SHIVAJI UNIVERSITY, KOLHAPUR
B Sc. I Semester I Examination (NEP)
October/November 2022 (Held in February 2023)
English for Communication
Ability Enhancement Compulsory Course (AECC-1) A

Subject code: 88173

Day and Date: Wednesday, 15/02/2023 **Marks**: 40
Time: 10.00 am to 12.00 pm

Instructions: 1) All questions are Compulsory.

2) Figures to the right indicate full marks.

Q. 1 A) Complete the following sentence by choosing the correct alternatives: [4]

1) The modern world has been shaped by…….

A) industry B) technology C) modernity D) none

2) If birds could talk, ……. Could walk with us.

A) rocks B) animals C) trees D) flowers

3) Martin Luther King Jr. received the Nobel Peace Prize in …….

A) 1960 B) 1964 C) 1962 D) 1965

4) The pages of the book are …… with age

A) white B) black C) blue D) brown

Q. 1 B) Answer the following questions in one word/phrase/ sentence each. [4]

1) Who were the followers of Kanti I hunting?

2) Who has written the poem *How Beautiful*?

3) What is the primary task of technology?

4) What have made the book an open mystery?

Q. 2 A) Answer the following questions in three to four sentences each (Any Three) [6]

1) How does technology differ from nature?

2) How will the God behave with the child?

3) What is the dream of the speaker in I Have a Dream?

4) What happened at the moment of auspicious vision?

5) Bring out the imagery used in the poem *The Book*?

P.T.O

Q. 2 B) Write short notes on the following in about 7 to 8 sentences (Any Two) **[**6**]**

1) The difference between ‘mass production’ and ‘production by masses’.

2) God’s love for the human beings.

3) Martin Luther King’s warning to the Negroes.

4) End of the story The Auspicious Vision

Q. 3 A) Describe Cell phone using names of parts, color, size or other details. [4]

Or

Describe your close Friend.

Q. 3 B) Write a detailed description of a Temple in your village [4]

Or

As you are student in a particular college, describe your daily routine.

Q. 4 A) i) Write synonyms for the following. [2]

a) clever b) companion

ii) Write antonyms for the following. [2]

a) Optimistic b) Support

iii) Prepare new word by adding prefix or suffix. [2]

a) global b) success

Q. 4 B) Narrate your birthday celebration at home. Imagine the necessary details. [6]

Or

Narrate the memorable incident in your life.

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SHIVAJI UNIVERSITY KOLHAPUR
B. Sc. I Semester I Examination (NEP)
October / November 2022 (held in February 2023)
Botany Paper I DSC-13 A:Microbes, Algae and Biofertilizers
Subject code: 88181

Day and date: Monday, 20/02/2023
Time: 10.00 to 12.00 am **Marks: 40**
Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.
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Q. 1. Complete the following sentences with correct alternative. [08]

1. The nucleic acid core of virus is surrounded by ----------

A) collar B) capsid

C) envelope D) whisker

2. ---------- is known as the 'Father of Virology'.

A) M. Beijerinck B) W. M. Stanley

C) D. J. Iwanowsky D) Adolf Mayer

3. Comma-shaped bacteria are known as----------

A) Vibrio B) Coccus

C) Spiral D) Lophotrichous

4. The exchange of genetic material between two bacterial cells takes place through a ----------

A) flagellum B) plasmodesmata
C) conjugation tube D) transformation tube

5. ---------- is used for extraction of agar.

A) *Chlorella* B) *Spirulina*

C) *Spirogyra* D) *Gelidium*

6. According to G. M. Smith (1955) algae has been classified into ---------- divisions.

A) six B) seven

C) eight D) nine

7. ---------- is an important group of nitrogen fixing micro-organism.

A)Blue-green algae B)Brown algae

C)Red algae D)Yellow algae

8. Trichoderma is a ----------eco-friendlyfertilizer.

A) fungal B)bacterial

C)viral D)algal

Q. 2. Answer the following questions (Any two) **[16]**

1.Discuss in brief the general characters of viruses.

2. Describe various types of bacteria.

3.Give an account of vegetative structure of *Nostoc*.

Q. 3. Write short notes (Any four) **[16]**

1.TMV

2.Types of bacteria based on Gram staining

3.Positive economic importance of algae

4.Azolla as Biofertilizer

5.Blue green algae as Biofertilizer

6.Microbes used as Biofertilizer

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SHIVAJI UNIVERSITY KOLHAPUR
B. Sc. I Semester I Examination (NEP)
October / November 2022 (held in February 2023)
Botany Paper II DSC-14 A Cell biology and Analytical techniques
Subject code: 88181

Day and date: Monday, 20/02/2023
Time: 2.00 to 4.00 pm **Marks: 40**
Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.
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Q. 1. Complete the following sentences with correct alternative. [08]

1. Cell membrane is ----------.
   a. non-permeable b. selective permeable
   c. permeable d. half permeable

2. Fluid mosaic model proposed by ---------.
   a. Taiz and Zeiger b. Williamson and Stort
   c. Nageli d. Singer and Nicolson

3. ---------- is most suitable for paper chromatography.
   a. Card sheet paper b. Canvas paper
   c. Blotting paper d. Whatman No. 1

4. Scanning electron microscopy is used to ---------.
   a. observe the surface texture of a sample
   b. observe anatomy of sample
   c. observe atoms of a sample
   d. observe electrons of a sample

5. ---------- is considered as 'Power House of the Cell.
   a. chloroplast b. mitochondria
   c. nucleus d. ribosomes

6. Cytokinesis is ----------.
   a. division of nucleus b. division of cytoplasm
   c. synthesis of cell d. synthesis of cytoplasm

7. ---------- is known as the father of microscopy.

a. Antony Von Leeuwenhoek b. Albert Einstein
c. Luis Pasture d. Birbal Sahani

8. Mitosis is ---------- cell division.

a. equational b. reductional
c. gametogenic d. abnormal

Q. 2. Answer the following questions (Any two) [16]

1. Explain structure of prokaryotic cell with suitable diagram.
2. Explain ultrastructure of chloroplast with suitable diagram and add a note on its significance.
3. What is microscopy? Describe Scanning Electron Microscopy.

Q. 3. Write short notes (Any four) [16]

1. Mitosis
2. Plasma membrane
3. Mitochondria
4. Compound microscope
5. Thin Layer Chromatography (TLC)
6. Plant cell wall- structure and functions

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SHIVAJI UNIVERSITY, KOLHAPUR

B.Sc. I Semester I Examination (NEP)
October/November 2022(held in February 2023)
Chemistry II – DSC – A4
Organic Chemistry
Subject Code : 88180

Day & Date : Thursday 16/02/2023 Marks : 40
Time : 02:00 pm to 04:00 pm
Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q1) Select the most correct alternative and rewrite the sentence. (08)

1) The electrophile is _____ species.

a) Electron poor b) Electron loving c) Electron acceptor d) All of these

2) The compound CH_3·CH(Cl)·COOH shows _____ isomerism.

a) Geometric b) Conformational c) Optical d) cis-trans

3) Benzene is _____ in nature.

a) Acidic b) Basic c) Amphoteric d) Neutral

4) Butadiene on polymerisation forms _____ rubber.

a) Polythene b) Benzene c) Buna d) None of these

5) Heterolytic covalent bond fission yields _____ .

a) Pair of free radicals b) Pair of cations

c) Pair of anions d) One each of cation and anion

6) Quite often in organic compounds presence of chiral carbon causes _____ isomerism.

a) Geometrical b) Conformational c) Optical d) cis-trans

7) The C─C─C bond angle in benzene is _____ .

a) 120˚ b) 180˚ c) 90˚ d) 270˚

8) Cycloalkanes on heating forms _____ .

a) Alkanes b) Cycloalkenes c) Alkenes d) All of these

Q2) Attempt any two of the following. (16)

1) What is carbanion ? Give any two methods of preparations of carbanion ?

2) Discuss optical isomerism in tartaric acid and 2,3-dihydroxybutanoic acid.

3) What is Electrophilic substitution reaction ? Give the mechanism of Friedal-Craft reaction.

4) What is cycloalkene ? Give any two methods of preparation and chemical properties of cycloalkene.

Q3) Attempt any four of the following. (16)

1) Hyperconjugation

2) Enantiomerism

3) Structure of benzene

4) Chemical properties of alkadiene

5) Electromeric effect

6) Plane of symmetry

SHIVAJI UNIVERSITY KOLHAPUR

B.Sc. Part I (Semester I)Examination (NEP)

October; November 2022 (held in February 2023)

CHEMISTRY – DSC A-3

INORGANIC CHEMISTRY (Paper I)

Subject Code -71605

Day and Date –Thursday ,16/02/2023

Time-10.00 am to 12.00 pm Total Marks-40

Instructions- 1.All Questions are Compulsory

2.Figures to the Right indicate Full Marks

3.Neat Diagram Should be drawn whenever necessary

……

Q.1. A) Select most correct alternative and rewrite the sentence 8 Marks

I) The Shape of S orbital is……

a) spherical b) dumbbell shaped c) triangular d) square planner

2) The attractive force which keeps atoms together in a matter is known as……bond

a) electrovalent b) chemical c) covalent d) hydrogen

3) Geometry of BF_3 is……

a) linear b) trigonal planner c) tetrahedral d) diagonal

4) Atomic Orbitals are …….

a) polycentric b) monocentric c) bicentric d) neutral

5) Molecular Orbitals are ……..

a) polycentric b) monocentric c)bicentric d) both a and b

6) Principal quantum number represents…….

a) energy of electron b) spin of electron c)orientation of electron d) shape of orbital

7) Degenerate atomic orbitals have……..energy

a) different b) very low c) very high d) same

8)Alkaline earth metal contains……valence electrons.

a)1 b) 2 c) 3 d) 4

Q.2.write short answers from the following **(Any four)** 16 Marks

i) Explain Born Haber Cycle

ii) Explain SP^3 hybridisation

iii) Explain wave particle duality

iv) Give limitations of VBT

v) Distinguish between Atomic orbitals and Molecular orbitals

vi) Write electronic configuration of N , P, Ne and Ca

Q.3. Answer the following questions in brief **(Any Two)** 16 Marks

i) Explain MO diagram of N_2 molecule

ii) Explain SP^3d^2 hybridisation with example

iii) Give postulates of Bohrs theory of Hydrogen

SHIVAJI UNIVERSITY KOLHAPUR

B.Sc. Part I (Semester I)Examination

October; November 2022 (held in February 2023)

CHEMISTRY – DSC A-3

INORGANIC CHEMISTRY (Paper I)

Subject Code-71605

Day and Date –Thursday , /02/2023

Time-10.00 am to 12.00 pm Total Marks-50

Instructions- 1.All Questions are Compulsory

2.Figures to the Right indicate Full Marks

3.Neat Diagram Should be drawn whenever necessary

……

Q.1. A) Select most correct alternative and rewrite the sentence 10 Marks

1) ……. is an ionic compound

a) NaCl b) CCl_4 c) HF d) Cl_2

2) The Shape of S orbital is……

a) spherical b) dumbell shaped c) triangular d) square planner

3) The attractive force which keeps atoms together in a matter is known as……bond

a) electrovalent b) chemical c) covalent d) hydrogen

4) Geometry of BF_3 is……

a) linear b) trigonal planner c) tetrahedral d) diagonal

5) Atomic Orbitals are …….

a) polycentric b) monocentric c) bicentric d) neutral

6) Molecular Orbitals are ……..

a) polycentric b) monocentric c)bicentric d) both a and b

7) Principal quantum number represents…….

a) energy of electron b) spin of electron c)orientation of electron d) shape of orbital

8) Degenerate atomic orbitals have……..energy

a) different b) very low c) very high d) same

9)Alkaline earth metal contains……valence electrons.

a) 1 b) 2 c) 3 d) 4

10) In $SiCl_4$, Si is…… valent.

a) mono b) di c) tri d) tetra

Q.2.write short answers from the following **(Any four)** 20 Marks

i) Explain Born Haber Cycle

I i) Explain SP^3 hybridisation

iii) Explain wave particle duality

iv) Give limitations of VBT

v) Distinguish between Atomic orbitals and Molecular orbitals

vi) Write electronic configuration of N , P, Ne and Ca

Q.3. Answer the following questions in brief **(Any Two)** 20Marks

i) Explain MO diagram of N_2 molecule

ii) Explain SP^3d^2 hybridisation with example

iii) Give postulates of Bohrs theory of Hydrogen

SHIVAJI UNIVERSITY KOLHAPUR
B.Sc. I Semester I Examination (NEP)
October/November 2022 (held in February 2023)
Mathematics Paper I DSC-A5
Calculus-I
Subject code - 88176

Day & Date: Friday, 21/02/2023

Time: 2.00 to 4.00 pm **Marks**: 40

Center: Matoshri Bayabai Shripatrao Kadam Kanya Mahavidyalaya, Kadegaon

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Q.1. Choose the correct alternatives. **8**

1) Expansion of $\frac{1}{1-x}$ in ascending power of x is -------

a) $-1-x-x^2-x^3-\cdots$ b) $1+\frac{x^2}{2!}+\frac{x^4}{4!}+\cdots$

c) $-1+x-x^2+x^3-\cdots$ d) $1+x+x^2+x^3+\cdots$

2) The $f(x)$ and $g(x)$ be the functions such that $f(a)=0$ and $g(a)=0$ then $\lim_{x\to a}\frac{f(x)}{g(x)}=\cdots$

a) $\lim_{x\to a}\frac{f'(x)}{g'(x)}$ b) $\lim_{x\to a}\frac{g'(x)}{f'(x)}$ c) $\frac{f(a)}{g(a)}$ d) none of these

3) $\lim_{x\to 0}\frac{sinx}{x}=\cdots$

a) 1 b) 0 c) 2 d) -1

4) The geometrical meaning of rolls theorem is that the tangent at point $c\in(a,b)$ is ……

a) parallel to y axis b) parallel to x axis

c) Intersecting to x and y axis d) none of these

5) A function $f(x)$ is said to be continuous at $x=a$, if …….

a) $\lim_{x\to a}f(x)$ exists b) f(a) exists

c) $\lim_{x\to a}f(x)=f(a)$ d) $\lim_{x\to a}f(x)\neq f(a)$

6) $\lim_{x\to a}\frac{a^x-1}{x}$ where $a>0$ = ……..

a) 0 b) 1 c) e^x d) $loga$

7) Continuity is ….. condition for the existence of derivative.

a) necessary but not sufficient b) sufficient but not necessary

c) necessary as well as sufficient d) neither sufficient nor necessary

8) A polynomial function in R …….

a) is never continuous in R b) is always continuous in R

c) may or may not continuous in R c) is continuous in R except at X=0

Q.2. Attempt any two of the following **16**

1) State and prove Lagrange's mean value theorem and its geometrical interpretation

2) Verify Rolle's theorem in the case of function

i) $f(x) = 2x^3 + x^2 - 4x - 2$ ii) $f(x) = |x|\ in\ x \in [-1,1]$

3) If $y = e^{\alpha sin^{-1}x}$, prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (n^2 - \alpha^2)y_n = 0$

Q.3. Attempt any four of the following **16**

1) prove that composite function of two continuous functions is continuous

2) Verify Cauchy mean value theorem for the function defined below

$f(x) = \frac{1}{x}$, $g(x) = \frac{1}{x^2}$ on [1,4]

3) Find the n^th^ derivative of e^xlogx

4) Find the $\lim_{x \to a^-} f(x)$, $\lim_{x \to a^+} f(x)$ and $\lim_{x \to a} f(x)$ where, $f(x) = x^2, a = 2$

5) Find the series expansion of e^{ax}

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SHIVAJI UNIVERSITY, KOLHAPUR
B.Sc. I Semester I Examination (NEP)
October/November 2022 (held in February 2023)
Mathematics Paper II DSC-A6
Differential Equations
Subject code – 88176

Day & Date: Wednesday, 22/02/2023
Time: 2.00 to 4.00 pm **Marks: 40**

Center: Matoshri Bayabai Shripatrao Kadam Kanya Mahavidyalaya, Kadegaon

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Q.1. Choose the correct alternatives. **8**

1) The Necessary and Sufficient condition for $Mdx + Ndy = 0$ to be exact is.....

a) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$ b) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial y}$

c) $\frac{\partial N}{\partial x} = \frac{\partial M}{\partial x}$ d) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$

2) The integrating factor of the linear differential equation

$\frac{dy}{dx}$ + Py = Q is.....

a) $e^{\int f(y)dy}$ b) $e^{\int f(x)dx}$ c) e^{x} d) e^{y}

3) Which of the following form of the equation is of the type homogeneous differential equations.

a) $f(D) = 0$ b) $f(D)\,y = 0$

c) $f(D) = X$ d) $f(D)\,y = X$

4) The solution of the differential equation $\frac{ydx-xdy}{y^2} = 0$ is....

a) $\frac{y}{x}$ = c b) $\frac{y+x}{y}$ = c c) $\frac{x}{y}$ = c d) x+y = c

5) $\frac{1}{D-a}X$ =.....

a) $e^{ax}\int Xe^{-ax}dx$ b) $e^{-ax}\int Xe^{ax}dx$

c) $e^{ax}\int Xdx$ d) $e^{-ax}\int Xe^{-ax}dx$

6) The Solution of differential equation $p = log(px - y)$ is............

a) $y = cx + e^c$ b) $y = cx - e^c$

c) $x = cy + e^c$ d) $x = cy - e^c$

7) The meaning of $\frac{1}{D+a}X$ = ...

a) $e^{ax} \int X e^{-ax} dx$ b) $e^{-ax} \int X e^{ax} dx$

c) $e^{ax} \int X dx$ d) $\int X dx$

8)The degree of the differential equation....

$(1 + x^2)\frac{dy}{dx} + 2xy = cosx$

a) 1 b) 2 c) 3 d) 4

Q.2. Attempt any two of the following **16**

1) Prove the necessary and sufficient condition for the differential equation $Mdx + Ndy = 0$ to be exact is $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$

2) If $y = y_1, y = y_2, y = y_3, \dots \dots . . y = y_n$ are n linear independent solutions of the linear differential equation $f(D)y = 0$ $then$ $y = C_1y_1 + C_2y_2 + C_3y_3 + \cdots \dots + C_ny_n$ is also the general or complete solution of $f(D)y = 0$ $where$ $C_1, C_2, C_3, \dots . C_n$ are arbitrary constants.

3) If $y = Y$ be the complete solution of the equation $f(D)y = 0$ and $y = u$ be the particular solution of the equation $f(D)y = X$ where X is the solution of x, then Prove that, complete solution of the equation $f(D)y = X$ is $y = Y + u$.

Q.3. Attempt any four of the following **16**

1) $Solve$ $(4x + 3y + 1)dx + (3x + 2y + 1)dy = 0$

2) $Solve$ $(1 + x^2)\frac{dy}{dx} + y = e^{tan^{-1}x}$

3) $Solve$ $p = log(px - y)$

4) $Solve$ $[D^3 + 2D^2 + D]y = 0$

5) $Solve$ $(D^2 - 5D + 6)y = e^{4x}$

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B.Sc. Part–I Semester I (NEP): Microbiology
Oct/Nov. 2022 Examination (held in Feb 2023)
MICROBIOLOGY (Paper I)
DSC - 25 A Introduction to Microbiology

Day and Date:- Thursday, 23/02/2023 **Subject Code - 88185**

Time: - 10.00 to 12.00 pm **Total Marks: 40**

Instructions:
1) All Questions are Compulsory.
2) Draw labelled diagrams wherever necessary.
3) The figures to the right indicate full marks.

Q. 1. Rewrite the following sentences by selecting the correct answer from the given alternatives: (08)

1. ..... is used for preparation of agar-agar.
   A) Red Algae B) Cyanobacteria C) Sargassum D) Lichens
2. Which of the following scientist experimented with raw meat, maggots and flies in an attempt to disprove the theory of spontaneous generation .....
   A) Joseph Lister B) Louis Pasteur C) Alexander Fleming D) Francisco Redi
3. In the peptidoglycan two acetylated amino sugars are linked by ..... linkage.
   A) ß – 1,4 B) ά - 1,4 C) ß – 1,3 D) ά - 1,3
4. Who was the first scientist to discover antibiotic penicillin .....
   A) Edward Jenner B) Alexander Fleming C) Louis Pasteur D) Paul Ehlrich
5. The formation of a living organism from non-living matter is known as…….
   A) Abiogenesis B) Spontaneous generation C) Both A) and B) D) None of above
6. The bacteria occurs in salty environment are called as ……
   A) Barophili B) Psychrophilic C) Thermophilic D) Alkalophilic
7. F pilus has a major role as …….
   A) motility of the cell B) port of entry of genetic material during mating
   C) attachment to host cell D) human infection
8. Bacterial endospore play an important role in …….
   A. Storage B. Protein synthesis C. Reproduction D. Survival

Q. 2. Attempt any two of the following: (16)

1. Explain difference between Prokaryotic and Eukaryotic cell.
2. Describe in detail, three-kingdom classification system.
3. Describe in Brief Structure and function of bacterial Flagella.

Q. 3. Attempt any four of the following: (16)

1. Louis Pasteur
2. General Characteristics of Bacteria
3. Alexander Fleming
4. Cell Membrane
5. Function of capsule
6. Economic importance of Fungi

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B.Sc. Part–I Semester I (CBCS): Microbiology
Oct/Nov. 2022 Examination (held in Feb 2023)
MICROBIOLOGY (Paper II)
DSC - 26 A Microbial Diversity

Day and Date:- Thursday, 23/02/2023 **Subject Code - 88185**

Time: - 02.00 to 04.00 pm **Total Marks:40**

Instructions: 1) All Questions are Compulsory.
2) Draw labelled diagrams wherever necessary.
3) The figures to the right indicate full marks.

Q. 1. Rewrite the following sentences by selecting the correct answer from the given alternatives: **(08)**

1. U.V. radiation at ..... wavelength has the highest microbicidal activity.
   A) 265 nm B) 290 nm C) 250 nm D) 300 nm
2. To demonstrate volutin granules ..... is used.
   A) Albert's technique B) Anjesky' s staining
   C) Burri's technique D) Morozov' s staining
3. …..…… is the correct order of staining reagents in Gram-Staining.
   A) Crystal violet, alcohol, iodine solution, safranin
   B) Crystal violet, iodine solution, alcohol, safranin
   C) Crystal violet, safranin, alcohol, iodine solution
   D) Iodine solution, crystal violet, alcohol, safranin
4. If the total magnification of a microscope is 2000X with the use of a 10X ocular lens,…. is the magnification of the objective lens.
   A) 10X B) 20X C) 200X D) 2000X
5. Seitz filter is a..... filter.
   A) Asbestos B) Diatomaceous C) Glass D) HEPPA
6. During bacterial staining, the smear is needed to be heat-fixed so that …..…….
   A) The bacteria will react to the stain B) The bacteria will move around
   C) The bacteria will not die D) The bacteria will not be washed off
7. ..... is used for disinfection of water.
   A) Chlorine B) Acid C) Phenol D) Alcohol
8. ..... is an example of disinfectant.
   A) $AgNO_3$ B) NaCl C) H_2SO_4 D) K_2HPO_4

Q. 2. Attempt any two of the following: **(16)**

1. Write in brief about Capsule (Maneval's method).
2. Define Sterilization? Explain principle of sterilization by dry and moist heat.
3. Write in brief about Gram's Staining.

Q.3. Attempt any four of the following: **(16)**

1. Simple staining.
2. Applications of Compound Microscope.
3. Explain sterilization by Filtration.
4. Alcohol as disinfectant.
5. Electron Microscope.
6. Iodine as disinfectant.

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SHIVAJI UNIVERSITY KOLHAPUR
B.Sc. I Semester I Examination (NEP)
October/November 2022 (held in February 2023)
Physics Paper II DSC-A2
Mechanics-II
Subject code - 88178

Day & Date: Friday, 17/02/2023

Time: 2.00 to 4.00 pm **Marks**: 40

Center: Matoshri Bayabai Shripatrao Kadam Kanya Mahavidyalaya, Kadegaon

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Q.1. Choose the correct alternatives. **8**

1) Kepler's third law of planetary motion is referred as …

a) Law of elliptical orbits b) Law of equal areas

c) harmonic law d) Law of equal time periods

2) The period of geostationary satellite is …

a) 12 hours b) 24 hours c) 6 hours d) 18 hours

3) The displacement of particle performing SHM at time t is $y = a \cos \omega t$. The velocity of the particle at time t = T/2 is ------ (Where T is period of SHM)

a) $a\,\omega$ b) $a\,\omega^2$ c) zero d) $-a\,\omega$

4) Total energy of a body performing SHM is E. Then average kinetic energy of the body, over a period is …

a) $\frac{E}{2}$ b) $\frac{E}{4}$ c) $\frac{E^2}{2}$ d) $\frac{E}{8}$

5) The quantity $Ya\,K^2$ is called ------

a) flexural rigidity b) bending moment

c) geometrical moment of inertia d) depression in bending

6) A plane perpendicular to neutral surface is called -------

a) Plane of bending b) interaction of bending

c) neutral axis d) neutral plane

7) Which of the following is unit of surface tension

a) $dyne/m$ b) $dyne/cm$ c) $dyne/cm^2$ d) $dyne/m^2$

8) If T is surface tension of a liquid then the excess pressure inside the liquid drop of radius r is

a) $\frac{T}{r}$ b) $\frac{2\ T}{r}$ c) $\frac{T}{2\ r}$ d) $\frac{4\ T}{r}$

Q.2. Attempt any two of the following **16**

1) Show that the square of the period of revolution of a satellite is directly proportional to the cube of the radius of the orbit.

2) Derive expressions for kinetic energy, potential energy and total energy of the particle performing SHM.

3) Describe the Jaeger's method to determine the surface tension of a liquid.

Q.3. Attempt any four of the following **16**

1) State applications of artificial satellites.

2) What are damped oscillations? Obtain differential equation for damped oscillations.

3) Obtain an expression for work done in twisting the wire.

4) Obtain an expression for the Young's Modulus of material of the beam supported at both ends

5) State and explain applications of the surface tension.

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SHIVAJI UNIVERSITY KOLHAPUR
B.Sc. I Semester I Examination (NEP)
October/November 2022 (held in February 2023)
Physics Paper –I DSC-A1
Mechanics-I
Subject code - 88178

Day & Date: Friday, 17/02/2023

Time: 10.00 to 12.00pm **Marks**: 40

Center: Matoshri Bayabai Shripatrao Kadam Kanya Mahavidyalaya, Kadegaon

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Q.1. Choose the correct alternatives. **8**

1) The triangle law of vector addition can be used to find the resultant of …

a) only two vectors

b) parrellel vectors

c) unit vectors only

d) more than two vectors

2) If the vector product of two non-zero vectors is zero, the vectors must be …

a) either parallel or antiparallel

b) perpendicular

c) inclined at van angle $45^0$with each other

d) always antiparallel

3) Ordinary differential equation involves…

a) only dependent variables.

b) only independent variables.

c) total derivatives.

d) partial derivatives.

4) The equation $\frac{dy}{dx} = sinx$ is …

a) linear

b) non-linear.

c) homogeneous.

d) first order non-linear.

5) If the total… acting on a particle is zero, then the angular momentum of the particle is conserved.

a) force

b) momentum

c) energy

d) torque.

6) Rocket motion is based on Newton's…law of motion.

a) First,

b) Second,

c) Third,

d) None of all

7) Moment of inertia in rotational motion is analogous to the … in translational motion.

a) momentum

b) mass

c) force

d) torque

8) Moment of inertia of a spherical shell about its diameter …

a) $\frac{2}{3}MR^2$

b) $\frac{3}{2}MR^2$

c) $\frac{5}{3}MR^2$

d) $\frac{1}{2}MR^2$

Q.2. Attempt any two of the following **16**

1) Define scalar product. Show that scalar product of rectangular vector,

$\bar{A}.\bar{B} = A_1B_1 + A_2B_2 + A_3B_3$ for vectors

$\bar{A} = \hat{\imath}A_1 + \hat{\jmath}A_2 + \hat{k}A_3$ and $\bar{B} = \hat{\imath}B_1 + \hat{\jmath}B_2 + \hat{k}B_3$

2) Define center of mass of a system of particles. How the coordinates of center of mass are obtained? Discuss the physical significance of center of mass.

3) Define moment of inertia and radius of gyration. Derive the expression for moment of inertia of a spherical shell about one of its diameter.

Q.3. Attempt any four of the following **16**

1) Define and explain the vector product. State any two characteristics of vector product.

2) Write note on linear momentum and angular momentum of single particle.

3) Define order and degree of differential equation with one example each.

4) A solid cylinder of mass 500 g and radius 10 cm, what is its moment of inertia about its own axis.

5) state and explain the triangle law of vector addition.

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Seat No.	

Total No. of Pages: 2

SHIVAJI UNIVERSITY, KOLHAPUR

B.Sc. (Part – I) (Semester – I) (New) (NEP)

Examination February, 2023

ZOOLOGY (Paper - I)

Animal Diversity – I

Sub. Code: 88182

Day and Date: Monday, 22-02-2023 **Total Marks: 40**

Time: 10.00 a.m. to 12.00 p.m.

Instructions: *1) All questions are compulsory.*

2) Figures to the right indicate full marks.

Q.1 Select the correct answer from the following and rewrite complete sentence. 08 M

1. Protista are …….

   A) Unicellular & Prokaryotic B) Multicellular & eukaryotic C) Eukaryotic D) None of above

2. Locomotion in Amoeba is achieved by……..

   A) Flagellum B) cilia C) Pseudopodia D) All the above

3. Through ostia……

   A) CO_2 is given out B) Ammonia is given out C) Water is taken in the body D) Reproduction

4. Scolex of Tapeworm has……

   A) Mouth &hooks B) Mouth & Suckers C) only suckers D) Suckers & hooks

5. Jelly fish is the common name of ……..

   A) Aurelia B) Physalia C) Obelia D) Hydra

6. Platyhelminthes are also known as……

   A) Flat worms B) Pore bearing C) Round worms D) With jointed appendages

7. Tapeworm is ……

   A) Ectoparasite B) Obligatory parasite C) Endoparasite D) All the above

8. Spongocoel in Sycon is lined by …….

   A) Porocytes B) Pinacocytes C) Thesocytes D) Choanocytes

Q.2 Attempt any two of following. **16M**

1. Give general characters and classification of phylum Arthropoda upto classes.
2. Describe life cycle of Ascaris.
3. Describe canal system in sycon and state its significance.

Q.3 Attempt any four of following. **16M**

1. Write a short note on different polyps in siphonophore
2. General characters of phylum Platyhelminthes
3. Give general characters of class calcarea
4. Metamerism in annelida
5. Water vascular system
6. Significance of torsion in Mollusca

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Seat No.	

Total No. of Pages: 2

SHIVAJI UNIVERSITY, KOLHAPUR

B.Sc. (Part – I) (Semester – I) (New) (NEP)

Examination February, 2023

ZOOLOGY (Paper - II)

Cell Biology and Evolutionary Biology

Sub. Code: 88182

Day and Date: Monday, 21-02-2023 **Total Marks: 40**

Time: 10.00 a.m. to 12.00 p.m.

Instructions: *1) All questions are compulsory.*
2) Figures to the right indicate full marks.

Q.1 Select the correct answer from the following and rewrite complete sentence. 08 M

1. ……. is the membrane bound cell organelles, having genetic material and various proteins.
   A) Lysosome B) Nucleolus C) Nucleus D) Ribosomes
2. The term 'great dying' is usd for ……
   A) K-T extinction B) Devonian extinction C) Extinction of Dinosaurs D) Permian – Triassic extinction
3. ……. Is fundamental, structural and functional unit of living organisms
   A) Bones B) Cells C) Organs D) None of the above
4. …… plays a role in the formation of acrosome during spermiogenesis
   A) Golgi complex B) Nucleus C) Endoplasmic reticulum D) Mitochondria
5. The half-life of uranium- 238 is about -------
   A) 4.5 billion years B) 5.1 billion years C) 5.7 billion years D) 5.4 billion years
6. The theory of natural selection for organic evolution is put Forword by ……
   A) De Vries B) Lamarck C) Darwin D) Mendel
7. Fossilized footprints are the type of …….
   A) Moulds B) Petrification C) Casts D) Ichnofossils
8. When ribosomes are present in large number on the wall of endoplasmic reticulum, then it is called…….
   A) Smooth Endoplasmic reticulum B) Rough Ribosomes C) Rough Endoplasmic reticulum D) All of above

Q.2 Attempt any two of following. **16M**

1. Give an account of ultrastructure of nucleus. Add a note on nuclear pore complex
2. Describe the fluid mosaic model of the plasma membrane
3. Describe the theory of chemical evolution of life

Q.3 Attempt any four of following. **16M**

1. Mitochondria
2. Urey and Miller's experiment
3. Function of Lysosome
4. Cast and Mould fossil
5. Struggle for existence
6. Cell shapes

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