

B.Sc. (NON-MEDICAL) - 6th SEM. EXAMINATIONS; SEPT./OCT.-2017
(SUB:-NUMERICAL ANALYSIS; PAPER CODE: 9010603)

TIME: 03:00 Hrs.

Max Marks:30

Instructions:-

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five (5) questions in all. Question No. one (1) is compulsory. Attempt other four (4) questions, selecting at least one question from each unit, in addition to Q.1. Marks are indicated against each question.
4. Draw the diagram wherever required.

Q.1. Answer all the following:

a) Fit a Poisson distribution to the set of observation:

x	0	1	2	3
f	122	60	15	2

b) Prove that $\Delta = EV = \Delta E$.

c) Evaluate $\int_0^2 e^{x^2} dx$ using Simpson's 1/3 rule.

UNIT-I

Q.2. a) Using Newton's divided difference formula find the value of $f(11)$ from the following data:

x	1	5	9	10	13	17
f(x)	48	100	294	900	1210	2028

b) Find y at x = 3.9 from the following table:

x	1	2	3	4
f(x)	10	30	70	90

Q.3. a) The Table given below reveals the velocity "v" of a body during the time 't' specified. Find its acceleration at t = 1.1

t:	1.0	1.1	1.2	1.3	1.4
v:	43.1	47.7	52.1	56.4	60.8

b) Find the largest eigen value and the corresponding eigen vector of the matrix :

$$\begin{pmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{pmatrix}$$

Using Power method. Take $[1,0,0]^T$ as initial eigen vector.

UNIT-II

- Q.4. a) Find the Taylor series solution with three terms for the initial value problem: (4)
 $y' = x^3 + y, y(1) = 1$. Find y at $x = 1.1$.
- b) Apply the fourth order Runge – Kutta method, to find an approximate value of y when $x = 0.2$, given that $y' = x + y, y(0) = 1$, with $h = 0.2$. (4)

- Q.5. a) Find the missing term in the table: (4)

x	45	50	55	60	65
y	3.0	2.0	-2.4

- b) Apply Hermite's formula to interpolate for $\sin(1.05)$ from the following data: (4)

x	Sinx	Cosx
1.00	0.84147	0.54030
1.10	0.89121	0.45360

UNIT-III

- Q.6. a) Apply Stirling's formula to obtain y_{25} , given $y_{20} = 2854, y_{24} = 3162, y_{28} = 3544$ and $y_{32} = 3992$. (4)
- b) Using Gauss forward difference formula, find y_8 given $y_0 = 7, y_5 = 11, y_{10} = 14, y_{15} = 18, y_{20} = 24$ and $y_{25} = 32$. (4)
- Q.7. a) Using Euler's method find $y(0.2)$ and $y(0.4)$ from $y' = x + y, y(0) = 1$, with $h = 0.2$. (4)
- b) Using Milne method (only predictor) to find $y(1.4)$ given:
 $y' = x^2(1 + y), y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979$. (4)

B.Sc. (NON-MEDICAL) - 6th SEM. EXAMINATIONS; OCT.-2017
(SUB:-NUCLEAR PHYSICS; PAPER CODE: 9010605)

TIME: 03:00 Hrs.**Max Marks:40****Instructions:-**

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five (5) questions in all. Question No. one (1) is compulsory. Attempt other four (4) questions, selecting at least one question from each unit, in addition to Q.1. Marks are indicated against each question.
4. Draw the diagram wherever required.

- Q.1. Answer all the following: (2x4=8)**
- a) Calculate the mass number of the nucleus whose radius is 5×10^{-15} m.
 - b) What is parity?
 - c) Define range and straggling.
 - d) Differentiate between radiative and direct reaction.

UNIT-I

- Q.2. Explain the terms: nuclear magnetic dipole moment and electric quadrupole moment. (8)**
- Q.3. Give an account of Rutherford's theory of scattering of alpha particles and calculate the distance of closest approach. Explain how nuclear radius can be determined. (8)**

UNIT-II

- Q.4. a) What is alpha disintegration? (4)**
- b) Discuss energy lifetime relationships for α – particles (Geiger-Nuttal law). (4)**
- Q.5. a) Discuss the energetics of β decay. (4)**
- b) Write in brief: (4)**
- I) Photo electric effect.
 - II) Pair Production.

UNIT-III

- Q.6. Discuss the principle construction and working of linear accelerator. Give its advantages and disadvantages. (8)**
- Q.7. What is nuclear fusion reactor? Discuss the principle, construction and working. Give its applications also. (8)**

Sr.No. 9441(S)

Roll No _____

B.Sc. (NON-MEDICAL) - 6th SEM. EXAMINATIONS; OCT.-2017
(SUB:-INORGANIC CHEMISTRY-VI; PAPER CODE: 9010607)

TIME: 03:00 Hrs.

Max Marks:40

Instructions:-

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five (5) questions in all. Question No. one (1) is compulsory. Attempt other four (4) questions, selecting at least one question from each unit, in addition to Q.1. Marks are indicated against each question.
4. Draw the diagram wherever required.

Q.1. Answer all the following questions:

(2x4=8)

- a) Give the formula of Zeise's salt and Wilkinson's catalyst.
- b) Explain why AgI_2^- complex is stable whereas AgF_2^- is not.
- c) Give the reaction of $(\text{PNCI}_2)_3$ with Grignard reagent.
- d) Which elements are required for strengthening bones and teeth?

UNIT-I

Q.2. a) Give a brief account of Wilkinson's catalysis and its uses as homogeneous catalyst in the hydrogenation alkenes. (4)

b) Explain the bonding in organotin compounds. (2)

c) Describe the properties of organolithium compounds. (2)

Q.3. a) Discuss the structure of ironpentacarbonyl. (2)

b) Give a brief account of the metal ethylenic complexes. (4)

c) Give two methods of preparation of organoaluminium compounds. (2)

UNIT-II

Q.4. a) Explain the principle of hard and soft acids and bases. (2)

b) What do you mean by hard and soft acids and bases. Give their characteristics and classification. (4)

c) What is symbiosis? Give examples. (2)

Q.5. a) What are silicones? Describe their classification, properties and uses. (4)

b) Complete the reaction: (2)



c) What do you mean by phosphazenes? (2)

UNIT-III

Q.6. a) What are trace elements? Discuss the role played by iron and copper in human systems. (4)

b) Explain the structure and role of haemoglobin in biological systems. (4)

P.T.O.

- Q.7.** a) Write a note on nitrogen fixation. (4)
b) What are metalloporphyrins? (2)
c) Write a short note on Ca^{2+} pump. (2)

B.Sc. (NON-MEDICAL) - 6th SEM. EXAMINATIONS; OCT.-2017
(SUB:-PHYSICAL CHEMISTRY-VI; PAPER CODE: 09010608)

TIME: 03:00 Hrs.**Max Marks:40****Instructions:-**

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five (5) questions in all. Question No. one (1) is compulsory. Attempt other four (4) questions, selecting at least one question from each unit, in addition to Q.1. Marks are indicated against each question.
4. Draw the diagram wherever required.

Q.1. Answer all the following:**(2x4=8)**

- a) What is the difference between thaw point and melting point?
- b) What is the importance of photochemistry?
- c) Why metal complexes are coloured?
- d) What is meant by d-p mixing?

UNIT-I

- Q.2. a) Explain the Franck – Condon principle in emission and absorption. (5)**
b) Why electronic bond spectrum is very complex, but still preferred? (3)

- Q.3. Discuss the salient features observed in the electronic spectrum of a diatomic molecule. (8)**

UNIT-II

- Q.4. a) Describe Grotthus and Lambert-Beer Law. (3)**
b) What do you understand by quantum yield of a photochemical reaction? What are the causes for high and low quantum yield? (5)
- Q.5. a) Draw and explain the Jablonski diagram. (6)**
b) What do you understand by chemiluminescence? Give two examples. (2)

UNIT-III

- Q.6. a) Write short notes on: (5)**
(i) abnormal colligative properties and (ii) Raoult's law. (5)
b) Describe the method for determination of osmotic pressure of dilute solution. (3)
- Q.7. a) Define phase rule. Explain phase diagram of Eutectic system. (5)**
b) Define and explain the term degree of freedom. (3)
