

I B. Tech II Semester Regular Examinations, April/May - 2017**APPLIED CHEMISTRY**

(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. Answering the question in **Part-A** is Compulsory
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Differentiate emulsion and suspension polymerization with examples. (2M)
- b) Why net calorific value (NCV) is less than gross calorific value (GCV)? (2M)
- c) Explain differential aeration corrosion with one example. (2M)
- d) Draw and explain the structure of fullerene. (2M)
- e) Write the applications of Hall-Effect. (2M)
- f) What are electrical insulators? Give their applications. (2M)
- g) Write the principle involved in Batteries. (2M)

PART -B

2. a) Bring out the difference between thermoplastics and thermosetting plastics with suitable examples. (8M)
- b) Explain the following i) Biodegradable polymers ii) Vulcanization of natural rubber. (6M)
3. a) Name the different types of coals? Explain the proximate analysis of coal and write its significance. (8M)
- b) Define the octane number of gasoline .what is its significance and how is it measured? Why ethylene di bromide is added when TEL is used as an antiknock reagent? (6M)
4. a) What are nano materials? How to characterise nano materials by BET and TEM methods? (8M)
- b) Explain the following i) Green synthesis principles ii) Applications of Super conductors (6M)
5. a) Explain the construction, working and applications of photo voltaic cell. (8M)
- b) Which type of non conventional energy source you prefer for the generation of energy? How to construct it and its importance? (6M)
6. a) What are the insulators? Write about electrical and electronic applications of Insulators? (10M)
- b) What are semiconductors and P-n junction diode? (4M)
7. a) What are batteries ?Explain the principle ,construction, working and application of Ni-metal hydride cell. (8M)
- b) Write about cathodic protection methods to control corrosion? Explain with suitable examples. Differentiate galvanizing and tinning. (6M)



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PART -A

1. a) Why conducting polymers shows conductivity? Give examples. (2M)
- b) What is power alcohol? Write its applications. (2M)
- c) What is electrode potential? What is the effect of electrolyte concentration on electrode potential? (2M)
- d) Define R_4M_4 principle of green synthesis. (2M)
- e) Differentiate Ferro and Ferri magnetism. (2M)
- f) What is tidal energy? Write any two conditions to generate tidal energy. (2M)
- g) Discuss the phenomenon of metal Cladding with suitable examples. (2M)

PART -B

2. a) Explain chain growth and step growth polymerization with suitable examples. (8M)
- b) What are Elastomers? Explain preparation, properties and engineering applications of Thiokol rubber. (6M)
3. a) Differentiate HCV and LCV? Explain with neat diagram how to determine calorific value by bomb calorimeter. (10M)
- b) What are explosives? Explain the classification and discuss about RDX and TNT (4M)
4. a) What are nano materials? How to prepare Nano materials with chemical reductions method? Explain how Nano materials are taking major role in medical field. (8M)
- b) What are the super conductors? Explain properties of type-1 and type-2 super conductors (6M)
5. a) Explain differences between conventional and non conventional energy sources. (8M)
- b) Explain the construction, working and applications of methanol – oxygen fuel cell. Write short notes on Biofuels. (6M)
6. a) Explain Hall effect and its applications. (8M)
- b) Discuss the structure of cesium chloride with neat diagram. (6M)
7. a) What is electro chemical series? Discuss its significance. (8M)
- b) Explain the principle involved in batteries. Differentiate electroplating and electro less plating of corrosion control. (6M)



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PART -A

1. a) What is heterogeneous polymerization? Explain about suspension polymerization. (2M)
- b) Differentiate between HDPE and LDPE. (2M)
- c) What is refining? Why petroleum is subjected to refining? (2M)
- d) Write the composition of LPG and CNG. (2M)
- e) What is electro less plating? What are its advantages over electroplating? (2M)
- f) Define Hall Effect. (2M)
- g) What are the applications of solar energy? (2M)

PART -B

2. a) Discuss about the preparation and engineering applications of Teflon, Bakelite and Thiokol rubber. (8M)
- b) Write a note on biodegradable polymers. (6M)
3. a) Define L.C.V and H.C.V. How these are related. A gas has the following composition by volume $H_2 = 22\%$, $CH_4 = 4\%$, $CO = 20\%$, $CO_2 = 6\%$, $O_2 = 3\%$ and $N_2 = 45\%$. If 25 % excess air is used. Find the actual weight of air supplied per m^3 of this gas. (8M)
- b) How explosives are classified? Write about RDX, TNT. (6M)
4. a) Write about the construction and working of calomel electrode. Give a neat sketch. (8M)
- b) Explain about
 - i) Water line corrosion.
 - ii) Sacrificial anodic protection.
 - iii) Electro less plating
5. a) How do you characterise nonomaterials by BET method? (8M)
- b) How green chemical methods are superior over conventional methods in organic synthesis? Explain with examples. (6M)
6. a) What are magnetic materials? Explain. (8M)
- b) Explain with suitable examples about the BCC, FCC structure and spinels. (6M)
7. a) What is photo voltaic cell? Explain the principle of working. (8M)
- b) What are the non-conventional energy sources? Discuss about geothermal energy. (6M)



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PART -A

1. a) What are plastics? How do they differ from fibers and elastomers? (2M)
- b) What are conducting polymers? Give the applications of conducting polymers. (2M)
- c) What is RDX and TNT? Write their uses. (2M)
- d) Give about cetane number. (2M)
- e) Write any three differences between galvanic cell and electrolytic cell. (2M)
- f) What are electrical insulators? Give their applications. (2M)
- g) Give the importance of photo voltaic cells. (2M)

PART -B

2. a) How are the plastics fabricated by compression and injection molding methods? (8M)
- b) What are the conducting polymers? Why the polymers becomes conducting? (6M)
Explain by taking Poly acetylene as an example.
3. a) What are the advantages of liquid fuels? (8M)
- b) Explain about Fisher-Tropsch's process. What are rocket fuels? Give examples. (6M)
4. a) Explain about cathodic protection methods with suitable examples. (10M)
- b) What are the characteristic of a battery? Explain Ni-Cd cell, its constructions and working. (4M)
5. a) What are CNTs? Give their applications. (8M)
- b) Explain the principles of green synthesis. (6M)
6. a) How is the semi conductors prepared? (8M)
- b) Write a note on electrical and electronic applications of insulators. Give the applications of Ferro magnetic materials. (6M)
7. a) Give the applications of solar energy. (8M)
- b) How do non-conventional energy sources differ from conventional energy sources? Write about tidal wave power. (6M)



Code No: R161201

R16

SET - 1

I B. Tech II Semester Regular Examinations, April/May - 2017
ENGLISH-II
(Com. to All Branches)

Time: 3 hours

Max. Marks: 70

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

PART -A

1. a) What is the layman's view of atomic bomb? How right is he in thinking so? (2M)
- b) Define culture shock with various symptoms of it. (2M)
- c) What is public health surveillance and why is it important? (2M)
- d) What was the program Gates developed along with his friend and how did he market it? (2M)
- e) What were Kalam's contributions to DRDO? (2M)
- f) Name any two European scientists Bhabha was associated with and their contributions to the scientific world. (2M)
- g) What was Branley's experiment and what is its importance? (2M)

PART -B

2. a) How is the knowledge given by science different from what is acquired through education? Give examples from your learning experiences to support your answer. (5M)
- b) Mention any four great qualities of Dr. Kalam that made the world recognize him as a great scientist and leader. (4M)
- c) Write a letter to the Regional Manager of South Central Railways, Vijayawada complaining about the luggage/parcel you have not received which your friend has sent from IIT Mumbai. (5M)
3. a) Who do you think is to be held responsible for the destruction created by technology? Support your opinion with suitable examples. (5M)
- b) Write an email to your principal with a copy to your head of the department, asking him/her to permit your class to go on an industrial & educational tour for a week. (4M)
- c) List out the awards and achievements of Sir C.V. Raman. (5M)



4. a) How should one avoid culture shock before experiencing it when one goes to a new place? What precautions would help in living peacefully in a new place of new culture? (5M)
- b) **Fill in the blanks with suitable forms of the verbs given in the parenthesis.** (4M)
She _____ (look) for a house for the past one month. Finally, she _____ (find) one that suits her requirements. She _____ (want) a house that has a small garden and space to _____ (park) her car. She _____ (say) she _____ (love) to live in a house that _____ (have) cross ventilation. She _____ (move) into it tomorrow.
- c) Name the discoveries and inventions that Bhabha was associated with. How did they help him contribute better to our country? (5M)
5. a) How did lottery in the village change the lives of the people? What could be done to make the villagers' lives better? (5M)
- b) Why and how do you think J.C.Bose remained an ideal scientist in principle and practice? State instances from his life that support your opinion. (4M)
- c) Write an essay on "Importance of Technical Education" in about 300 to 350 words. (5M)
6. a) What kind of health problems are common in India in relation to climate changes? What steps are to be taken by the public and government to prevent health hazards caused due to climate changes? (5M)
- b) Give a note on P.C. Ray's discoveries and their properties. (5M)
- c) **Give one word substitutes for the following and use the word in your own sentence:** (4M)
i) Hard to please
ii) A great lover of books
iii) Having a ready disposition to fight
iv) Someone who is the first to think/make something
7. a) What do you think are the qualities of Bill Gates that made him a successful professional? Give examples from the text to support your answer. (5M)
- b) How did Hardy help Ramanujan personally and professionally? (5M)
- c) **Rewrite the following sentences correcting the errors:** (4M)
i) I started late at my house. Thought I can take a cab to reach my office in time.
ii) He plays football when he was free.
iii) He drunk coffee everyday when he was young.
iv) Had your breakfast in the morning?



I B. Tech II Semester Regular Examinations, April/May – 2017
ENGLISH-II
 (Com. to All Branches)

Time: 3 hours

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**PART -A**

1. a) What is the foremost task of education according to the text “The Greatest Source- Education”? (2M)
- b) How is the attitude of the local people towards a person who is under culture shock? (2M)
- c) Who is Paul Allen and how did he contribute to Microsoft? (2M)
- d) Explain the process of lottery in the village and state whether it is democratic. (2M)
- e) What is Kalam’s role in SLV-3 project that made it successful? (2M)
- f) Explain Raman Effect. (2M)
- g) What were the unique achievements of Ramanujan? (2M)

**PART -B**

2. a) Does our education system help us find the difference between science and education? Give reasons to support your point of view. (4M)
- b) What qualities of Abdul Kalam made him the world’s admirable scientist? How do you think he has developed them? (5M)
- c) Write a dialogue between you and your friend who has come from a school where he is not very much exposed to English. He feels he is not fit for the course and needs to quit. However, his previous ranks and marks show that he is brilliant. Convince him instilling some courage using your soft skills. (Your dialogue cannot be less than 10 exchanges-A+B) (5M)
3. a) Who is to be held responsible for the destructive use of scientific inventions- science or people? Give reasons/examples to support your opinion. (5M)
- b) What were Raman’s contributions to Indian Institute of Sciences? (5M)
- c) Write an email to the regional manager of Samsung, complaining about the malfunctioning of the refrigerator you bought last month. The service center manager refused to take up the issue as the product is in the guarantee period. Give details of your gadget and request for immediate action. (4M)



4. a) Why and when do variations in cultures lead to a shock to new comers? How do you think one can avoid any kind of culture shock? (5M)
- b) Why did Bhabha initiate Indian Nuclear programme? Do you think it is realistic and necessary for a country like India? Give reasons. (5M)
- c) **Fill in the blanks with suitable forms of the verbs given in the parenthesis.** (4M)  
I \_\_\_\_\_ (wait) for this news for the past one week. Finally, it \_\_\_\_\_ (come) but none \_\_\_\_\_ (be) ready to accept it. Our teacher \_\_\_\_\_ (leave) us to \_\_\_\_\_ (join) her family in Chennai. She \_\_\_\_\_ (tell) me this a week ago but did not officially announce. She \_\_\_\_\_ (vacate) her house tomorrow. So we \_\_\_\_\_ (think) of giving her a farewell today evening.
5. a) Is lottery morally justified? Give reasons with examples from the story “The Lottery”. (5M)
- b) Why did J.C.Bose remain against patenting his inventions? (5M)
- c) Write an essay on “Importance of Digital Literacy in Rural India”. (4M)
6. a) What are the different measures the author talks about to manage health problems caused due to climate changes? (5M)
- b) What were the achievements and awards won by P.C. Ray? How did they contribute to the scientific world? (5M)
- c) **Give one word substitutes for the following and use the word in your own sentence:** (4M)  
i) A remedy for all diseases  
ii) One who can speak two languages  
iii) A word opposite in meaning  
iv) A person who never drinks alcohol
7. a) What do you think is the role of Gates parents in his success? Can similar kind of home environment lead to anyone’s success? Give reasons. (5M)
- b) What were the circumstances that helped Ramanujan go to England and why did he return to India? (5M)
- c) **Rewrite the following sentences correcting the errors:** (4M)  
i) I waved at my friend’s car. Thought he will stop to pick me up.  
ii) They gathered under the tree and discusses the agenda of the meeting.  
iii) She sung a very melodious song yesterday in the competition.  
iv) You saw the doctor yesterday?





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**ENGLISH-II**

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**PART -A**

1. a) What is the scientific dilemma a layman is linked with and why? (2M)
- b) What is the role of language in helping us recover from culture shock? (2M)
- c) How is temperature directly related to the death rate of a place? (2M)
- d) What did Gates feel about the free distribution of his software and what did he write in his open letter? (2M)
- e) How was Kalam involved with Pokhran-II project? (2M)
- f) How was TIFR founded and what were its research areas? (2M)
- g) Name the top most award in the field of science that Bose received. What was it given for? (2M)

**PART -B**

2. a) Describe how education can be the greatest source for civilization. Give suitable examples to support your answer. (5M)
- b) Why do you think Dr. Kalam was nominated as President of India unanimously? Give reasons highlighting his qualities/characteristics. (4M)
- c) You are the president of the students' union of your college. Write a letter to the officer-in-charge of the hostels of your college explaining the problems faced by the students. Suggest some solutions and request for immediate action. (5M)
3. a) Is it possible to have a scientific invention without any evil effects? Support your answer with suitable examples from our day to day use of scientific inventions. (5M)
- b) Was Raman's career as a scientist a smooth one? Give reasons to support your answer. (5M)
- c) Write an email to your district collector asking him to provide more beds and a proper qualified doctor at all the health centers in the rural places of your district which would improve the living conditions in the villages. (4M)



4. a) How is culture shock caused and what are the various strategies a person can adopt to overcome culture shock? (5M)
- b) How did Bhabha contribute to Atomic Energy Commission in India? (5M)
- c) **Fill in the blanks with suitable forms of the verbs given in the parenthesis.** (4M)  
She \_\_\_\_\_ (look) for a house for the past one month. Finally, she \_\_\_\_\_ (find) one that suits her requirements. She \_\_\_\_\_ (want) a house that has a small garden and space to \_\_\_\_\_ (park) her car. She \_\_\_\_\_ (say) she \_\_\_\_\_ (love) to live in a house that \_\_\_\_\_ (have) cross ventilation. She \_\_\_\_\_ (move) into it tomorrow.
5. a) Explain the practice of lottery in the village. Do you think it is the right one? Give reasons to support your opinion. (5M)
- b) Mention the famous devices designed by J.C.Bose. Describe their functioning and importance. (5M)
- c) Write an essay on "Importance of Protecting One's Culture". (4M)
6. a) What kind of health problems do Indians face due to climate changes? How can they be prevented? (5M)
- b) Give details of contributions of P.C Ray as a scientist, entrepreneur and socialist to India. (5M)
- c) **Give one word substitutes for the following and use the word in your own sentence:** (4M)  
i) Detailed plan of a journey  
ii) Person who works in the same department/office  
iii) One who travels in space  
iv) A small shop that sells fashionable clothes, cosmetics etc.
7. a) Explain the social services rendered by Bill Gates as Philanthropist. (5M)
- b) What were the strengths and weaknesses of Ramanujan as a mathematician according to Hardy? (5M)
- c) **Rewrite the following sentences correcting the errors:** (4M)  
i) I keep smiling at the blind man at the bus stop. Although I knew he cannot see my smile.  
ii) She looked at the cake and immediately orders for it.  
iii) She written the report yesterday.  
iv) Had your lunch in the afternoon?



Code No: R161201

**R16**

**SET - 4**

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**ENGLISH-II**  
(Com. to All Branches)

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Max. Marks: 70

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- ~~~~~

**PART -A**

1. a) Why does the author say that the 'know-how' produced by science and technology is an 'unfinished sentence'? (2M)
- b) How can one control air pollution and manage it? (2M)
- c) How do people express their culture shock? (2M)
- d) What is public health surveillance and why is it important? (2M)
- e) What was Kalam's role in building indigenous rockets in India? (2M)
- f) Describe the work of Raman that made him to achieve the Noble Prize. (2M)
- g) Name some awards P. C. Ray won. What were they given for? (2M)

**PART -B**

2. a) What is the prime source for civilizations to come into existence and disappear? Do you agree with the author's argument? Justify. (5M)
- b) Why do you think Dr. Kalam is called "The Missile Man of India"? How did his scientific contributions help our country? (5M)
- c) Write a letter to the Editor of the Hindu newspaper stating the present hot summer days and the bad status of bus shelters that cannot give shade resulting in deaths due to sunstroke at many places. (4M)
3. a) Describe any modern invention that the present generation is obsessed with. Write the positive and negative effects it has on the society. Who should be praised or held responsible for these effects? (5M)
- b) What were the challenges Raman faced in his life and career? How did he overcome them? (5M)
- c) Write an email to the regional manager of Whirlpool, complaining about the malfunctioning of the washing machine you bought last month. The service center manager refused to take up the issue as the product is in the guarantee period. Give details of your gadget and request for immediate action. (4M)



4. a) Elaborate with examples on how language variations contribute to culture shock. (5M)  
b) How did Bhabha's education help him contribute better to our country's scientific and academic progress? (5M)  
c) **Fill in the blanks with suitable forms of the verbs given in the parenthesis.** (4M)  
I \_\_\_\_\_ (wait) for this news for the past one week. Finally, it \_\_\_\_\_ (come) but none \_\_\_\_\_ (be) ready to accept it. Our teacher \_\_\_\_\_ (leave) us to \_\_\_\_\_ (join) her family in Chennai. She \_\_\_\_\_ (tell) me this a week ago but did not officially announce. She \_\_\_\_\_ (vacate) her house tomorrow. So we \_\_\_\_\_ (think) of giving her a farewell today evening.
5. a) What is black box in the story "The Lottery"? Who made it? When and why is it significant? (5M)  
b) How could J.C. Bose establish the harmony between the living and non-living worlds? (5M)  
c) Write an essay on "Making India a Developed Country" (4M)
6. a) Suggest some traditional measures to manage health problems caused due to climate changes? (5M)  
b) How and when could P.C. Ray help his village people? (5M)  
c) **Give one word substitutes for the following and use the word in your own sentence:** (4M)  
i) Incapable of being seen through  
ii) One who talks to people to help solve their problems  
iii) One who talks in sleep  
iv) That which can be easily broken
7. a) When and how did Bill Gates start building his own empire of business? Give the details of each stage. (5M)  
b) How do you justify Srinivasa Ramanujan's birthday being celebrated as Mathematics day in India? (5M)  
c) **Rewrite the following sentences correcting the errors:** (4M)  
i) I gave a good gift to my friend. Which I bought in Dubai.  
ii) They ride through the tunnel and stopped at the other end.  
iii) The peon rung the bell when the clock showed 12.  
iv) You came to see me now?



Code No: R161212

**R16**

**SET - 1**

**I B. Tech II Semester Regular Examinations, April/May - 2017**  
**ENVIRONMENTAL STUDIES**  
(Com. to ECE, CSE, EIE, IT, ECC)

Time: 3 hours

Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**  
3. Answer any **FOUR** Questions from **Part-B**

**PART -A**

1. a) Write about ecological succession. (2M)
- b) Explain the concept of food chain. (2M)
- c) What are the methods of conserving water resources? (2M)
- d) Define biodiversity. (2M)
- e) Write the classification of municipal solid waste. (2M)
- f) List out the different types of land pollution. (2M)
- g) Write about EIA. (2M)

**PART -B**

2. a) What are the structure and function of an ecosystem? (7M)
- b) Write about Role of IT in Environment and human health. (7M)
3. a) Describe various renewable sources of energy. (7M)
- b) What are the methods of conservation soil erosion? (7M)
4. a) What is biodiversity at global, national and local levels? (7M)
- b) Write about endangered and endemic species of India. (7M)
5. a) Write about classification and effects of urban and industrial solid waste. (7M)
- b) Write the causes and effects and control methods of Air Pollution. (7M)
6. a) Mention the different environmental acts and write about Water Act. (7M)
- b) Discuss about Environmental ethics and issues connected. (7M)
7. a) Define EIA and describe various stages of EIA along with methodologies. (7M)
- b) Discuss EIA of a major thermal power project, as a case study. (7M)



Code No: R161212

**R16**

**SET - 2**

**I B. Tech II Semester Regular Examinations, April/May - 2017**  
**ENVIRONMENTAL STUDIES**  
(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 **FOUR** Questions from **Part-B**

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PART -A

1. a) Differentiate between primary succession and secondary succession. (2M)
- b) Define food chain and ecological pyramids. (2M)
- c) Write about man induced landslides. (2M)
- d) What is meant by extinction of a species? (2M)
- e) Write about e – waste management. (2M)
- f) List out salient features of forest conservation act. (2M)
- g) Write about environmental audit. (2M)

PART -B

2. a) What are the structure and function of an ecosystem? (7M)
- b) Write about ecological succession. (7M)
3. a) What are the effects of dams on forest and tribal people? (7M)
- b) What is role of an individual in conservation of natural resources? (7M)
4. a) What are different threats to bio diversity? (7M)
- b) Discuss RAMSAR convention. (7M)
5. a) Mention about different types of pollution briefly. (7M)
- b) Name different types of air pollutants and sources of air pollution. (7M)
6. a) Write about rain water harvesting. (7M)
- b) Write about Water (Prevention and control of Pollution) Act. (7M)
7. a) Write about Impact Assessment and its significance. (7M)
- b) What are the stages involved in EMP and EIS? (7M)



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ENVIRONMENTAL STUDIES
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PART -A

1. a) What is primary productivity? (2M)
- b) What are the causes of acid rains? (2M)
- c) Discuss about benefits of Dam construction. (2M)
- d) Write about man and wild life conflicts. (2M)
- e) Write about the sources of water pollution. (2M)
- f) Write about Urban problems related to energy. (2M)
- g) Write about environmental audit. (2M)

PART -B

2. a) Define environment. Write about global warming and climate changes. (7M)
- b) Write about energy flow in ecosystem. (7M)
3. a) What is deforestation? What are the causes of deforestation? (7M)
- b) Write about use and over utilization of ground water. (7M)
4. a) What is biodiversity at global, national and local levels? (7M)
- b) Write about endangered and endemic species. (7M)
5. a) Name different types of air pollutants and sources of air pollution. (7M)
- b) What are the various methods of safe disposal of hazardous waste management? (7M)
Discuss.
6. a) Write about rain water harvesting concept and its advantages. (4M)
- b) What are the major issues and problems related to Resettlement and Rehabilitation of displaced people during river valley projects? (10M)
7. a) Define and Discuss ecotourism. (7M)
- b) Write about the – Green business and Green politics. (7M)



Code No: R161212

R16

SET - 4

I B. Tech II Semester Regular Examinations, April/May - 2017
ENVIRONMENTAL STUDIES
(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 **FOUR** Questions from **Part-B**
- ~~~~~

PART -A

1. a) Explain the concept of food chain and ecological niche. (2M)
- b) Write about energy flow in ecosystem. (2M)
- c) What are the conflicts over dams? Give an example. (2M)
- d) Write about genetic diversity. (2M)
- e) Write the classification of solid waste. (2M)
- f) Discuss the problems involved in enforcement of Environmental Legislation. (2M)
- g) Write the various stages of EIA. (2M)

PART -B

2. a) Write about Global warming and climate change. (7M)
- b) Write in detail about forest ecosystem. (7M)
3. a) Write in detail about energy resources. (7M)
- b) What is Waste land reclamation? (7M)
4. a) India a biodiversity nation-Explain. (7M)
- b) What are the different uses of biodiversity? (7M)
5. a) What are the causes, effects and control measures of noise pollution? (7M)
- b) What are the causes, effects and control measures of water pollution? (7M)
6. a) Write about environmental ethics. (4M)
- b) What are different acts and explain about any one act in detail? (10M)
7. a) What are the stages involved in preparation of EMP and EIS? (7M)
- b) Brief about Environmental audit. (7M)



I B. Tech II Semester Regular Examinations, April/May – 2017
MATHEMATICS-III

(Com. to CE, EEE, ME, ECE, CSE, CHEM, EIE, IT, ECC, AE, AME, MM, PE, PCE, MET, AGE)

Time: 3 hours

Max. Marks: 70

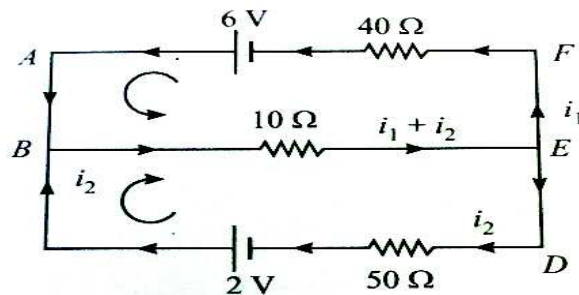
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is Compulsory
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Find the rank of a matrix $A = \begin{bmatrix} -1 & 2 & 1 & 8 \\ 2 & 1 & -1 & 0 \\ 3 & 2 & 1 & 7 \end{bmatrix}$ (2M)
- b) Prove that if λ is an eigen value of a matrix A then λ^{-1} is an eigen value of the matrix A^{-1} if it exists. (2M)
- c) Evaluate $\int_0^1 \int_0^1 \int_{\sqrt{x^2+y^2}}^y xyz \, dz dy dx$. (2M)
- d) Find the value of $\Gamma\left(\frac{5}{2}\right)$. (2M)
- e) Find the angle between the surface $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at (2, -1, 2). (2M)
- f) If $\vec{F} = (5xy - 6x^2)\vec{i} + (2y - 4x)\vec{j}$ then evaluate $\int \vec{F} \cdot d\vec{R}$ along the curve $y = x^3$ from the point (1, 1) to (2, 8). (2M)
- g) Write the quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 1 & 0 & 4 \\ 0 & -2 & -1 \\ 4 & -1 & 3 \end{bmatrix}$. (2M)

PART -B

2. a) Solve the system of equations $20x + y - 2z = 17, 3x + 20y - z = -18, 2x - 3y + 20z = 25$ by Gauss Jacobi method. (7M)
- b) Find the currents in the following circuit (7M)



3. a) Verify Cayley-Hamilton theorem and find the inverse of the matrix (7M)
- $$A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$$
- b) Reduce the quadratic form $2x^2 + 2y^2 + 2z^2 - 2xy - 2yz - 2zx$ to canonical form by orthogonal transformation and hence find rank, index, signature and nature of the quadratic form. (7M)
4. a) Trace the curve $r^2 = a^2 \cos 2\theta$. (7M)
- b) Evaluate $\int_0^a \int_{\frac{x}{2}}^{2a-x} x y^2 dy dx$ by changing the order of integration. (7M)
5. a) Express $\int_0^1 x^m (1-x^n)^p dx$ in terms of Γ functions and hence evaluate $\int_0^1 x^5 (1-x^3)^{10} dx$. (6M)
- b) Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 \theta \cos^7 \theta d\theta$ by using β, Γ functions. (4M)
- c) Express $\int_0^4 \sqrt{x}(4-x)^{3/2} dx$ in terms of β function. (4M)
6. a) Show that the vector field $\vec{F} = (x^2 - yz)\vec{i} + (y^2 - zx)\vec{j} + (z^2 - xy)\vec{k}$ is conservative and find the scalar potential function corresponding to it. (7M)
- b) Show that $\nabla \cdot (\vec{F} \times \vec{G}) = \vec{G} \cdot (\nabla \times \vec{F}) - \vec{F} \cdot (\nabla \times \vec{G})$ (7M)
7. State Stoke's theorem and verify the theorem for $\vec{F} = (x+y)\vec{i} + (y+z)\vec{j} - x\vec{k}$ and S is the surface of the plane $2x + y + z = 2$, which is in the first octant. (14M)



I B. Tech II Semester Regular Examinations, April/May – 2017
MATHEMATICS-III

(Com. to CE, EEE, ME, ECE, CSE, CHEM, EIE, IT, ECC, AE, AME, MM, PE, PCE, MET, AGE)

Time: 3 hours

Max. Marks: 70

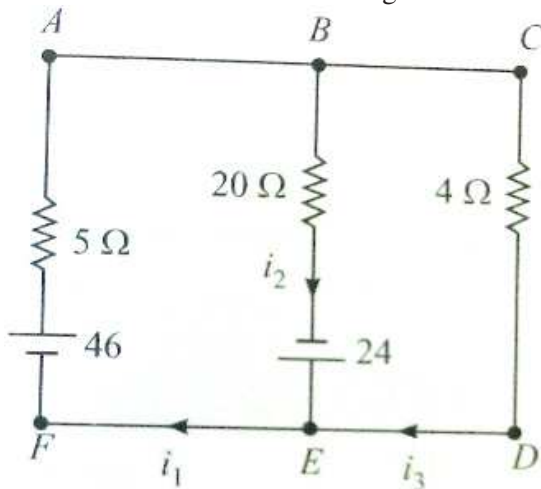
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is Compulsory
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Determine the rank of a matrix $A = \begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$. (2M)
- b) Use Cayley-Hamilton theorem to find A^8 if $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$. (2M)
- c) Evaluate $\int_0^1 \int_0^1 \int_0^y xyz \, dx dy dz$. (2M)
- d) Find the value of $\Gamma\left(-\frac{5}{2}\right)$. (2M)
- e) Find unit normal vector to the surface $x^2y + 2xz^2 = 8$ at the point $(1, 0, 2)$. (2M)
- f) 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 the path $x = t, y = t^2, z = t^3$. (2M)
- g) Write the quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 0 & 5/2 & 3 \\ 5/2 & 7 & 1 \\ 3 & 1 & 2 \end{bmatrix}$ (2M)

PART -B

2. a) Show that the system of equations is consistent (7M)
 $2x - y - z = 2, x + 2y + z = 2, 4x - 7y - 5z = 2$ and solve.
- b) Find the currents in the following circuit (7M)



3. a) Reduce the quadratic form $6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 - 2x_2x_3 + 4x_1x_3$ to canonical form and hence state nature, rank, index and signature of the quadratic form. (7M)
- b) Determine the natural frequencies and normal modes of a vibrating system for which mass $m = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ and stiffness $k = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$. (7M)
4. a) Trace the curve $y^2(2a - x) = x^3$. (7M)
- b) Evaluate $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$ by changing in to polar coordinates and hence deduce $\int_0^\infty e^{-x^2} dx = \frac{\sqrt{\pi}}{2}$. (7M)
5. a) Show that $\beta(m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$. (6M)
- b) Evaluate $\int_0^\pi \sin^4\theta \cos^2\theta d\theta$ by using β, Γ functions. (4M)
- c) Express $\int_0^1 \frac{1}{(1-x^3)^{1/3}} dx$ in terms of β function. (4M)
6. a) Show that the vector field $\vec{F} = (x^2 + xy^2)\vec{i} + (y^2 + x^2y)\vec{j}$ is conservative and find the scalar potential function. (7M)
- b) Show that $\nabla(\nabla \cdot \vec{F}) = \nabla \times (\nabla \times \vec{F}) + \nabla^2 \vec{F}$. (7M)
7. State Greens theorem in plane and verify the theorem for $\oint_C [(y - \sin x)dx + \cos x dy]$, where C is the plane triangle formed by the lines $y = 0, x = \frac{\pi}{2}, y = \frac{2}{\pi}x$. (14M)



I B. Tech II Semester Regular Examinations, April/May – 2017
MATHEMATICS-III

(Com. to CE, EEE, ME, ECE, CSE, CHEM, EIE, IT, ECC, AE, AME, MM, PE, PCE, MET, AGE)

Time: 3 hours

Max. Marks: 70

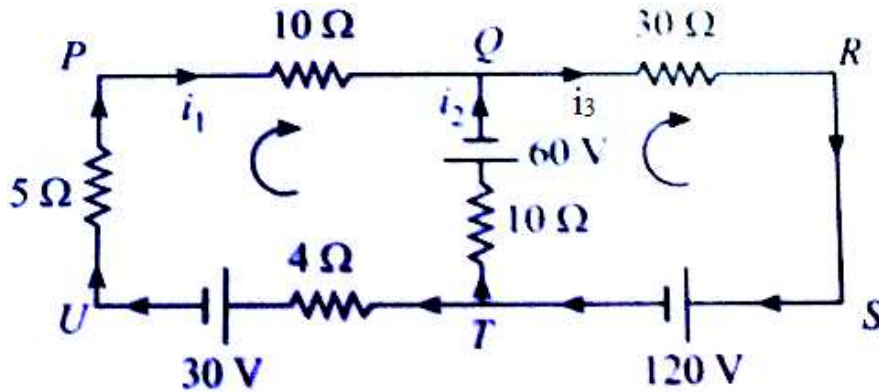
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PART -A

1. a) Determine the rank of a matrix $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$. (2M)
- b) Use Cayley-Hamilton theorem and find A^{-1} if $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$. (2M)
- c) Evaluate $\int_0^{\frac{\pi}{2}} \int_0^{\frac{a^2-r^2}{a}} \int_0^{\frac{a^2-r^2}{a}} r \, dz \, dr \, d\theta$. (2M)
- d) Show that $\beta\left(\frac{1}{2}, \frac{1}{2}\right) = \pi$. (2M)
- e) Find directional derivative of $\phi = xy^2 + yz^2$ at the point (2,-1,1) in the direction of the vector $\bar{i} + 2\bar{j} + 2\bar{k}$. (2M)
- f) If $\bar{F} = (x^2 - y)\bar{i} + (2xz - y)\bar{j} + z^2\bar{k}$ then evaluate $\int_C \bar{F} \cdot d\bar{R}$ where C is the straight line joining the points (0, 0, 0) to (1, 2, 4). (2M)
- g) Write the quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 3 & 5 & 0 \\ 5 & 5 & 4 \\ 0 & 4 & 7 \end{bmatrix}$. (2M)

PART -B

2. a) Solve the system of equations $10x + y + z = 12$, $2x + 10y + z = 13$, $2x + 2y + 10z = 14$ by Gauss Seidel method. (7M)
- b) Find the currents in the following circuit (7M)



3. a) Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2xy - 2yz + 2zx$ to canonical form by orthogonal transformation and hence find the rank, index signature and nature of the quadratic form. (7M)
- b) Find the natural frequencies and normal modes of a vibrating system (7M)
 $mx'' + kx = 0$ for mass $m = \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$ and stiffness $k = \begin{bmatrix} 9 & -3 \\ -3 & 3 \end{bmatrix}$.
4. a) Trace the curve $a^2y^2 = x^2(a^2 - x^2)$. (7M)
- b) Evaluate $\int_0^1 \int_{\sqrt{y}}^{2-y} xy \, dx \, dy$ by changing the order of integration. (7M)
5. a) Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. (6M)
- b) Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 \theta \, d\theta$ by using β, Γ functions. (4M)
- c) Express $\int_0^1 \frac{x \, dx}{\sqrt{1+x^4}}$ in terms of β function. (4M)
6. a) Find the constants a, b such that the surfaces $5x^2 - 2yz - 9x = 0$ and $ax^2y + bz^3 = 4$ cut orthogonally at (1,-1,2). (7M)
- b) Show that $\nabla \times (\nabla \times \vec{F}) = \nabla(\nabla \cdot \vec{F}) - \nabla^2 \vec{F}$. (7M)
7. State Gauss divergence theorem in plane and verify the theorem for $\vec{F} = 4xz\vec{i} - y^2\vec{j} + zy\vec{k}$ over the cube $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$. (14M)



I B. Tech II Semester Regular Examinations, April/May – 2017
MATHEMATICS-III

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PART -A

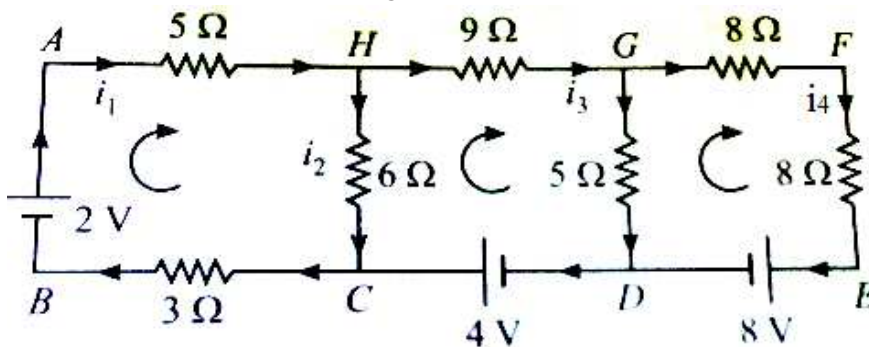
1. a) Find inverse of the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ by elementary operations. (2M)
- b) Prove that if λ is an eigen value of a matrix A then $\frac{|A|}{\lambda}$ is an eigen value of $\text{adj}A$. (2M)
- c) Evaluate $\int_0^1 \int_{y^2}^1 \int_0^{1-x} x \, dz \, dx \, dy$. (2M)
- d) Determine the value of $\beta(2, 3)$. (2M)
- e) Show that $\nabla f g = f \nabla g + g \nabla f$. (2M)
- f) If $\vec{F} = x^2 y^2 \vec{i} + y \vec{j}$ then evaluate $\int_C \vec{F} \cdot d\vec{R}$ where C is the curve $y^2 = 4x$ in the XY plane from (0, 0) to (4, 4). (2M)
- g) Write the quadratic form corresponding to the symmetric matrix (2M)

$$\begin{bmatrix} 2 & -3 & 5 \\ -3 & 2 & -2 \\ 5 & -2 & 2 \end{bmatrix}$$

PART -B

2. a) Solve the system of equations (7M)

$$x + 10y + z = 6, \quad 10x + y + z = 6, \quad x + y + 10z = 6$$
 by Gauss Seidel method.
- b) Find the currents in the following circuit (7M)



3. a) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence (7M)
find A^4 .
- b) Reduce the quadratic form $3x_1^2 + 5x_2^2 + 3x_3^2 - 2x_1x_2 - 2x_1x_3 + 2x_2x_3$ to (7M)
canonical form and hence state nature, rank, index and signature of the quadratic
form.
4. a) Trace the curve $r = a \sin 3\theta$. (7M)
- b) Evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} y \sqrt{x^2+y^2} dy dx$ by transforming to polar coordinates. (7M)
5. a) Establish a relation between β and Γ functions. (6M)
- b) Evaluate $\int_0^{\frac{\pi}{2}} \cos^7 \theta d\theta$ by using β, Γ functions. (4M)
- c) Express $\int_0^1 \frac{x dx}{\sqrt{1-x^5}}$ in terms of β function. (4M)
6. a) Find the angle between the surfaces $ax^2 + y^2 + z^2 - xy = 1$ and conservative (7M)
 $bx^2y + y^2z + z = 1$ at $(1, 1, 0)$.
- b) Show that $\vec{F} = (y^2 - z^2 + 3yz - 2x)\vec{i} + (3xz + 2xy)\vec{j} + (3xy - 2xz + 2z)\vec{k}$ (7M)
is both solenoidal and irrotational.
7. a) State Greens theorem in plane and apply the theorem to evaluate $\oint_C x^2y dx + (7M)$
 y^3dy , where C is the closed path formed by $y = x$, $y = x^3$ from $(0, 0)$ to $(1, 1)$.
- b) Evaluate $\int_S \vec{F} \cdot \vec{dS}$ using Gauss divergence theorem, where $\vec{F} = 2xy\vec{i} + yz^2\vec{j}$ (7M)
 $+ z\vec{k}$ and S is the surface of the region bounded by $x = 0$, $y = 0$, $z = 0$,
 $x + 2z = 6$.

