



Subject : Applied Chemistry
Year/ Semester:I/II

Branch :ECE

Department: Humanities & Basic Sciences

Faculty :D.SWAPNA,
Designation:Asst. professor

UNIT-1

1. Explain the mechanism of (a) Free radical polymerisation 4M
(b) Ionic Polymerisation 3M
(c) Compounding of plastics? 3M
2. (a) Write the (a) Suspension and Emulsion polymerisation? 4M
(b) stereo specific polymers? 4M
3. Write the (a) Preparation and properties of Bakelite and BUNA-S 6M
(b) Vulcanisation 4M
4. (a) Write the differences between thermo plastics and thermosetting plastics. 4M
(b) Explain the fabrication methods of Plastics? 6M
5. Explain the (a) Biodegradable polymers? 5M
(b) Fibre Reinforced plastics? 5M

UNIT - II

1. (a) Define the Calorific Value, LCV and HCV of a fuel? 4M
(b) Describe how the Calorific value of a solid fuel is determined using a bomb calorimeter? 6M
2. Explain the a) Proximate analysis of coal? 5M
b) Ultimate analysis of coal? 5M
3. (a) Write a note on (a) Octane Number and Cetane Number? 5M
(b) Catalytic Cracking methods .6M
4. Define the (a) Petrol Knocking and Diesel Knocking? 4M
(b) Refining of petroleum. 6M
5. (a) Write a brief note on RDX and TNT? 4M
(b) Explain the Natural gas, LPG and CNG? 6M

UNIT- III

1. Explain the (a) Standard hydrogen electrode and Calomel electrode. 7M
(b) Electrochemical series? 3M
2. Define the (a) Single electrode potential and give its significance? 3M
(b) Lithium cells? 7M
3. (a) Explain the galvanic cell? 5M
(b) Define corrosion? Write the factors effecting the corrosion? 5M
4. Discuss the mechanism of corrosion? 10M
5. Explain the (a) Cathodic protection? 6M
(b) Galvanization and Tinning? 4M



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UNIT-IV

1. Explain the (a) BET and TEM for the preparation of Nano materials? 6M
(b) Types of Liquid Crystals 4M
2. Write a detailed account on the (a) Types of superconductors.6M
(b) R₄M₄ principles in green chemistry?4M
3. Write a detailed account on the (a)Preparations, and properties of carbon nano tubes.6M
(b)Preparations of Fullerene 4M
4. (a)What is the green Chemistry? Write the principles of green chemistry?6M
(b) Write any two methods of synthesis of compounds by using green chemistry? 4M
5. Write the (a) Sol-gel method for the preparation of Nano materials? 5M
(b) Engineering application of superconductors? 4M

UNIT-V

1. Write a note on (a) p-n Junction diode (6M)
(b) Structure of NaCl and CsCl (4M)
2. Explain (a) Controlled valency semiconductors.5M
(b) Spinels and Inverse spinels. 5M
2. Write the (a) four types of crystalline solids.5M
(b) Simple Cubic, BCC, FCC packing of metals?.5M
3. Explain (a) What are the magnetic materials? 6M
(b) Zone refining 4M
4. (a) Discuss about the (a) Hall Effect and its applications? 6M
(b) Characteristics of insulators? 4M

UNIT-VI

1. Discuss about (a) Photovoltaic cells. 7M
(b) Fuel cell and example 3M
2. Discuss briefly about the (a) Methanol-Oxygen fuel cell 5M
(b) Geothermal energy? 5M
3. Write about (a) the types of cycles in OTEC plant? 7M
(b) Biomass. 3M
4. Explain the (a) Tidal and Wave power 5 M
(b) Biodiesel? 5M
5. Write a brief note (a) Hydro power? 5M
(b) Hydrogen-Oxygen fuel cell 5M



DADI INSTITUTE OF ENGINEERING & TECHNOLOGY
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I B.Tech Question Bank

Subject : Applied Chemistry

Year/ Semester:I/II

Branch :ECE

Faculty :D.SWAPNA,

Designation:Asst. professor

Department: Humanities &Basic Sciences



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Phone: 08924-221111 / 221122/9963994049, www.diet.edu.in, E-mail: examcell@diet.edu.in

Course : B.Tech. Branch : ECE Year/Semester : I/II Academic Year : 2018-19

Faculty Name : Mrs.CH.DINESH Subject : Data Structures AdmittedBatch : 2018

QUESTION BANK

UNIT-I: ARRAYS

1. A) Define data structure. Discuss different types of data structure their Implementations applications. [5 M]
B) What is an array? Discuss different types of array with examples. [5 M]
2. A) Explain how to implement polynomial ADT using array. Discuss its Advantages And Disadvantages. [5 M]
B) Explain polynomial addition using arrays [5 M]
3. A) Explain sparse matrix representation using array with an example. Discuss the Advantage and disadvantages of this method. [5 M]
B) Discuss matrix multiplication with an example [5 M]
4. A) Explain in detail about transpose of matrix with example? [5 M]
B) illustrate about polynomial representation along with ADT? [5 M]

UNIT-II: STACKS AND QUEUES

1. A) Write an algorithm to insert and delete a key from circular queue. [5 M]
B) Explain the procedure to convert infix expression to postfix expression with the Following expression: $((A - (B+C) * D) / (E+F))$ [5 M]
2. A) Explain the evaluation of prefix expression. Find the equivalent prefix of : 8 6 3 + * 1 2 3 -/- [5 M]
B) Explain basic operations of queue. List the steps to implement queue using stack. [5 M]
3. A) Explain the operations performed on simple queue with an example. [5 M]
B) Convert following expression $X + (Y * Z) - ((N * M + O) / P)$ in to post form. [5 M]
4. A) Write an algorithm for basic operations of stack. [5 M]
B) Explain the procedure to evaluate postfix expression. Evaluate the following Postfix expression $7 3 4 + - 2 4 5 / + * 6 / 7 + ?$ [5 M]

UNIT-III: LINKED LISTS

1. A) Write recursive algorithm for lists. [5 M]
B) Explain the procedure to insert and delete element from sparse matrix. [5 M]
2. A) Write an algorithm to push and pop an element from linked stack. [5 M]
B) Discuss sparse matrix representation using linked list. [5 M]
3. A) Write an algorithm to delete an element anywhere from doubly linked list. [5 M]
B) Write applications of single linked list to represent polynomial expressions [5 M]
4. A) List various operations of linked list and explain how to insert a node anywhere in

- The list. [5 M]
B) Show how to reverse a single linked list. [5 M]

UNIT-IV: TREES

1. A) Explain binary tree ADT. [4 M]
B) Discuss representation of binary tree using arrays and linked list. [6 M]
2. A) What operations can be performed on binary trees? Discuss. [4 M]
B) Write in-order, pre-order and post-order traversal of a binary tree. [6 M]
3. A) Construct max heap for the following: [5 M]
140, 80, 30, 20, 10, 40, 30, 60, 100, 70, 160, 50, 130, 110, 120
B) Explain in-order traversal of threaded binary tree with an example. [5 M]
4. A) Define binary search tree. Show how to insert and delete an element from binary Search tree with an example? [6 M]
B) Write algorithm to insert and delete an element from binary search tree. [4 M]

UNIT-V: GRAPHS

1. A) What is a graph? Explain the properties of graphs. [4 M]
B) Write breadth first traversal algorithm. Explain with an example [6 M]
2. A) What are connected components of graph? Is there a method to find out all the Connected components of graph? Explain. [4 M]
B) Explain Prim's algorithm with an example. [6 M]
3. A) Discuss kruskal's algorithm with an example. [6 M]
B) Explain how to represent a graphs. [4 M]
4. A) Explain Warshall's algorithm to find transitive closure of a graph with a suitable Example. [5 M]
B) Explain All pairs shortest path with example? [5 M]

UNIT-VI: SORTING

1. A) Write algorithm for merge sort. [5 M]
B) Discuss how to sort elements using merge sort with suitable example. [5 M]
2. A) Rearrange following numbers using quick sort: [5 M]
10, 6, 3, 7, 17, 26, 56, 32, 72
B) Write a program to sort the elements using radix sort. [5 M]
3. A) State and explain insertion sort with example. [5 M]
B) Differentiate between iterative merge sort and recursive merge sort [5 M]
4. A) State and explain heap sort with example. [6 M]
B) Evaluate time complexity and space complexity of an algorithm. [4 M]



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DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING

QUESTION BANK (2018-19)

NAME OF SUBJECT : Electrical & Mechanical Technology (mid-1)
Name of the faculty : P Vinod, EEE
REGULATION : R16
COURSE : B.TECH
BRANCH : ECE
YEAR / SEMESTER : I/ II

UNIT-1 DC MACHINES

- 1.a) Explain constructional features and working principle and applications of a DC generator.
- b) Draw and explain magnetization characteristics of DC shunt and compound Generators.
- 2.a) Explain the emf equation of DC 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 resistance. Calculate the terminal voltage when running at 900 r.p.m. if the armature current is 50 A.
- 3.A) b) How the DC generators are classified. Explain with neat circuit diagrams
- B) 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.
- 4.a) Explain the operation of three point starter and applications of DC motors.
- B) Explain different speed control methods of DC motor. Which is the more popular method? Torque equation of dc motor?
- 5.a) What is a transformer? How does a transformer transfer electrical energy from one circuit to another? Derive its emf equation?

b) 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. (c) 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.

6a) Define regulation and efficiency of a transformer

b) Derive the condition for maximum efficiency in a transformer

7. a) What are various losses in a transformer? Explain each one in detail.

b.) 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.

UNIT-2 AC ROTATING MACHINES

1.a) Explain the construction & principle of operation of alternator

b) What is slip and write its expression. How does the slip vary with load?

2. a) Obtain the condition for maximum torque under running condition in Induction motor.

b) construction & principle of operation of 3-phase squirrel cage induction motor.

3a) Draw equivalent circuit of 3-phase induction motor on load. What is the effect of increasing air-gap length in an induction motor?

b) Define the efficiency and applications of three-phase induction motor?

4. a) Draw and explain the slip-torque characteristics of a 3-phase induction motor. How is speed of a DC motor reversed?

b) Write the expressions for starting and running torque of an induction motor.

5. 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 1440 rpm. Find the percentage slip and the no. of poles of the motor.

6) Explain regulation of alternator by synchronous impedance method

UNIT-3 MEASURING INSTRUMENTS

1 a). Explain how deflection torque is produced

1b) What is controlling torque and explain its significance

2a) Explain how damping torque is produced

2b) Explain how fluid friction and eddy current damping occurs?

3a) Explain about moving iron instruments

3b) Explain about moving coil (PMMC) instruments

4a) explain about ammeters

4b) explain about voltmeters

5a) explain the construction and working of wattmeter

5b) explain the construction and working of energy meters

6a) explain the construction of CRO

6b) Explain the working principle of CRO



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DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

ELECTRICAL AND MECHANICAL TECHNOLOGY

UNIT-IV

SHORT ANSWER QUESTIONS

1. What do you understand by TDC and BDC?
2. What do you understand by (i) Brake Power; (ii) Specific Fuel Consumption
3. What do you understand by (i) Frictional Power; (ii) Brake Thermal Efficiency
4. What do you understand by (i) Indicated Thermal Efficiency; (ii) Mechanical Efficiency?

LONG ANSWER QUESTIONS

1. Discuss in detail the differences between Four Stroke and Two Stroke engines.
2. A certain engine with a bore of 250 mm has an indicated thermal efficiency of 30%. The brake specific fuel consumption and specific power output are 0.35 kg/kWh and 90 kW/m². Find the mechanical efficiency and brake thermal efficiency of the engine. Take the calorific value of the fuel as 42 MJ/kg.
3. Discuss in detail the differences between Spark Ignition and Compression Ignition engines.
4. A four stroke Compression Ignition engine develops a brake power of 368 kW while 73.6 kW is used to overcome the friction losses. It consumes 180 kg/h of fuel at an air-fuel ratio of 20:1. The heating value of fuel is 42000 kJ/kg. Calculate (i) Indicated Power; (ii) Mechanical Efficiency; (iii) Indicated Thermal Efficiency; (iv) Brake Thermal Efficiency
5. Discuss in detail the differences between Renewable and non Renewable energy resources.
6. What are the important basic components of an Internal Combustion engine? Explain them briefly.

UNIT-V

SHORT ANSWER QUESTIONS

1. Explain the distinction between Absorptivity and Reflectivity
2. Define Efficiency and Effectiveness of a Fin.
3. Explain the distinction between Laminar and Turbulent flows.
4. Explain Radiation Intensity of a Black body.

LONG ANSWER QUESTIONS

1. Explain the effect of extended surfaces on heat transfer. Discuss in detail the classification of fins with neat sketches.
2. A cubical tank of water of volume 1 m^3 is kept at a steady temperature of 65°C by a 1 kW heater. The heater is switched off. How long does the tank take to cool to 50°C , if the room temperature is 15°C
3. Discuss in detail the differences between Forced and Natural Convection.
4. A thin metallic plate is insulated at the back surface and is exposed to the sun at the front surface. The front surface absorbs solar radiation at 900 W/m^2 and dissipates it mainly by convection to the ambient air at 30°C . If the heat transfer coefficient between the plate and the air is $15 \text{ W/m}^2\text{K}$, what is the temperature of the plate?
5. Discuss in detail, Fourier's law of Heat conduction. What are the assumptions made?
6. An immersion water heater of surface area 0.1 m^2 and rating 1 kW is designed to operate fully submerged in water. Estimate the surface temperature of the heater when the water is at 40°C and the heat transfer coefficient is $300 \text{ W/m}^2\text{K}$. If this heater is by mistake used in air at 40°C with heat transfer coefficient of $9 \text{ W/m}^2\text{K}$, what will be the surface temperature?

UNIT-VI

SHORT ANSWER QUESTIONS

1. What is a Worm and a Worm wheel? Where is it used.
2. What is the difference between Double-Helical and Herringbone gears?
3. Name the different gears used for (i) Parallel shafts; (ii) Intersecting shafts.
4. What do you mean by Initial Tension in a Belt Drive

LONG ANSWER QUESTIONS

1. How is a Lathe specified? Explain with a neat sketch the relevance of each of the specification points.
2. Explain how Brazing is different from welding. Why is Brazing more extensively used in industrial practice?
3. Distinguish between Arc and Gas welding processes from the point of view of Heat concentration, Temperature, Ease of operation and Running cost.
4. What is the requirement of fluxes in Brazing? Give details of some of the fluxes used in brazing with their applications
5. Explain the resistance welding process giving the equipment, parameters controlled and the applications.
6. Distinguish between Brazing and soldering from the point of view of the filler metals used, applications and the strength of the joint obtained.



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ENGLISH- II QUESTION BANK- I B. TECH (CIVIL, EEE& ECE)

Unit- I

- 1) A. Explain Schumacher views on education?
B. What was the objective of the SLV project?
C. Give the synonyms of the following:
 - i. Precipitate
 - ii. Antecedent
- 2) A. Write a letter to the editor of a leading newspaper on the problem of eve - teasing in your city.
B. Explain the work Kalam did at DRDO.
C. Give Antonyms for the following words:
 - i. Inferior
 - ii. Conceal
- 3) A. What are the arguments which the author put forward to show that education is necessary?
B. Who helped Kalam design the guidance systems for Agni Missile?
C. Give synonyms for following:
 - i. Apprehension
 - ii. Brink
- 4) A. How is positive attitude helpful for the students?
B. Name a few awards that Kalam won.
C. Give antonyms for the following words:
 - i. Culminate
 - ii. Persuade
- 5) A. What should be done to overcome the problems of modern life?
B. Why Abdul Kalam is called the Missile Man of India?
C. Give Antonyms for the following words:
 - i. Decline
 - ii. Civilized

UNIT- II

- 1) A. Who is responsible for the destructive use of scientific inventions- Science or people?
B. What were some of the changes that Raman had initiated at the Indian Institute of Science?
C. Write the superlative adjectives for the following words:

C. Fill in the blank with an appropriate form of the verb given in brackets:

- i. The train --- (have left) before I reached the station.
- ii. She --- (lost) the key just now.

4) A. Explain Non - Verbal Communication.

B. What were Bhabha's efforts to set up research institute in India?

C. Fill in the blank with an appropriate form of the verb given in brackets:

- i. She --- (see) Delhi many times.
- ii. She --- (have work) a lawyer since 2000.

5) A. What is Body Language?

B. What is the message of Bhabha to the youth?

C. Fill in the blank with an appropriate form of the verb given in brackets:

- i. Summer----- (come) after winter.
- ii. She----- (meet) the principal yesterday.

UNIT- IV

1) A. Write an essay on- "Global Warming"

B. Write the views of the author on J.C. Bose.

C. In questions given below out of four alternatives, choose the one which can be substituted for the given word/sentence:

- i. A person who knows many foreign languages
A. Linguist B. Grammarian C. Polyglot D. Bilingual
- ii. One who possesses many talents
A. Versatile B. Nubile C. Exceptional D. Gifted

2) A. What seems to have been the original purpose of the lottery? What do people believe about it?

B. What was Bose's attitude towards education as he grew up?

C. In questions given below out of four alternatives, choose the one which can be substituted for the given word/sentence:

- i. That which cannot be corrected
A. Unintelligible B. Indelible C. Illegible D. Incurable
- ii. The study of ancient societies
A. Anthropology B. Archaeology C. History D. Ethnology

3) A. Is it important that the original paraphernalia for the lottery had been lost? What do you suppose the original ceremony was like? Why have some of the villages given up this practice? Why hasn't this one?

B. Why did Bose shift his interest? What were his contributions to the two fields he worked in?

C. In questions given below out of four alternatives, choose the one which can be substituted for the given word/sentence:

i. A person of good understanding knowledge and reasoning power

A. Expert B. Intellectual C. Snob D. Literate

ii. A person who insists on something

A. Disciplinarian B. Stickler C. Instantaneous D. Boaster

4) A. Is the lottery a collective act of murder? Is it morally justified? Is tradition sufficient justification for such actions? How would you respond to cultures that are different from ours that perform "strange" rituals?

B. Give an account of Bose's experiments relating to plant responses.

C. In questions given below out of four alternatives, choose the one which can be substituted for the given word/sentence:

i. State in which the few govern the many

A. Monarchy B. Oligarchy C. Plutocracy D. Autocracy

ii. A style in which a writer makes a display of his knowledge

A. Pedantic B. Verbose C. Pompous D. Ornate

5) A. Write a newspaper report about an accident that took place on the main road in your town.

B. Explain the childhood and early life of J.C. Bose.

C. In questions given below out of four alternatives, choose the one which can be substituted for the given word/sentence:

i. One who eats everything

A. Omnivorous B. Omniscient C. Irascible D. Insolvent

ii. The custom or practice of having more than one husband at same time

A. Polygyny B. Polyphony C. Polyandry D. Polychromic

UNIT- V

1) A. How can we prevent climate change?

B. Explain Assertiveness.

C. Fill the blank with suitable preposition.

i. I have been waiting for you _____ seven o'clock.

ii. I will have finished this essay _____ Friday.

2) A. How does climate change affect human health?

B. Explain the early life of Prafulla Chandra Ray.

C. Fill the blank with suitable preposition.

- i. Peter is playing tennis _____ Sunday.
 - ii. What are you doing _____ the afternoon?
- 3) A. How are morality and excessive heat related?
 B. Write an essay on – “Climate Change”.
 C. Fill the blank with suitable preposition.
- i. We are going to see my parents _____ the weekend.
 - ii. In 1666, a great fire broke out _____ London.
- 4) A. Write a short note on aeroallergens.
 B. What are the contributions and achievements of Prafulla Chandra Ray?
 C. Fill the blank with suitable preposition.
- i. The shops open _____ nine.
 - ii. She has never seen the sea _____ winter.
- 5) A. What is public health surveillance and why is it important?
 B. Write an article on- “Air Pollution”.
 C. Fill the blank with suitable preposition.
- i. My brother's birthday is _____ the 5th of November.
 - ii. My birthday is _____ May.

UNIT- VI

- 1) A. Why IBM approached Bill Gates? Explain the problems and prospects of their agreement.
 B. Who is Srinivasa Ramanujan?
 C. Fill the gap with the suitable verb.
- i. Neither of the contestants _____ able to win a decisive victory. (was / were)
 - ii. Oil and water _____ not mix. (do / does)
- 2) A. What does SMART mean in goal setting?
 B. Who is Paul Allen? Write the achievements of Allen with Gates.
 C. Fill the gap with the suitable verb.
- i. One of my friends _____ gone to France. (has / have)
 - ii. Each of the boys _____ given a present. (was / were)
- 3) A. What are the advantages of team work?
 B. Explain the achievements of Ramanujan at Cambridge.
 C. Fill the gap with the suitable verb.
- i. Neither Peter nor James _____ any right to the property. (has / have)
 - ii. No prize or medal _____ given to the boy, though he stood first in the examination. (was / were)

- 4) **A.** Explain the family details of Bill Gates.
B. Explain the education and research career of Srinivasa Ramanujan?
C. Fill the gap with the suitable verb.
- i.** He and I _____ at Oxford together. (was / were)
 - ii.** Slow and steady _____ the race. (win / wins)
- 5) **A.** Why did Bill Gates and Allen sue a case against the new owner of MITS?
B. Write a report on- “Blood donation camp”.
C. Fill the gap with the suitable verb.
- i.** Either Mary or Alice responsible for this. (is / are)
 - ii.** Neither the Minister nor his colleaguesgiven any explanation for this.
(have / has)



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Question Bank(2018-2019)

Subject-Environmental studies

Branch: CSE&ECE

Year/Sem: I/II

Name of the faculty: M.Lalitha

Department: H & BS

Unit-1

1. a) Discuss the scope of environmental education? 5m
b) What is the role of IT on environment and human health? 5m
2. Why is environmental studies considered as a multidisciplinary subject? 10m
3. Discuss the causes and effects of global warming. 10m
4. a) Discuss the causes and effects of Acid rains. 5m
b) Discuss the causes and effects of Ozone depletion. 5m
5. a) What are ecological pyramids? Write about different types of pyramids. 5m
b) Give an account of energy flow in an ecosystem. 5m
6. Write about structure and function of ecosystem. 10
7. a) Write a short note on food web. 5m
b) Discuss the phenomenon of ecological succession. 5m
8. Explain the structure and functioning of Forest or grassland ecosystem. 10
9. Describe the structure and functioning of a pond ecosystem. 10m
10. Effect of human activity on ecosystem.10m

Unit-2

1. What are renewable and non –renewable energy resources? Explain. 10m
2. What are the major causes and consequences of deforestation? 10m
3. a) Write about crises and conflict over water. 5m
b) Write a short note on Soil erosion. 5m
4. What is mining? What are the impacts of mining on environment? 10m

5. a) What is the role of an individual in conservation of natural resources? 5m
b) Describe few modern agricultural methods and their consequences. 5m
6. a) Write a short note on Forest resources. 5m
b) Write a short note on Rehabilitation problems. 5m

Unit-3

1. a) Define biodiversity. Write about threats of biodiversity. 5m
b) What are the three levels of biodiversity? 5m
2. What are the hot spots of biodiversity? 10m
3. Explain in-situ and ex-situ conservation of biodiversity? 10m
4. a) What are the different values of biodiversity? 5m
b) Write about Endemic and Endangered Species. 10m

Unit-4

1. a) Mention briefly about the various types of pollution. 5m
b) Briefly describe sources, effects and control of noise pollution. 5m
2. Discuss adverse effects and control of water pollution. 10m
3. Briefly describe sources, effects and control of various Air pollutants. 10m
4. What are the various types of solid waste and methods of safe disposal of solid waste? 10m
5. a) Role of an individual in the prevention of environmental pollution? 5m
b) Write a note on Bhopal Gas Tragedy. 5m

Unit -5

1. a) What do you understand by environmental ethics? 5m
b) Discuss the salient features of Wild life protection Act. 5m
2. a) Discuss the salient features of Forest Conservation Act. 5m
b) What are the major limitations to successful implementation of all environmental legislation?
5m
3. What is rain water harvesting? What are the purposes served by it? 10m
4. a) Methods to propagate environmental awareness in society? 5m
b) Write a note on Water act. 5m

5. Write a short note on urban problems related to:

- a) Energy 5m b) Water conservation 5m**

Unit -6

- 1. Write about EIA, its significance at various stages. 10m**
- 2. a) Explain about environmental audit? 5m**
b) Discuss about environmental management plan. 5m
- 3. a) Discuss the concept of ecotourism, its principles and merits. 5m**
b) Write a short note on EIS. 5m
- 4. Write a short note on Green business, green politics and green campus. 10m**



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I B.TECH IISem Question Bank

Subject : Mathematics-III Branch: ECE, EEE, Civil. (2018-2019)

Faculty: Dr.Ch.Prabhakara Rao.

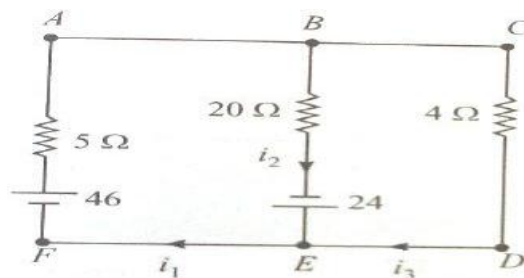
UNIT -I

1(a) Solve the system of equations $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$ by Gauss Jacobi method 5M

(b) Reduce the matrix A to normal form and hence find the rank of the matrix

$$A = \begin{bmatrix} 2 & -2 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 1 & 2 \end{bmatrix} \quad \text{5M}$$

2(a) Find the currents in the following circuits 5M



(b) solve the system of equations $10x + y + z = 12$, $2x + 10y + z = 13$ and $2x + 2y + 10z = 14$ using Gauss-seidel method. 5M

3(a) Find the non singular matrices P and Q such that the normal form of A is PAQ where

$$A = \begin{bmatrix} 1 & 3 & 6 & -1 \\ 1 & 4 & 5 & 1 \\ 1 & 5 & 4 & 3 \end{bmatrix}. \text{ Hence find its rank.} \quad \text{5M}$$

(b) Find the rank of $\begin{pmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{pmatrix}$ after reducing it to Echelon form 5M

4(a) Find the values of 'a' and 'b' for which equation $x + y + z = 3$; $x + 2y + 2z = 6$; $x + ay + 3z = b$ have unique solutions. 5M



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(b) using Gauss-jordan method solve the system of equations $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$. 5M

5(a) Reduce the matrix A to normal form and hence find the rank of the matrix. 5M

$$A = \begin{bmatrix} 2 & 1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \end{bmatrix}$$

(b) prove that the following set of equations are consistent and solve them.

$$2x - y - z = 2 ; x + 2y + z = 2 ; 4x - 7y - 5z = 2 ;$$

UNIT – II:

1(a) Find Eigen values and Eigen vectors of $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ 5M

(b) Reduce the quadratic form $10x^2 + 2y^2 + 5z^2 - 4xy - 10xz + 6yz$ into canonical form and find the nature, rank, index and signature. 5M

2(a) Reduce the Quadratic form $3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$ into sum of squares form by an orthogonal transformation and give the matrix transformation. 5M

(b) Find A^{-1} using Cayley –Hamilton theorem, where $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ 5M

3(a) what is the nature of the quadratic form X^TAX , if $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ 5M

(b) Prove that if τ is an Eigen value of a matrix A then τ^{-1} is an Eigen value of matrix A^{-1} if it exists. 5M



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4(a) If τ is an Eigen value of a non singular matrix A then show that $\frac{|A|}{\tau}$ is an Eigen value of matrix adjoint A(adjA) 5M

(b) Find A^{-1} using Cayley –Hamilton theorem, where $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ 5M

5(a) state Cayley-Hamilton theorem and find A^8 if $A = \begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$ 5M

(b) Diagonalize the matrix $\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ -1 & 2 & 2 \end{bmatrix}$ 5M

6(a) Show that if λ is an eigen value of A, then prove that the eigen value of

$B = a_0A^2 + a_1A + a_2I$ is $a_0\lambda^2 + a_1\lambda + a_2$. 5M

(b) Is the matrix $\begin{bmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 2 & 5 & 7 \end{bmatrix}$ diagonalizable ? 5M

UNIT –III :

1(a) Evaluate $\int_{y=0}^2 \int_{x=0}^3 xy \, dx dy$ 5M

(b) Evaluate $\int_0^a \int_{\frac{x^2}{a}}^{2a-x} xy^2 dy dx$ by changing the order of integration. 5M

2(a) Evaluate $\int_{x=0}^a \int_{y=0}^b (x^2 + y^2) dy dx$ 5M

(b) By changing the order of integration , evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 dx dy$ 5M

3(a) Find the moment of inertia about the initial line of the cardioid $r = a(1 - \cos\theta)$. 5M

(b) Evaluate $\iiint dx dy dz$ V is the finite region of space formed by the planes

$x = y = z = 0$ and $2x + 3y + 4z = 12$ 5M

4(a) Evaluate $\int_0^{\frac{\pi}{2}} \int_0^{a \sin\theta} \int_0^{\frac{a^2-r^2}{2}} r \, dz \, dr \, d\theta$. 5M



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(b) Evaluate $\int_0^4 \int_{\frac{y^2}{4}}^y \frac{y}{x^2+y^2} dx dy$ 5M

5(a) Evaluate $\int_0^a \int_x^a (x^2 + y^2) dy dx$ by changing the order of integration. 5M

(b) Evaluate $\iint (x^2 + y^2) dx dy$ in the positive quadrant for which $x + y \leq 1$. 5M

UNIT – IV:

1(a) Show that $\int_0^\infty \sqrt{x} e^{-x^3} dx = \frac{\sqrt{\pi}}{3}$ 5M

(b) Show that $\int_0^\infty \frac{x^{m-1}}{(a+bx)^{m+n}} dx = \frac{\beta(m,n)}{a^n b^m}$ 5M

2(a) Prove that $\Gamma(n)\Gamma(n-1) = \frac{\pi}{\sin n\pi}$ 5M

(b) Prove that $\int_0^{\frac{\pi}{2}} \sqrt{\cos x} dx \int_0^{\frac{\pi}{2}} \frac{dx}{\sqrt{\cos x}} = \pi$ 5M

3(a) Evaluate $\int_0^1 \frac{x^4(1+x^5)}{(1+x)^{15}} dx$ 5M

(b) Evaluate $\int_5^7 (x-5)^6(7-x)^3 dx$ using β and Γ functions. 5M

4(a) Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$ 5M

(b) Show that $B(m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$ where $m > 0, n > 0$. 5M

5(a) Evaluate $\int_0^{\pi/2} \sin^5 \theta \cos^{7/2} \theta d\theta$. 5M

(b) Evaluate $\int_0^1 x^4 \left(\log \frac{1}{x}\right)^3 dx$ 5M

6(a) Evaluate $\int_0^1 \frac{xdx}{\sqrt{1-x^5}}$. 5M

(b) Evaluate $\int_0^\infty x^2 e^{-x^2} dx$. 5M



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UNIT- V :

1(a) Find unit normal vector to the surfaces $x^2y + 2xz^2 = 8$ at the point (1,0,2) 5M

(b) Prove that $\text{div.}(gradr^m) = m(m+1)r^{m-2}$ 5M

2(a) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point (2, -1, 2). 5M

(b) If \vec{A} is irrotational, evaluate $\text{div}(\vec{A} \times \vec{r})$ where $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ 5M

3(a) Find $\text{div}\vec{F}$, where $\vec{F} = r^n\vec{r}$. Find n if it is solenoidal. 5M

(b) Show that $\vec{F} = (y^2 - z^2 + 3yz - 2x)\vec{i} + (3xz + 2xy)\vec{j} + (3xy - 2xz + 2z)\vec{k}$ is both irrotational and Solenoidal. 5M

4(a) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at (1,-2,-1) in the direction of $2\vec{i} - \vec{j} - 2\vec{k}$ 5M

(b) Show that the vector $(x^2 - yz)\vec{i} + (y^2 - zx)\vec{j} + (z^2 - xy)\vec{k}$ is irrotational and find its scalar potential. 5M

5(a) Show that $\nabla^2(f(r)) = \frac{d^2f}{dr^2} + \frac{2}{r} \frac{df}{dr}$ or $f''(r) + \frac{2}{r} f'(r)$ where $r = |\vec{r}|$. 5M

(b) Prove that $\text{div}(\vec{a} \times \vec{b}) = \vec{b} \cdot \text{curl}\vec{a} - \vec{a} \cdot \text{curl}\vec{b}$ 5M

UNIT – VI

1(a) Use Greens theorem to evaluate $\int (2xy - x^2)dx + (x^2 + y^2)dy$, where c is the closed curve of the region bounded by $y = x^2$ and $y^2 = x$. 5M

(b) State Gauss divergence theorem and verify $\vec{F} = 4xz\vec{i} - y^2\vec{j} + zy\vec{k}$ over the cube $x = 0$ & $x = 1, y = 0$ & $y = 1, z = 0$ & $z = 1$. 5M

2(a) Evaluate $\int (e^x dx + 2ydy - dz)$ where c is the curve $x^2 + y^2 = 9, z = 2$, by using Stoke's theorem. 5M

(b) Compute $\int (ax^2 + by^2 + cz^2)ds$ over the surface of the sphere $x^2 + y^2 + z^2 = 1$. 5M



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3(a) If $\vec{F} = (3x^2 + 6y)\vec{i} - 14yz\vec{j} + 20xz\vec{k}$ then evaluate $\int \vec{F} \cdot d\vec{r}$ from (0,0,0) to (1,1,1) along $x = t, y = t^2, z = t^3$. 5M

(b) Apply stoke's theorem to evaluate $\int (ydx + zdy + xdz)$ where c is the curve of intersection of the sphere $x^2 + y^2 + z^2 = a^2$ and $x + z = a$. 5M

4(a) State stoke's theorem, and verify for $\vec{F} = (x + y)\vec{i} + (y + z)\vec{j} - x\vec{k}$ and S is the Surface of the plan $2x + y + z = 2$ which is in the first octant. 5M

(b) Using divergence theorem to evaluate $\iint \vec{F} \cdot d\vec{s}$ where $\vec{F} = x^3\vec{i} + y^3\vec{j} + z^3\vec{k}$ and S is surface of the sphere $x^2 + y^2 + z^2 = r^2$. 5M

5(a) Verify Green's theorem in the plan for $\int (x^2 - xy^3)dx + (y^2 - 2xy)dy$ where C is the square with vertices (0,0), (2,0), (2,2), (0,2) 5M

(b) Evaluate by Green's theorem $\oint (y - \sin x)dx + \cos x dy$ where C is the triangle enclosed by the lines $y = 0, x = \frac{\pi}{2}, y = 2x$. 5M