computers? Explain them.
   (b) Explain in detail about floating point representation.
2. (a) Explain the steps that are involved in conversion of AND/OR/NOT logic to NAND/NOR logic with an example.
   (b) Simplify the following expressions in sum-of-products form and product-of-sums form.
      i. $x^1y^1 + y^1z^1 + yz^1 + xy$
      ii. $AC^1 + B^1D + A^1CD + ABCD$
3. What is a counter? Explain in detail about Binary Ripple counter.
4. (a) Explain the Division algorithm with the flowchart for divide operation.
   (b) Explain the Divide overflow condition of division operation.
5. Explain about the basic machine instructions along with examples.
6. What are the various registers found in CPU? Explain the register transfer operations.
7. (a) What is a virtual memory?
   (b) Discuss the
      i. Addressing mapping using pages.
      ii. Associate memory page table.
8. Explain about synchronous and Asynchronous bases with timing diagrams.

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Code 9A12301 4

II B.Tech I semester (R09) Regular Examinations, November 2010
DIGITAL LOGIC DESIGN & COMPUTER ORGANIZATION
(Computer Science & Systems Engineering, Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Represent the decimal values 5,-2,14,-10,26,-19,51 & -43 as signed, 7- bit numbers in the following binary formats.
   i. Sign-and-magnitude
   ii. 1's - complement
   iii. 2's - complement
   (b) Convert given decimal numbers in to binary.
   i. $(965.47)_{10}$
   ii. $(1245.78)_{10}$
   iii. $(376.5)_{10}$
2. (a) How the minimization of logical expressions can be done? Explain in detail.
   (b) Reduce the following four variable function to its minimum sum of the products form.
   $Y = \overline{A}\overline{B}C\overline{D} + ABC\overline{D} + A\overline{B}C\overline{D} + A\overline{B}CD + A\overline{B}\overline{C}\overline{D} + AB\overline{C}\overline{D} + \overline{A}\overline{B}CD + \overline{A}BCD$
3. (a) What is a Decoder? Explain it with general structure of decodes.
   (b) Design 5-to-32 Decoder using one 2-to-4 and four 3-to-8 Decoders.
4. Discuss indetail about addition and subtraction of floating point numbers along with the flow chart.
5. Explain in detail about.
   (a) Byte addressability.
   (b) Big Endian and Little Endian assignments.
6. (a) Explain in detail about Hardwired control.
   (b) Differentiate between hardwired and micro programmed control.
7. (a) What is cache memory? Explain locality of Reference .
   (b) What are the mapping procedures used in organization of cache memory.
8. (a) Explain about DMA.
   (b) Explain about Bus arbitration.

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Code 9A12302 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
DATA COMMUNICATION SYSTEMS
(Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Briefly describe the seven layers of the OSI protocol hierarchy.
   (b) Define the following terms : Information capacity, bits, bit rate, band and M- ary encoding.
2. (a) Discuss the classification of transmission lines.
   (b) Draw the block diagram of a simplex optical fiber communications link and explain each block.
3. (a) Describe digital companding.
   (b) List and describe the various frame synchronization techniques.
4. (a) Explain in detail the optical properties of radio waves.
   (b) What are the advantages and disadvantages of geosynchronous satellites?
5. (a) Describe the differences between the operation of a cordless telephone and a standard telephone.
   (b) What are the characteristics that a telephone message- channel noise measuring set should possess.
6. (a) Determine :
      i. The channel capacity for a cellular telephone area comprised of seven macrocells with 10 channels per cell.
      ii. Channel capacity if each macrocell is split into four minicells.
      iii. Channel capacity if each minicell is further split into four microcells.
   (b) List and describe the three classifications of AMPS cellular telephones.
7. (a) Explain why Mosse code is inadequate for modern day data communications networks.
   (b) How does exact-count encoding detect errors? Explain with an example.
8. (a) Describe data communications modems and tell where they are used in data communications circuits.
   (b) List and describe the four modern operational modems.

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Code 9A12302 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
DATA COMMUNICATION SYSTEMS
(Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Draw the simplified block diagram for a digital modulation system and explain.
   (b) List and briefly describe the four transmission modes.
2. (a) Explain the differences between STP and UTP transmission lines.
   (b) Briefly describe the construction of an optical fiber cable. Also describe the fiber optic cable configurations.
3. (a) What is companding ?Illustrate the process of companding.
   (b) Describe T carrier systems in detail.
4. (a) List and give examples of the three satellite elevation categories.
   (b) Describe the three modes of terrestrial propagation of electromagnetic waves.
5. (a) Describe the block diagram of a telephone set.
   (b) Explain the transmission characteristics of a local subscriber loop.
6. (a) Explain the following :
      i. Cell Splitting
      ii. Sectoring
      iii. Segmentation
      iv. Dualization
   (b) Discuss the concept of personal communication services.
7. (a) Briefly describe cyclic redundancy checking .
   (b) For a 12-bit data string of 101100010010, determine the number of hamming bits required, orbiterarily place the Hamming bits into the data string, determine the logic condition of each Hamming bit, assume an arbitrary single-bit-transmission error and prove that the Hamming code will successfully detect the error.
8. (a) What in the difference between asynchronous and synchronous modems?
   (b) List and describe the most common modulation methods used with 56k voice-band modems.

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Code 9A12302 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
DATA COMMUNICATION SYSTEMS
(Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) What are data communications standards, and why are they needed? Describe the primary standards organizations for data communications.
   (b) Determine
      i. The peak frequency deviation
      ii. Maximum bandwidth
      iii. Band for a binary FSK signal with a mask frequency of 49KHz, a space frequency of 51KHz, and an input rate of 2 Kbps.
2. (a) Describe the primary characteristics of electromagnetic waves.
   (b) What are the advantages and disadvantages of optical fiber cables.
3. (a) Explain the four methods of pulse modulation.
   (b) What is the difference between WDM and D-WDM?
4. (a) List the advantages and disadvantages of microwave radio communications over cable transmission facilities.
   (b) Explain the purpose of microwave radio repeaters.
5. (a) Describe basic telephone call procedures.
   (b) What is meant by line conditioning? What types of line conditioning are available.
6. (a) Explain the basic steps involved in handoff process.
   (b) Describe the advantages and disadvantages of digital cellular telephone compared to analog cellular telephone.
7. (a) Give a brief explanation of the Hamming code.
   (b) Briefly compare and contrast asynchrounous and synchronous serial data formats.
8. (a) Describe the basic blocks of a voice-band modem.
   (b) Explain the two transmission modes used with data communication modems.

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Code 9A12302 | 4

II B.Tech I semester (R09) Regular Examinations, November 2010
DATA COMMUNICATION SYSTEMS
(Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Differentiate between connection oriented and connection less protocols.
   (b) Explain the types of noise that are most prevalent and most interfering to data communications signals.
2. (a) Describe the categories of unshielded twisted pair cables as classified by EIA/TIA 568 standard.
   (b) Constant the advantages and disadvantages of step-index, graded-index, single -mode propagation and multimode propagation.
3. (a) Draw the block diagram of a single - channel PCM transmission system and describe each component.
   (b) For a 20-channel PCM/TDM system with an 8-KHz sample rate, 10 bits per sample, and one framing bit per frame, determine the line speed.
4. (a) Describe the difference between wave attenuation and wave absorption.
   (b) List and explain the three orbital patterns used by satellites.
5. (a) Describe the operation and basic functions of a standard telephone set.
   (b) When is D-type conditioning mandatory? What limitations are imposed with D-type conditioning?
6. (a) Discuss the essential components of a cellular telephone system.
   (b) Describe the operation of AMPS control channels.
7. Define error detection and describe several common techniques of achieving it.
8. (a) Describe the basic functions of a channel service unit.
   (b) Explain the difference between
      i. Probability of error and bit error rate
      ii. Cable modems and standard voice-band modems.

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Code :9A02306 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
BASIC ELECTRICAL 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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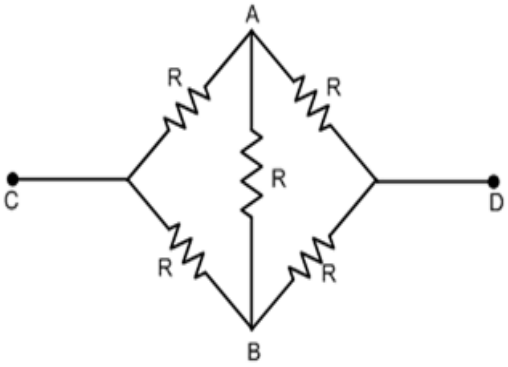
1. (a) Define and explain resistance, inductance, and capacitance.
   (b) Two resistances of 1.5Ω and 3.5Ω are connected in parallel and this parallel combination is connected in series with a resistance of 1.95Ω . Find the equivalent resistance of the circuit. What current will it draw if connected to a 30V supply.

2. (a) State and explain superposition theorem.
   (b)



   Find the equivalent resistance between C and D.

3. Show that peak factor of a sinusoidal current wave form is 1.414.

4. (a) Explain the constructional details of single phase transformer.
   (b) A single phase transformer working at unity power factor has an efficiency of 90% at both half load and at full load of 600W. Determine the efficiency at 80% of full load.

5. (a) Derive the emf equation of DC generator.
   (b) A 4 - pole DC shunt generator with lap - connected armature supplies a load of 100A at 200V. The armature resistance is 0.1Ω and the shunt field resistance is 80Ω . Find the total armature current and emf generated.

6. (a) Explain the principle of operation of DC Motor.
   (b) A 100V series motor takes 45A when running at 750 rpm. Its armature resistance is 0.22Ω , while the series field resistance is 0.13Ω . Iron and friction losses amount to 750W. Find the shaft power.

7. Explain the principle of operation of 3 - phase induction motor in detail.

8. Explain permanent magnetic moving coil instruments in detail with a neat diagram.

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Code :9A02306

2

II B.Tech I semester (R09) Regular Examinations, November 2010
BASIC ELECTRICAL 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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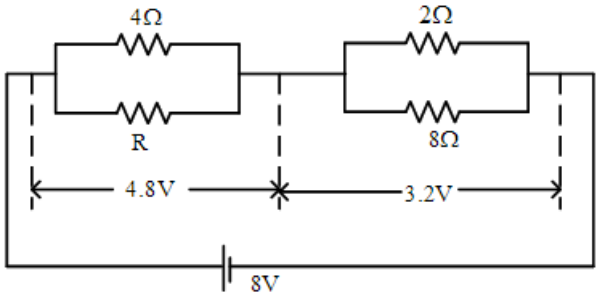
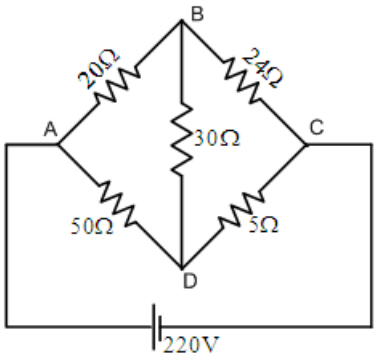
1. (a) Define and explain basic circuit components.
   (b)



   If the total power disipated in a network shown is 16W, find the value of R and the total current.

2. (a) State and explain Thevenin's theorem.
   (b)



   Determine the current delivered by the source.

3. (a) Show that power dissipated by a pure inductive circuit excited by a sinusoidal source is zero.
   (b) A pure capacitance $C = 10\mu F$ passes a current i = 10sin 2000t amperes. Find the voltage across the element.

4. Explain the tests to be conducted to determine copper and iron losses with neat circuit diagram.

5. (a) Explain the principle of operation of DC generator.
   (b) A six pole, lap-wound armature has 840 conductors and flux per pole of 0.018Wb. Calculate the emf generated, when the machine is running at 600 rpm.

6. (a) What is the significance of Swinburnis Test? Explain with a neat diagram.
   (b) A 220V DC shunt motor takes a total current of 100A and runs at 750 rpm. The resistance of armature winding and of shunt field winding is 0.1Ω and 40Ω respectively. Find the torque developed by armature.

7. (a) Explain with the help of suitable diagram, how a rotating magnetic field is produced in a 3 - phase induction motor.
   (b) A 12 - pole 3 - phase induction motor runs at 485 rpm on a 50 Hz supply. Calculate slip.

8. Explain the principle and the operation of moving iron attraction type instruments with neat diagram.

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Code :9A02306 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
BASIC ELECTRICAL 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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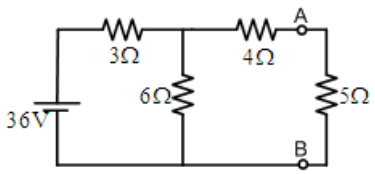
1. (a) Define and explain Kirchhoff's law.
   (b) Three resistors of $5\Omega, 10\Omega, 15\Omega$ are joined in parallel. If the current in 10Ω resistor is 3A, what is the current in other resistors and the total current?

2. (a) Explain the passive elements in detail.
   (b) By using Thevenins theorem find the current through 5Ω resistor.



3. Show that form factor of a sinusoidal current is 1.11.

4. (a) Explain the principle of operation of a single phase transformer.
   (b) A 3300/220V, 30KVA, single phase transformer takes a no load current of 1.5A when the low voltage winding is open. The Iron loss component is 0.4A. Find
      i. No load input power.
      ii. Magnetising component.
      iii. Power factor of no load current.

5. Explain the types of DC Generator in detail.

6. (a) Explain the losses that occur in a DC Machine.
   (b) A 500V DC shunt motor takes 4A on no load. The armature resistance including that of brushes is 0.2Ω and the field current is 1.0A. Estimate the output and efficiency when the input current is 20A.

7. (a) Define and explain slip of 3-phase induction motor.
   (b) Calculate the synchronous speed, slip and rotor frequency of a 3-phase 50Hz, 4-pole induction motor running at 1440 rpm.

8. (a) Make a comparison between spring control and gravity control.
   (b) A moving - coil instrument gives a full scale deflection, when the current is 35mA and its resistance is 20Ω. Calculate the value of the shunt to be connected in parallel with the meter to enable it to be used as an ammeter for measuring currents upto 45A.

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Code :9A02306

4

II B.Tech I semester (R09) Regular Examinations, November 2010
BASIC ELECTRICAL 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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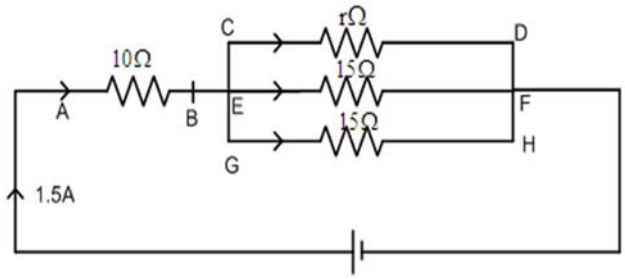
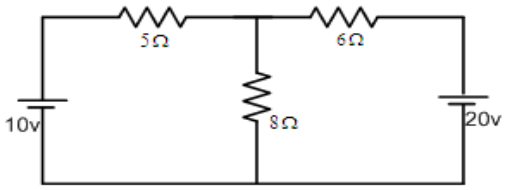
1. (a) Define and explain Ohm's Law.



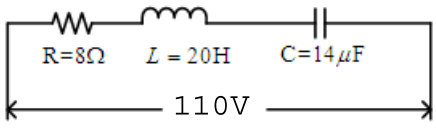
(b) For the circuit shown, calculate the value of resistance r, when the total current taken by the network is 1.5 A.

2. (a) Explain the types of sources in detail .



(b) By using the superposition theorem find the current through 8 Ω resistor.

3. (a) Derive the expression for R.M.S value of a sinusoidal current wave form.
(b) Calculate the current, power and power factor of the given circuit.



4. Define efficiency and regulation of transformer. Explain the tests to be conducted to predetermine the efficiency and regulation with neat diagrams.

5. (a) What is the significance of open circuit characteristics? How these characteristics are determined experimentally.
(b) A 4-pole DC generator has 378 wave wound conductors in its armature. If the fluxes per pole is 0.02 wb and the generator runs at 1000 rpm. Calculate the induced emf.

6. (a) Derive the expression for torque of a DC motor.

(b) A DC series motor having a resistance of 1Ω between terminals, runs at a speed of 800 rpm at 200v with a current of 15A. Find the speed at which it will run when connected in series with a 5Ω resistance taking the same current at the same supply voltage.

7. (a) Derive the relationship between the frequency of the rotor induced emf and the supply frequency of the stator.

   (b) A 6-pole induction motor is fed by a 3-phase 50Hz supply and running with a full load slip of 3%. Find the full load speed of the induction motor and also the frequency of the rotor emf.

8. (a) Explain the principle and operation of moving iron repulsion type instruments.

   (b) A meter movement with full-scale deflection current of 80μ A and internal resistance of 50Ω is required to measure a maximum current of 25mA. Determine the shunt resistance needed.

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Code 9A04301

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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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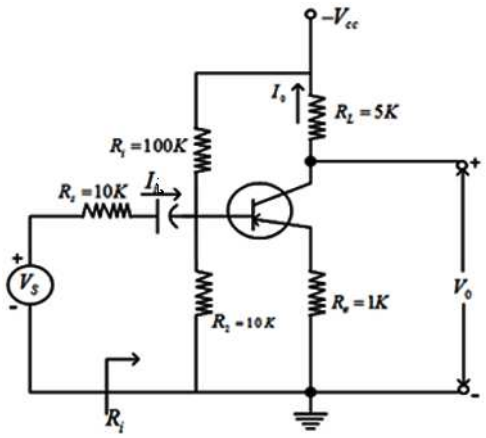
1. (a) Discuss PN diode VI characteristics with neat sketch.
   (b) Calculate the factor by which the current will increase in silicon diode operating at a forward voltage of 0.4 Volts, when the temperature is raised form 25^0C to 150^0C.
2. (a) With Circuit and necessary waveforms explain the operation 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
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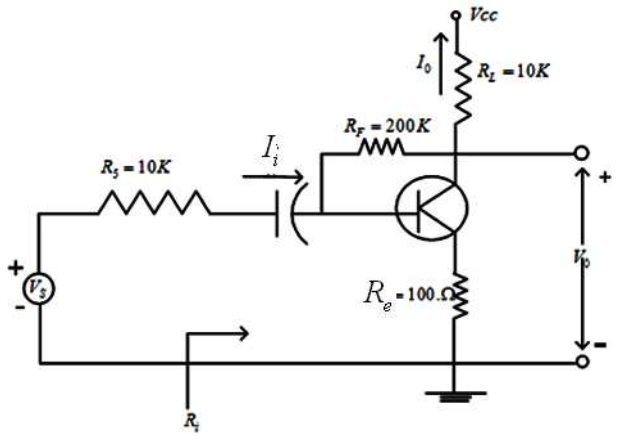
1. (a) Discuss energy band diagram for PN diode for the following cases
   i. Un biased
   ii. Forward biased
   iii. Reverse biased
   (b) Determine the forward resistance of PN diode, when the forward current is 5 MA at T=300K. Assume the diode is silicon.
2. (a) With circuit and necessary waveforms 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
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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 9A05301 **1**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(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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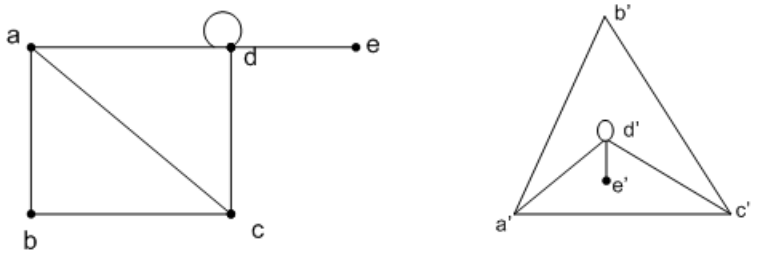
1. (a) Explain about different types of statement connectives.
   (b) Show that$\neg$P $\wedge$ ($\neg$Q $\wedge$ R)) $\vee$ (Q $\wedge$ R) $\vee$ (P $\wedge$ R) $\Leftrightarrow$ R without constructing truth table.
2. (a) Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q, Q \rightarrow R, P \rightarrow M$ and $\neg M$.
   (b) Explain about free and bond variables for predicate calculus.
3. (a) Explain about the properties of a Binary relation in a set with suitable examples.
   (b) Define a lattice . Let$(L, \leq)$ be lattice in which * and $\oplus$ denote the operations of meet and join respectively. For any $a, b \in L$, show that $a \leq b \Leftrightarrow a * b = a \Leftrightarrow a \oplus b = b$.
4. (a) Define and give examples for semigroups and monaids.
   (b) Explain about the general properties of algebraic systems.
5. (a) How many 10 - digit binary numbers are there with exactly six 1's?
   (b) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where each $x_i \geq 2$?
   (c) From a group of 10 professors how many ways can a committee of 5 members be formed so that atleast one of the professor A and professor B will be included?
6. Solve the recurrence relation $a_n = c.a_{n-1} + f(n)$ for $n \geq 1$, where C is a constant, by substitution.
7. What is a spanning tree? Explain any two ways for finding out spanning tree of a given graph with examples.
8. Define isomorphism of graphs. Prove that the following graphs are isomorphic.



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Code 9A05301 **2**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(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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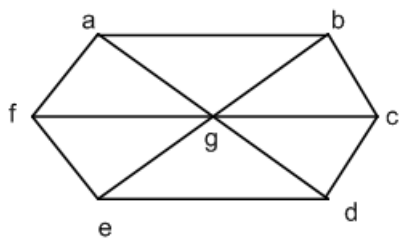
1. (a) What is a principle disjunctive normal form? Obtain the principle disjunctive form of $P \rightarrow ((P \rightarrow Q) \wedge \neg (\neg Q \vee \neg P))$
   (b) Show that $(((P \vee \neg Q) \rightarrow R \leftrightarrow S) \vee \neg (((P \vee \neg Q) \rightarrow R) \leftrightarrow S)$ is a tautology.
2. (a) Explain the concept of tree and bound variables for predicate calculus.
   (b) Show that$(x)\,(P(x) \rightarrow Q(x))) \wedge (x)\,(Q(x) \rightarrow R(x)) \Rightarrow (x)\,(P(x) \rightarrow R(x))$.
3. (a) What is an equivalence relation? Give an example. And prove that it is equivalence relation.
   (b) Define a partial order relation. Let A be a given finite set and P(A) its power set. Let $\subseteq$ be the inclusion relation on the elements of P(A). Draw Hasse diagrams of $\langle P(A), \subseteq \rangle$ for
   (i) A = {a, b}
   (ii) A = {a, b, c, d}
4. (a) Write about general properties of an algebraic system.
   (b) Explain about homomorphism of subgroups.
5. (a) How many ways can we get a sum of 4 or of 8 when two distinguishable dice are rolled? How many ways can we get an even sum?
   (b) State and prove the binomial theorem.
6. Solve $a_n - 6a_{n-1} + 12a_{n-2} - 8a_{n-3} = 0$ by generating functions.
7. (a) Explain about different representations for graphs.
   (b) Explain about DFS and BFS methods.
8. (a) Explain about multigraphs and Euler circuits with examples.
   (b) What is a chromatic number? Find the Chromatic number for the following graph.



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Code 9A05301 **3**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(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) Explain different types of connectives for the statements with their truth tables.
   (b) Show that $P \rightarrow (Q \rightarrow P) \Leftrightarrow \neg P \rightarrow (P \rightarrow Q)$.
2. (a) Explain the concept of free and bound variables and rules of inference for predicate calculus.
   (b) Show that $(x)(P(x) \rightarrow Q(x)) \wedge (x)(Q(x) \rightarrow R(x)) \Rightarrow (x)(P(x) \rightarrow R(x))$.
3. (a) What is a partial order relation? Let X = {2, 3, 6, 12, 24, 36} and the relation $\leq$ be such that $x \leq y$ if x divides y. Draw the Hasse diagram of $\langle x, \leq \rangle$.
   (b) What is an equivalence relation? Give an example for equivalence relation and prove that it is an equivalence relation.
4. (a) Define a semigroup and monoid. Let S be a non empty set and P(s) be its power set. Prove that the algebras $\langle P(s), \cup \rangle$ and $\langle P(s), \cap \rangle$ are monoids.
   (b) Explain the concepts of homomorphism and isomorphism of groups with examples.
5. (a) What is pigeon hole principle? Explain any two of its applications.
   (b) How many two digits or three digits numbers can be formed by using the digits 1, 3, 4, 5, 6, 8 and 9 if no repetitions are allowed?
   (c) How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8 and 9 if no repetitions are allowed?
6. Solve the recurrence relation $a_n = c.a_{n-1} + f(n)$, where C is a constant, by substitution method. Find a solution for Towers of Hanoi problem using recurrence relation.
7. Explain any two methods for finding out the spanning tree of a given graph with suitable examples.
8. Explain about multigraphs and Euler circuits.

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Code 9A05301 **4**

II B.Tech I semester (R09) Regular Examinations, November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(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) Explain different types of connectives used for making compound statements with truth tables.
   (b) Show that $P \rightarrow (Q \rightarrow P) \Leftrightarrow \neg P \rightarrow (P \rightarrow Q)$.
2. (a) With suitable examples, explain the concepts of free and bound variables for the predicate calculus.
   (b) What is automatic theorem proving? Explain with an example.
3. (a) When do you call an algebraic system is a group? Given an algebraic system which is a group and prove that it is a group.
   (b) Explain about isomorphism and homomorphism of subgroups.
4. (a) What is a poset? Explain with an example? Draw its Hasse diagram.
   (b) What is an equivalence relation? Give an example and prove that it is equivalence relation.
5. (a) How many different licence plates are there that involve 1, 2, or 3 letters followed by 4 digits?
   (b) In how many ways can 7 women and 3 men be arranged in a row if the three men must always stand next to each other?
   (c) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where each $x_i \geq 2$?
6. Solve $a_n - 6a_{n-1} = 0$ for $n \geq 1$ and $a_0 = 1$ using generating functions.
7. (a) Explain about different representations of graphs.
   (b) What is a spanning tree? Explain any one method for finding spanning tree of a given graph
8. Write a short notes on
   (a) Multigraphs.
   (b) Hamiltonian graphs.
   (c) Chromatic numbers.

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