UNIVERSITY OF THE PUNJAB

Roll No. .....

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Environmental Chemistry | **TIME ALLOWED: 30 mins.**
Course Code: CHEM-401 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.
(OBJECTIVE TYPE)

Q.1 Encircle the most suitable answer from the given options. 10

i) A Polluted water contain dissolved oxygen below
   a) 10ppm
   b) 08ppm
   c) 15ppm
   d) 04ppm

ii) Which of the following is a Green House gas?
   a) CH_4
   b) CO_2
   c) O_3
   d) All of these

iii) Foul Smell of water is removed by
   a) Coagulation
   b) Aeration
   c) Chlorination
   d) Boiling

iv) Detergents are considered less environmental friendly than Soaps because they
   a) Contains additives
   b) Are non-biodegradable
   c) Contains surfactants
   d) Are biodegradable

v) Temperature in the Troposhere with altitude _____.
   a) Increases
   b) Decreases
   c) Remains Constant
   d) None

vi) Which one of the following belong to the class of Secondery Pollutants
   a) Carbon monoxide
   b) Methane
   c) Ozone
   d) Nitrogen dioxide

vii) Natural Ozone cycle is running in
   a) Ionosphere
   b) Troposhere
   c) Mesosphere
   d) None of these

viii) Fresh water contains total percentage of Earth's water
   a) 1 %
   b) 2 %
   c) 3 %
   d) 4 %

ix) The colloidal particles are removed from water by
   a) Filteration
   b) Coagulation
   c) Distillation
   d) Activated Sludge process

x) Harnessing of Earth's Heat energy can be used as a
   a) Renewable energy resource
   b) Non-renewable energy resource
   c) Alternative to Oil only
   d) Nuclear energy

UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Environmental Chemistry | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: CHEM-401 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions **2x10 = 20**

i. What is the effect of CO on Humans?
ii. Differentiate between Primary and Secondary Pollutants.
iii. What do you mean by Primary Water Treatment?
iv. What do you mean by Ozone Hole? How it is created?
v. Describe Lead Poisoning.
vi. How acid rain affects the quality of buildings?
vii. What are Point and Non-point sources of pollution?
viii. Discuss Methane as a green house gas.
ix. What is Reducing Smog?
x. Give the significance of Environmental Education.

Q.3 Extensive Questions **6 x 5 = 30**

a) What is Acid Rain? Explain its Causes and Environmental impact.
b) Explain the Environmental Consequences related to the burning of Fossil fuels.
c) Briefly explain the Potential impact of Global Warming on the Climate Change.
d) Discuss how Soaps and Detergents contribute Water Pollution?
e) What are heavy metals? Explain their sources and effects on Humans
f) Explain the Sources of Primary Pollutants in Air.

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Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Analytical Chemistry (Sp. Theory-I) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: CHEM-412 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Short Question (2x10=20)

1. What is a thermobalance ?
2. What is meant by evolved gas detection?
3. Differentiate between WCOT and SCOT columns in GC .
4. Differentiate between DSC and DTA.
5. What are precolums in HPLC.
6. Define and explain electrode potential
7. Give Nernst equation.
8. What is step wise elution.
9. What are standard columns in HPLC.
10. Give the equation for pH merriment in glass electrode.

Long Question

Q1: (a) Give applications of thermal methods of analysis.

(b) Give Nernst equation for potentiometer . (2x5=10)

Q2: Give in detail the interfacing of Gas Chromatography with

(a) Mass spectrometry

(b) infrared spectroscopy (2x5=10)

Q3: Give detailed note on any two detector of HPLC. (10)

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Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Analytical Chemistry (Sp. Theory-I) **TIME ALLOWED: 30 mins.**
Course Code: CHEM-412 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

MCQs (1x10)

1. Curie point is the temperature at which

a) ferro magnetic material becomes para magnetic

b)para magnetic become ferro magnetic material

c) ferro magnetism retains

d) para magnetism retain

2.TGA can not identify the

a) species b) loss in mass c) loss in weight d) temperature change

3. In heat flux DSC we can right the total heat flow as

a) dH/dt b) dt/dH c) dH/dq d) dq/dH

4. Capillary columns in GC are constricted of

a) fused silica b) alumina c) stainless steel d) glass

5. Precoulumn derivatizion is carried out before

a) separation b) sampling c) detection d) adsorption

6. In isocratic elution mobile phase throughout experiment is

a) unchanged b) volume ratio changed c) changed d) volume changed

7.change in temperature in HPLC causes changes in

a) retention times b) degrees of freedom c) accuracy d) coulmn packing

8. In heat flux DSC the constantan disk is made of

a) nickel and copper b) copper and chromiun

c) chromium and cadmium d) cadmium and copper

9. Which is not a reference electrode

a) ion selective electrode b) glass electrode

c) hydrogen electrode d) calomel electrode

10. In thermal conductivity detectors which metal is used as filament

a) tungsten b) copper c) iron d) lead

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Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Analytical Chemistry (Sp. Theory-II) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: CHEM-413 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUbJECTIVE

Section I

Q.2- Attempt all Short questions (2x10=20)

(i)- Give the advantages of Fourier transform IR over dispersive IR?.

(ii)-.Distinguish between internal conversion and fluorescence.

(iii) -. Name various vibrational modes of CO_2 and indicate which are IR active and Which are Raman active.

(iv)-. How will you distinguish between rotational and vibrational Raman spectroscopy?

(v)- What is the role of solvent in UV spectroscopy ?

(vi) Which gas is used to make plasma in ICP and what are advantages of this gas?

(vii)- What are the steps in ICP analysis?

(viii) Give some advantages of IR over Raman spectroscopy?

(ix) Define quantum yield of fluorescence and give it's characteristics

(x) Why grating is preferred over prism in UV/Visible spectroscopy ?

Section II

Attempt all questions

Q.3(a)-Discuss radiation filters used in UV/Visible spectroscopy (5)

(b)-Explain the phenomenon of metal isotope spectroscopy (5)

Q.(4)-(a) Explain the types of emitted Raman radiations (5)

(b). Discuss radiation sources of Infrared spectroscopy (5)

Q.5- (a) Explain the purpose and operation of nebulizer in ICP. (5)

(b)- Discuss the applications of fluorescence. (5)

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Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Analytical Chemistry (Sp. Theory-II) **TIME ALLOWED: 30 mins.**
Course Code: CHEM-413 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE

i- Which type of cuvette is used for UV spectroscopy

(a) Glass (b) Quartz (c) Plastic (d) All a,b,c

ii- Which is not the sample introduction part of ICP

(a) Nebulizer (b) Centre tube (c) Pump (d) Radiofrequency power generator

iii- What is the absorbance if $\log_{10}(T)$ is 0.1875

(a) 0.125 (b) 0.812 (c) 0.25 (d) None

iv- The temperature of plasma in ICP-AES is

(a) 6000-10,000°c (b) 4000-7000°c (c) 2000-5,000°c (d) 10,000-14,000°c

v- What is the life time of fluorescence ?

(a) $10^{-5} - 10^{-2}$ sec (b) $10^{-9} - 10^{-6}$ sec (c) $10^{-7} - 10^{-6}$ sec (d) $10^{-2} - 10^{-1}$ sec

vi-Which statement is wrong about Raman Spectroscopy

(a) Water can be used as solvent (b) Lenses are made up of quartz or glass

(c) Destructive technique (d) It may be vibrational or rotational

vii Which is the most common source of radiation in Raman spectroscopy

(a) Laser (b)Xe arc lamp (c) H_2 lamp (d) D_2 lamp

viii- Which of the following transition represents phosphorescence

(a) S_1 to T_1 (b) T_1 to So (c) S_1 to So (d) S_2 to S_1

ix- What occurs when a molecule absorbs radiation in near IR region ?

(a) molecule rotates (b) It vibrates faster (c) It spins faster (d) All, a,b,c

x- Which is not the continuum source of IR molecular absorption

(a) Xenon arc lamp (b) Tungsten lamp (c) Nichrome wire (d) Nernst glower

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Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Applied Chemistry (Sp. Theory-I) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: CHEM-415 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Short Questions

Briefly answer following question? 10 × 2 = 20

1. What is the role of sweetening process in crude oil refining?
2. Describe the chemistry of platforming?
3. Name four raw materials for paper industry.
4. Why phosphorus is considered as macro nutrient?
5. Write down applications of potash fertilizers.
6. Discuss the function of urea as fertilizer.
7. Why isomerization of light naptha is carried out?
8. Why desalting of crude oil is important.
9. Briefly explain the significance of beating in pulping process.
10. What is abiogenic theory of petroleum origin?

Subjective Part

10 × 3 = 30

Q 1.	(a)	Describe sulphate process of pulp manufacturing.	5
	(b)	Explain paper making in Fourdrinier machine.	5
Q 2.	(a)	Discuss C_4 alkylation process with the help of flow sheet diagram	6
	(b)	What is Octane number and how it can be improved.	4
Q 3.	(a)	Write down urea production on industrial scale?	5
	(b)	Discuss Calcium superphosphate manufacturing.	5

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Seventh Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Chemistry (Sp. Theory-I) **TIME ALLOWED: 30 mins.**

Course Code: CHEM-415 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Objective Part

10 × 1 = 10

1. Which of the following is a basic digestion process?

(a) Sulfite (b) Sulfate

(c) Soda process (d) both b and c

2. Which of the following fertilizer can be classified as complex fertilizer?

(a) Urea (b) Ammonim hydrogen phosphate

(c) Calcium cyanide (d) Triple phosphate

3. Which of the following is not a micronutrient for plants?

(a) Chlorine (b) Copper

(c) Iron (d) Zinc

4. Which of the following can be used as anti-chlor during pulp bleaching

(a) Sodium sulphite (b) Sodium sulphide

(c) Sodium thiosulphate (d) Sodium sulphate

5. Sulfate process of pulp manufacturing is also known as

(a) Sulphation process (b) NSSC process

(c) Kraft process (d) Haber process

6. Presence of porphyrins in crude oil is explained by

(a) Biogenic theory (b) Abiogenic theory

(c) Carbide theory (d) Both b and c

7. Which of the following solid fertilizer contains highest contents of Nitrogen?

(a) Ammonium nitrate (b) Ammonia

(c) Calcium cyanide (d) Urea

8. Which of the following process was developed in order to avoid the use of TEL

(a) Catalytic cracking (b) Catalytic reforming

(c) MEL addition (d) TML addition

9. Newspaper can be recycled maximum

(a) Two times (b) four times

(c) Three times (d) Five times

10. Among following, in which form, plants can incorporate Nitrogen?

(a) NO_2^{-1} (b) NO_3^{-1}

(c) N_2 (d) Urea