

UNIVERSITY OF THE PUNJAB



Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry [Special Written] (Old & New Course)
PAPER: I-A (Physical Chemistry)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- Q.1. (a) Discuss the details of nuclear fission fusion processes. 12
(b) What are tracers? Highlight applications of tracers in chemistry 13
- Q.2. (a) What is adsorption isotherm? Derive Langmuir adsorption isotherm for simultaneous adsorption of two gases on a solid surface. 10
(b) What is catalysis? Discuss the kinetics of catalytic reaction of a gas on solid surface in detail. 15
- Q.3. Define the term "SOL". Give different methods of preparation of SOL. Also discuss the various properties of SOL. 25
- Q.4. What is osmosis and osmotic pressure? How would you determine the molecular weight of macromolecules by Osmometry? 25
- Q.5. (a) What are GELS, classify them. Give the properties of GELS in detail. 13
(b) What are EMULSIONS? How can you classify the emulsions? Discuss the methods of emulsion preparation. 12
- Q.6. What is radioactive disintegration? Explain briefly disintegration as a first order process. How can you find half life period of a radioactive element? 25
- Q.7. Write notes on any TWO of the following: 25
(i) Enzyme catalysis
(ii) Purification of SOL
(iii) Radioactive equilibrium



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Special Written) (Old & New Course)
PAPER: I-B (Inorganic Chemistry)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

Q. No.1	a) Explain the use of p-orbitals in π -bonding with suitable examples.	12
	b) What are the specific characteristics of organic reagents to be used in gravimetric analysis?	13
Q. No.2	a) Explain Walsh diagram to describe the structure of water molecule.	15
	b) How the specificity of organic reagents can be increased?	10
Q. No.3	a) Discuss the chemistry of o-Phenanthroline and Cupferron.	15
	b) How lattice energy values can be used as criteria of bond type? What are the drawbacks of this concept?	10
Q. No.4	a) Discuss experimental evidences in favor of d orbital participation with suitable examples from phosphorous and sulphur molecules.	15
	b) Describe various uses of Flame emission spectroscopy.	10
Q. No.5	a) What are Silicates? How are they classified? Give their formulae and structures.	15
	b) Discuss working of graphite furnace in AAS.	10
Q. No.6	a) How $d\pi-p\pi$ bonding can be observed in molecules?	10
	b) Derive Kapustunskii Equations for calculating lattice energy in the absence of crystallographic data?	15
Q. No.7	Write note on any TWO of the followings:	2x12.5 = 25
	i. How the stability of metal complexes can be predicted?	
	ii. Born-Landé equations for lattice energy calculations	
	iii. Diagonal relationship	

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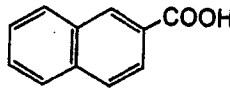
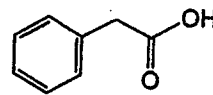
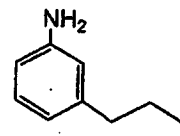
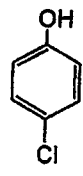
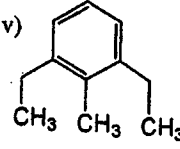
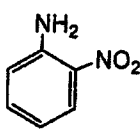
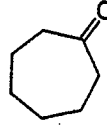
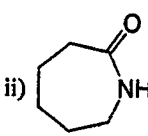
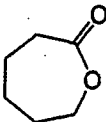
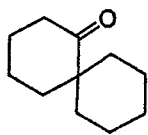
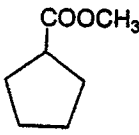
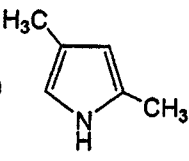
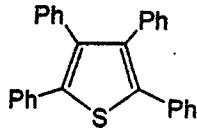
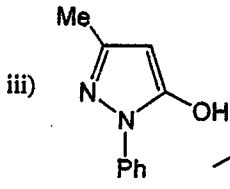
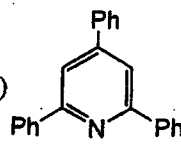
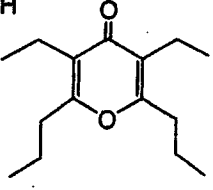
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Examination:- M.A./M.Sc.

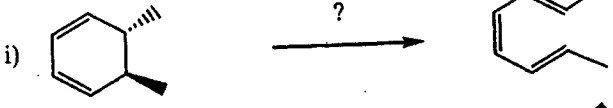
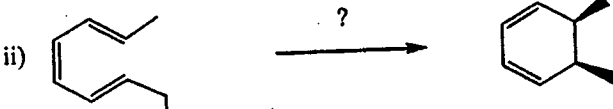
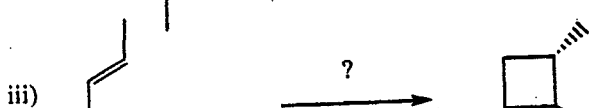
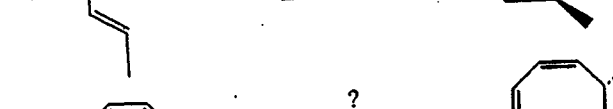
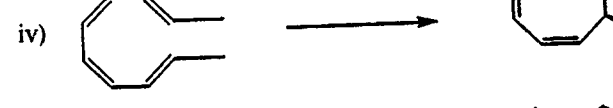
Roll No.

Subject: Chemistry [Special Written] (Old & New Course)
PAPER: I-C (Organic Chemistry)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q.1	<p>a) Outline methods for the synthesis of the following compounds starting from benzene.</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 5px;"> <p>i) </p> </div> <div style="text-align: center; margin: 5px;"> <p>ii) </p> </div> <div style="text-align: center; margin: 5px;"> <p>iii) </p> </div> <div style="text-align: center; margin: 5px;"> <p>iv) </p> </div> <div style="text-align: center; margin: 5px;"> <p>v) </p> </div> <div style="text-align: center; margin: 5px;"> <p>vi) </p> </div> </div> <p>b) Differentiate between "Meisenheimer complex" and "Wheland intermediate" by giving suitable examples.</p>	3 × 6 02
Q.2	<p>Sketch the routes involving rearrangement reaction to the following from cyclohexanone. Also write down the mechanism of rearrangement involved.</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 5px;"> <p>i) </p> </div> <div style="text-align: center; margin: 5px;"> <p>ii) </p> </div> <div style="text-align: center; margin: 5px;"> <p>iii) </p> </div> <div style="text-align: center; margin: 5px;"> <p>iv) </p> </div> <div style="text-align: center; margin: 5px;"> <p>v) </p> </div> </div>	4 × 5
Q.3	<p>Outline the syntheses for the following compounds starting from easily available materials.</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 5px;"> <p>i) </p> </div> <div style="text-align: center; margin: 5px;"> <p>ii) </p> </div> <div style="text-align: center; margin: 5px;"> <p>iii) </p> </div> <div style="text-align: center; margin: 5px;"> <p>iv) </p> </div> <div style="text-align: center; margin: 5px;"> <p>v) </p> </div> </div>	4 × 5

Q.4	<p>a) What are Singlet and Triplet Carbenes? What physical method will you use to distinguish singlet and triplet carbenes</p> <p>b) Describe various methods for the generation of carbenes.</p> <p>c) Discuss the role of carbenes in organic synthesis.</p>	04 08 08
Q.5	<p>Design syntheses for the following:</p> <p>a) Alanylglycine from alanine</p> <p>b) 3-oxopentanal from 3-hydroxypentanal</p> <p>c) 1-Acetoxybutan-3-one from ethyl acetoacetate</p> <p>d) 3-Benzoyloxycyclohexane-1,2-diol from cyclohexane-1,2,3-triol.</p> <p>e) Propanoic acid from acetic acid</p>	4 × 5
Q.6	<p>a) Differentiate between Electrocyclic and Cycloaddition reactions. Decorate your answer with examples.</p> <p>b) What conditions are used to affect each of the following transformation? Justify your answer and explain.</p> <p>i) </p> <p>ii) </p> <p>iii) </p> <p>iv) </p> <p>v) </p>	05 3 × 5
Q.7	<p>a) What do you know about "Bucherer Reaction"? Describe in detail.</p> <p>b) Nitronium ion is the actual electrophile in most of the nitration reactions. Give evidences in favour of formation of nitronium ion in nitration reactions.</p> <p>c) What is "Von Richter" reaction? Outline its reaction mechanism.</p>	06 08 06
Q.8	<p>Describe the differences and similarities of the following reaction with respect to their mechanisms, stereochemistry, merits and demerits.</p> <p>a) Wittig reaction b) Peterson Reaction</p> <p>c) Horner-Wadsworth-Emmons reaction</p>	20
Q.9	<p>Write short note on the followings.</p> <p>a) The Fiest-Benary Synthesis of Furan.</p> <p>b) The Knorr synthesis of Pyrrole</p> <p>c) The Hinsberg synthesis of thiophenes.</p> <p>d) The Hantzsch synthesis of Pyridines</p>	5 × 4



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry [Special Written] (Old & New Course)
PAPER: I-D (Bio-Chemistry)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

1. Explain the oxidative phosphorylation. Describe electron transport chain and formation of ATP (20)
2. a) Discuss the transmethylation of methionine and explain how it is involved in the biosynthesis of Cysteine and Cystine (4+6)
b) Write in detailed Urea Cycle Decarboxylation (10)
3. (a) Describe in detail the hexose monophosphate shunt (10)
(b) Write down the reactions of Uronic acid pathway (10)
4. a) Explain the biosynthetic steps along with their enzymes involved in the formation of Inosine monophosphate (IMP) and how it converted into AMP and GMP. (12+8)
5. Explain the chemistry, synthesis and biological function of hormone which related with diabetes mellitus and produced in pancreas. (20)
6. (a) Give an account of biosynthesis of Palmitic acid (15)
(b) Describe briefly digestion and absorption of Lipids (5)
7. a) Write in detailed about the two hormones which produce by thyroid gland (12)
b) Describe the regulation of carbohydrate metabolism (8)
8. a) Disorders linked to serum urate levels (12)
b) Explain β -oxidation of Fatty acids in detail (8)
9. Write note of followings two (10+10)
 - a) Male sex hormone
 - b) Transamination and deamination reactions of amino acids
 - c) Ketone Bodies

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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry [Special Written] (Old & New Course)
PAPER: I-E [Analytical Chemistry]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- Q1. a) Discuss the detail note on the sensitivity of detectors used in GC. 05
b) Write down the working principle of Thermal Conductivity Detector. 10
c) Discuss different types of columns used in GC and GLC, what factors affects the column efficiency. 10
- Q2. a) Discuss the details of each component used in HPLC Instrument. 15
b) Discuss selection rules for selecting mobile phase for HPLC. 05
c) Which equipment you will suggest for the quality control monitoring of hydrocarbons in oil refinery. 05
- Q3. a) Discuss the working principle of membrane electrodes. 10
b) Explain the working of the Indicator Electrodes of the First and Second Kind. 15
- Q4. a) In the presence of standard hydrogen electrode, why we need reference electrode. 05
b) Write a note on the application of glass membrane electrode for the measurement of ions other than proton (as an ion selective electrode). 10
c) Write a note on Redox Electrodes. 10
- Q5. a) Write a note on pulse polarographic techniques, why they are more sensitive than Conventional techniques. 10
b) Discuss various factors which affect Diffusion Current and half wave potential. 15
- Q6. a) Discuss the steps involved in anodic stripping voltametry and its Instrumentation. 10
b) Write a note on amperometric titrations. 15
- Q7. Write a note on 25
i) DTA ii) DSC
iii) Application of Conductometry other than Titrations



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course) [Special Written]
PAPER: I-F (Applied Chemistry)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- Q. 01 a. How acetylene, ethylene and propylene can be prepared. Also mention their industrial significance. 20
b. Briefly describe the origin of petroleum 5
- Q. 02 a. Explain different methods used for the analysis physical and chemical properties of fats and oils. 15
b. Write down various methods for the extraction and refining of vegetable oils. 10
- Q. 03 a. Write down the Dow process for preparing polystyrene. How polystyrene can be prepared in the laboratory. Also write down important industrial uses of the polystyrene 15
b. Write the synthesis, properties and application of epoxy resins 10
- Q. 04 a. What are different sources of the raw materials for paper manufacturing? Write down in detail. 10
b. What are sulphate and sulphite processes for paper manufacturing. What are the major differences between these processes and how these processes effect on the quality of paper? 15
- Q. 05 a. Describe the industrial manufacturing of calcium ammonium nitrate, calcium super phosphate and calcium cyanamide. 15
b. Briefly explain the uses of triple super phosphate and urea. 10
- Q. 06 a. Write a note on the environmental impacts of leather industry? 10
b. What are different common defects of raw hide? Describe both defects developed during animal life and before reaching to tanning industry. 10
c. What are different post tanning operations normally applied for manufacturing of vegetable tanned leather. 05
- Q. 07 Write short note on the following.
a. Ionic polymerization 05
b. Reforming of petroleum 05
c. Difference between fats, oils and waxes 05
d. Fractional distillation 05
e. Halogenation and nitration of benzene 05



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: II-A [Physical Chemistry (Additional)]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

Attempt any FOUR questions. All questions carry equal marks

1. a) Explain classification of polymers on the basis of structure and application. (5)
b) Discuss the significance of polymers in daily life (5)
c) Discuss the kinetics of the copolymerization polymerization. (15)
2. a) Derive the energy expression for the harmonic oscillator? How can harmonic character effect energy levels of a harmonic oscillator. (15)
b) What is Raman spectroscopy? Discuss pure Raman spectra of linear molecules. (10)
3. a) What is molar mass averages. Give different molar mass averages. (08)
b) Describe sedimentation method for determination of average molar mass. (17)
4. Explain the following thermodynamics functions for ideal solutions: (25)
 - a. Chemical Potential
 - b. Gibbs free energy change for mixing
 - c. volume change of mixing
 - d. enthalpy change of mixing
5. a) Derive expression for the rotational energy of diatomic molecule using quantum mechanical method.(15)
b) What is principle of electronic transitions? Give different types of electronic transitions (10)
6. a) Write a detailed note on quantum efficiency. (10)
b) Differentiate between Chemiluminescence and Photosensitized Reactions. (15)
7. Write note on two of the following: (12.5 X 2)
 - a) LASERS
 - b) Fermi-resonance
 - c) Frank-Condon Principle



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: II-B [Inorganic Chemistry (Additional)]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- Q. No.1 a) What are Metallocenes? Describe the chemistry of Ferrocene. 12
b) Discuss the redox reactions with Inner and Outer Sphere Mechanism giving suitable examples. 13
- Q. No.2 a) Discuss the structure, specific properties and role of chlorophyll in photosynthesis. 15
b) What are the applications of organometallic compounds in industry and medicines? 10
- Q. No.3 a) How reactions occurring in molten salt systems can be studied? Explain with examples. 12
b) What is tracer technique? Explain its application in chemistry, medicines and industry? 13
- Q. No.4 a) Classify the metal complexes into inert and labile type in terms of electronic configuration and size to charge ratio of metal ion involved? 10
b) Explain SN_1CB mechanism of substitution reactions in octahedral complexes and support it with experimental evidences. 10
- Q. No.5 b) Explain insertion-deinsertion reactions giving suitable examples. 10
b) What are Siderophores? What are their functions in living system? 05
c) What are the precautionary measures for using Liq. SO_2 and Liq. HF as solvent?
- Q. No.6 a) Compare chemical reactions occurring in Liq. H_2O and Liq. NH_3 15
b) How nitrogen fixation occurred in vivo and in vitro? Explain with examples? 10
- Q. No.7 Write note on any TWO of the followings: 2 x 12.5=25
a. Biochemistry of the non-metals
b. Wacker process
c. Methods to measure radioactivity

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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: II-C (Organic Chemistry) [Additional]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q. No. 1. (4 x 5 = 20)

- a) What is the mass of the 'McLafferty ion' from the following aldehydes?
Butanal, pentanal, hexanal and heptanal.
- b) Explain why the deuterium-coupled ^1H -spectrum of cyclohexane- d_{11} contains only a sharp singlet at room temperature but two singlet at 170 K.
- c) In benzaldehyde, two of the ring protons have resonance at 7.87 ppm, and the other three have resonance in the range from 7.5 to 7.6 ppm, explain.
- d) When *cis*-1-bromo-4-methyl cyclohexane undergoes an $\text{S}_{\text{N}}2$ reaction, only the *trans* product is obtained, why?
- e) Arrange the following protons in the decreasing order of their δ values in ^1H -NMR and account for your order: methyl, ethylenic, acetylenic, aryl and aldehydic.

Q. No. 2. Write a note on the following with examples? (10 + 10).

- (a) E1cB Eliminations (b) Determination of Cannizzaro reaction mechanism

Q. No. 3. Write a note on the following with suitable examples and explanations.

- (a) Stereoselectivity of E1 reactions (6)
- (b) Stereospecificity of E2 reactions (6)
- (c) Regioselectivity of E1 and E2 reactions (8)

Q. No. 4. a) How would you explain the stereochemistry of $\text{S}_{\text{N}}1$ & $\text{S}_{\text{N}}2$ reactions? (10)

- b) Discuss the role of neighbouring group participation in reaction mechanism giving examples. (10)

Q. No.5. a) What are terpenes? draw all the steps involved in the biosynthesis of isopentyl pyrophosphate. (10)

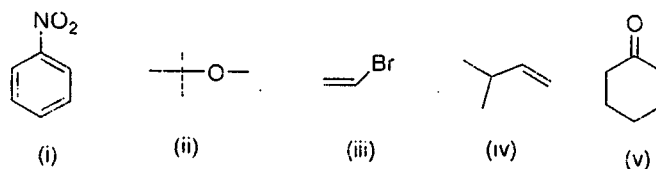
- b) Write a short note on alkaloids. Briefly explain the general methods of structure determination of alkaloids (10)

Q. No.6. a) How many signals would you expect in the ^1H -NMR and ^{13}C -NMR spectrum of each of the compounds?

Justify your answer.

= 10)

(2.5 x 4



- b) Define coupling constant and what are the different factors influencing the chemical shift and coupling constant values in ^1H -NMR spectrum? (10)

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Q. No.7. (a) The mass spectrum of *o*-nitrotoluene shows a prominent peak at m/z 120, but the similar peak in the case α , α , α -trideutero-*o*-nitrotoluene appears at m/z 122 instead of m/z 120, explain. (7)

(b) Briefly explain the quadrupole mass analyser in mass spectrometer. (6)

(c) Define ionization. Briefly explain at least three modes of ionization in mass spectrometry. (7)

Q. No.8. a) What fragments are expected as a result of McLafferty rearrangement in the following compounds? (10)

(i) 5-Methyl hexanal (ii) 4-Methyl-2-pentanone (iii) 2-Butylcyclohexanone

(iv) Butyl 2,2-dimethylpropanoate (v) 2-Ethylhexanoic acid

b) The mass spectrum of 3-butyne-2-ol shows an intense peak at m/z =55, draw the structure of the fragment and explain why it is particularly stable? (5)

c) A low-resolution mass spectrum of the alkaloid vobtusine showed the molecular weight to be 718 amu. This molecular weight is correct for the molecular formulas $C_{43}H_{50}N_4O_6$ and $C_{42}H_{46}N_4O_7$. A high-resolution mass spectrum provided a molecular weight of 718.3743. Which of the possible molecular formulas is the correct one for vobtusine? (5)

Q. No.9. a) Differentiate between following set of terms with suitable examples. (5+5)

(i) *Syn*-elimination and *Anti*-elimination

(ii) α -elimination and β -elimination

b). Explain isotopic labelling experiments in determination of reaction mechanism. (10)



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: II-D [Biochemistry (Additional)]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q. 1. a. Write down the composition of Blood. Differentiate between plasma and serum and explain the importance of formed elements of blood. (14)
- b. Write down the normal composition of urine. Why it is changed during various abnormal conditions? (6)
- Q. 2. What is the importance of immune system? Describe the structure of antibodies. How these antibodies are synthesized? Write their role in compliment system. (20)
- Q.3. Discuss antibiotic, anti-viral, anti-malarial and anti-fungal drugs with suitable example. Also explain drug resistance. (20)
- Q.4. Write down the importance of vitamins in the biological system. Give the biochemical functions, deficiency symptoms and requirements of the vitamin B complex. (20)
- Q. 5. a. How the proteins can be extracted and partially purified by following different biochemical techniques. (12)
- b. Explain molecular mechanism of muscle contraction and relaxation. (8)
- Q.6. Write notes on the followings. (20)
- i. ELISA
 - ii. RIA
 - iii. PAGE
 - iv. HPLC
- Q.7. Describe the regulation of gene expression in prokaryotes and eukaryotes. Also describe applications of recombinant technology. (20)
- Q.8. Discuss in detail all the steps involved in protein synthesis. How the protein synthesis is regulated in biological system? (20)
- Q.9. What is fermentation biotechnology? Discuss role of prokaryotes and fungi in the industry. How lactic acid is produced through fermentation? (20)



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: II-E (Analytical Chemistry) (Additional)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

Question No.	Questions	Marks
Q.1 a)	Write down the instrumentation and their function in detail	10
b)	Compare the operating protocol of single beam Infrared spectrophotometer.	8
c	Briefly discuss the vibrational modes and explain the symmetry of normal vibrations	7
Q2. a)	What are the wavelength selectors? How many types of it being used in uv/vis spectrophotometer.	10
b	Briefly discuss Atomic energy level?	07
c	What is meant by electromagnetic spectrum? Explain its different regions.	08
Q3.a	Write down the basic principle of atomic fluorescence?	8
b	How fluorescence come into play by irradiating the atom? Explain in form of energy level diagram.	9
c	Discuss the ICP -OES? How do this technique is suitable for multielement analysis	8
Q4a	What is the principle of laser operation? Explain it	08
b	What are the properties of laser light and elaborate its analytical application.	09
c	What is the difference between ruby and dye laser?	08
5 a	Briefly discuss basic principle of NMR spectroscopy. Which type of solvent could be used in NMR spectrum	08
b	What is chemical shift, spin-spin coupling, coupling constant. Briefly explain the factor effecting on the chemical shift.	10
c	Briely discuss application of NMR	07
Q6 a	Differentiate between gas and desorption ion sources in mass spectrometry	09
b	Discuss the modes of fragmentation patterns in organic molecules?.	06
c	Write down detailed features of Electron impact- mass spectrometer?	10
Q7	Write notes on any three of the following Chemical ionzation Fast atom Bombardment Pulsed Fourier transform NMR UV/Vis Soruces Ruby laser	25

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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: II-F [Applied Chemistry (Additional)]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- | | | | |
|------|-------|---|---------|
| Q.1 | (a) | Differentiate between iron and steel. Describe the main iron ores. | 10 |
| | (b) | What is passivity? Give the classification of steel. | 15 |
| Q.2 | (a) | Describe about the electroplating of plastics. | 10 |
| | (b) | Explain the chemistry involved in the rusting of iron. | 15 |
| Q.3. | (a) | Draw the structure of sugar and explain its chemistry. | 10 |
| | (b) | Give the chemistry involved in the production of sugar from beet. | 15 |
| Q.4 | (a) | What is spectrophotometry and AAS? | 10 |
| | (b) | Give the significance of on-line analysis and automation at industrial level. | 15 |
| Q.5 | (a) | What the difference between coal and coke? | 10 |
| | (b) | Explain pyrolysis and gasification of coal. | 15 |
| Q.6 | (a) | Differentiate between pigment and Dyes? | 10 |
| | (b) | Explain the methods of dyeing? | 15 |
| Q.7 | | Write a note on any TWO of the following: | (12,13) |
| | (i) | Cotton Mercerizing | |
| | (ii) | Polyesters | |
| | (iii) | Dual role of coke in iron production | |



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Part-II A/2016
Examination:- M.A./M.Sc.

Roll No.

Subject: Chemistry (Old & New Course)
PAPER: IV (Comp.) [Environmental Chemistry]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- Q.1 a) Explain how ozone layer is being depleted and what its impact on environment is.
b) Discuss Nitrogen cycle in detail with the help of flowsheet diagram (12,13)
- Q.2 a) What is meant by photochemical smog? What are the initial reactants in the process? Why is sunlight required?
b) What is acid rain? Give its causes. Discuss its impact on human life. (13,12)
- Q.3 a) Define BOD and COD. Why natural water can have a high value of BOD?
b) Give an account of health problems caused by polluted water.
c) How does temperature affect the solubility of oxygen in water. (9,8,8)
- Q.4 a) What are pesticides? Discuss various types of pesticides with examples.
b) What are PCBs, Dioxins and detergents? Discuss their sources and impact on environment. (12,13)
- Q.5 a) Explain the sources and toxicity of arsenic and mercury.
b) Discuss major segments of atmosphere. (13,12)
- Q.6 Describe the Analysis of pollutants by
1) Atomic absorption spectroscopy (12)
2) HPLC (13)
- Q.7 a) What are major sources of soil pollution? How does it affect human health?
b) Discuss environmental education and environmental degradation. (12,13)