Code No: R161106   **R16**   SET - 1

I B. Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2017
APPLIED CHEMISTRY
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

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

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PART –A

1. a) Explain the role of stabilizers in compounding of rubber.   (2M)

    b) What is Dulong's formula? How is LCV calculated?   (2M)

    c) Which one undergoes corrosion faster, Iron or Aluminium? Give reason.   (2M)

    d) What are nanomaterials?   (2M)

    e) What is the packing fraction of fcc, bcc and cubic crystal?   (2M)

    f) Write the applications of phosphoric acid fuel cells.   (2M)

    g) Define Vulcanization and explain its advantages.   (2M)

PART -B

2. Explain the   (14M)
    (i) emulsion polymerization
    (ii) injection moulding process
    (iii) conducting polymers.

3. a) Explain moving bed catalytic cracking method for preparation of gasoline.   (8M)

    b) Discuss the reasons of knocking in diesel engine fuels. Define cetane number.   (6M)

4. a) Explain the environmental factors affecting corrosion.   (8M)

    b) Explain the construction of Calomel electrode with a neat labeled figure.   (6M)

5. a) Discuss supercritical fluid method of green synthesis and its applications.   (8M)

    b) What are type-I and type-II superconductors? Give their characteristics.   (6M)

6. a) Explain   (8M)
        (i)   zone refining method of semiconductors
        (ii)   controlled valency semiconductors.

    b) Discuss electrical properties of Insulators.   (6M)

7. a) With the help of neat sketch, explain hydropower generation.   (8M)

    b) Write the working principle of photo voltaic cells.   (6M)

Code No: R161106　　　　　　　（ R16 ）　　　　　　　（ SET - 2 ）

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Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

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PART –A

1.　a)　What are syndiotactic and isotactic polymers?　　　　　　　　(2M)

　　b)　Calculate the weight of air required for the combustion of 5kg of carbon.　　(2M)

　　c)　What are the drawbacks of hydrogen electrode?　　　　　　　　(2M)

　　d)　What are liquid crystals?　　　　　　　　　　　　　　　　　(2M)

　　e)　What are normal and inverse spinals?　　　　　　　　　　　　(2M)

　　f)　Write the disadvantages of photovoltaic cell.　　　　　　　　　(2M)

　　g)　Define electrode potential.　　　　　　　　　　　　　　　　(2M)

PART -B

2.　a)　Explain the preparation, properties and uses of polyurethanes.　　　(8M)

　　b)　Discuss suspension polymerization.　　　　　　　　　　　　　(6M)

3.　a)　Explain any one preparation method of synthetic petrol.　　　　　(8M)

　　b)　What are explosives? How are they classified?　　　　　　　　(6M)

4.　a)　What is electrochemical series? Explain its uses.　　　　　　　　(8M)

　　b)　Explain concentration cells with a neat sketch.　　　　　　　　(6M)

5.　a)　Explain laser ablation and chemical vapour deposition method for preparation of　(8M)
　　　　carbon nanotubes.

　　b)　Write any six principles of green chemistry.　　　　　　　　　(6M)

6.　a)　Explain the structure of rock salt.　　　　　　　　　　　　　(8M)

　　b)　Discuss close packing of atom and ions in fcc and bcc.　　　　　(6M)

7.　a)　Discuss the working of tidal power and its limitations.　　　　　(8M)

　　b)　Explain geothermal energy and its advantages.　　　　　　　　(6M)

Code No: R161106　　　　　　　(**R16**)　　　　　　　(SET - 3)

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

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PART –A

1. a) What is condensation polymerization and co-polymerization? Give examples. (2M)

　　b) What are the various fractions obtained during fractional distillation of petroleum? (2M)

　　c) Differentiate reversible and irreversible cells with examples. (2M)

　　d) Write the importance of TEM and BET. (2M)

　　e) What is transistor? What are its applications? (2M)

　　f) What is the use of gear box in wind power system? (2M)

　　g) Define galvanizing and tinning. (2M)

PART -B

2. a) Discuss the preparation and applications of Teflon and polyvinyl chloride. (8M)

　　b) What is natural rubber? Explain how natural rubber is compounded to improve its properties. (6M)

3. a) Explain determination of S, C and N by ultimate analysis and their significance. (8M)

　　b) Write notes on rocket fuels. (6M)

4. a) Discuss the working of (i) Li cells (ii) Ni-metal hydride cell. (8M)

　　b) Explain (i) Pitting corrosion (ii) waterline corrosion. (6M)

5. a) Explain the sol-gel method for preparation of carbon nanotubes. (8M)

　　b) Explain electroless plating of metals with examples. (6M)

6. a) Write notes on (10M)
　　　(i) Stoichiometric semiconducting compounds of non elemental semiconductors.
　　　(ii) Czochralski crystal pulling technique for preparation of semiconductors.

　　b) What are ferro and ferri magnetism? Give examples. (4M)

7. a) Explain the working of OTEC with a neat sketch. (8M)

　　b) Write notes on biomass and biofuel. (6M)

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Code No: R161106 | **R16** | SET - 4

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Time: 3 hours | Max. Marks: 70

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

1. a) Differentiate high density and low density polyethylene. (2M)

    b) How is water separated from petroleum during refining process? (2M)

    c) Define single electrode potential. (2M)

    d) What are superconductors? Give 2 applications. (2M)

    e) Write the applications of junction transistor. (2M)

    f) What are the reasons for wind to be generated and which energy is converted to which energy? (2M)

    g) What is meant by biofuels? Give examples. (2M)

PART -B

2. a) Explain the mechanism of cationic addition polymerization with example. (8M)

    b) What is compounding? Explain compounding of plastics. (6M)

3. a) Discuss proximate analysis of coal and its significance. (8M)

    b) A coal sample gave the following analysis: C = 66.2, H = 4.2%, O = 6.1%, N = 1.4%, S = 2.9%, moisture = 9.7% and ash = 9.5%. If one kg of coal is burnt with 25% excess air, determine the quantity of products of combustion. (6M)

4. a) Explain electroless plating of metals with examples. (8M)

    b) Explain determination of single electrode potential. (6M)

5. a) What are fullerenes? How are they prepared? Mention their applications. (8M)

    b) What are nanomaterials? Explain synthesis of nanomaterials by sol-gel method. (6M)

6. a) Explain (i) structure of CsCl (ii) close packing of FCC. (8M)

    b) Explain Hall effect and give its applications. (6M)

7. a) Discuss (i) phosphoric acid fuel cell (ii) working of photovoltaic cell. (8M)

    b) Write the advantages and limitations of H_2-O_2 fuel cell. (6M)