

SHIVAJI UNIVERSITY KOLHAPUR
B. Sc. II, Semester IV, Examination (CBCS)
March/April 2023 (held in June 2023)
Botany Paper VII: DSC D 13 : Plant Anatomy
Subject code: 78910

Day and date: Monday, 19/06/2023

Time: 10.30 to 12.30 pm

Marks: 50

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. [10]

1. What is the function of the intercalary meristem.....
 - a. to produce new leaves
 - b. to produce new flowers
 - c. to produce new roots
 - d. to produce new stem tissue
2. Which type of meristem is responsible for primary growth.....
 - a. apical meristem
 - b. lateral meristem
 - c. vascular meristem
 - d. cambium meristem
3. What is the function of the cambium meristem.....
 - a. to produce new leaves
 - b. to produce new flowers
 - c. to produce new roots
 - d. to produce new vascular tissue
4. Four radial vascular bundle are found in.....
 - (a) dicot root
 - (b) monocot root
 - (c) dicot stem
 - (d) monocot stem.
5. Which of the following is not a function of the epidermal tissue system in plants.....
 - a. protection against water loss
 - b. pas exchange
 - c. absorption of nutrients
 - d. secretion of substances
6. Multiple epidermis is found in.....
 - (a) Sugarcane leaf
 - (b) Nerium leaf
 - (c) Maize leaf
 - (d) Jawar leaf

7. Water secreting glands in plant are.....

- (a) Digestive glands (b) Nectaries
(c) Hydathodes (d) Epithelium cells

8. Companion cells are found in.....

- (a) Xylem (b) Phloem
(c) stomata (d) endodermis

9. Cork is formed from.....

- (a) cork cambium (phellogen) (b) vascular cambium
(c) phloem (d) xylem.

10. The periderm includes.....

- (a) secondary phloem (b) cork
(c) cambium (d) all of these.

Q. 2. Answer the following questions (Any two) [20]

1. Describe various types of vascular bundles with suitable examples.
2. What is anomalous secondary growth? Describe in brief anomalous secondary growth in *Bignonia* stem.
3. What is secondary growth? Describe the process of secondary growth in dicot stem.

Q. 3. Write short notes (Any four) [20]

1. Tunica Corpus theory
2. Complex tissues
3. Primary structure of dicot root
4. Lenticel
5. Periderm
6. Mechanical tissue system

SHIVAJI UNIVERSITY KOLHAPUR
B. Sc. II, Semester IV, Examination (CBCS)
March/April 2023 (held in June 2023)
Botany Paper VIII: DSC D 14: Plant Metabolism
Subject code:78910

Day and date: Tuesday, 20/06/2023

Time: 10.30 to 12.30 pm

Marks: 50

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.

[10]

1. The term enzyme was coined by.....
(a) Fischer (b) Koshland
(c) Kocher (d) Khune.
2. Non protein part of enzyme is known as-----
a. apoenzyme b. prosthetic group
c. metal ion d. cofactor
3. Conversion of NO_2 to ammonia requires enzyme.
(a) nitrate reductase (b) nitrite reductase
(c) nitrogenase (d) dehydrogenase.
4. TCA cycle takes place in.....
(a) cytosol (b) chloroplast
(c) mitochondria (d) peroxisome.
5. According to IUB enzymes are classified intomajor class.
(a) seven (b) five
(c) six (d) eight
6. Conversion of pyruvic acid to Acetyl Co A..... co factor
(a) Mg ion (b) Zn ion
(c) Fe ion (d) Cu ion

7. Root nodule bacterium is isolated by

- (a) Frank (b) Robert
(c) Charls (d) Beijrinck

8. Maize grain showstype of seed germination

- (a) epigeal (b) vegetative
(c) hypogeal (d) viviparous.

9. is example of aerobic bacteria.

- a) *Azotobactor* b) *Yeast*
c) *Riccia* d) *Penicillium*

10..... is dormancy inducing hormone prevent seed germination.

- (a) Absciscic acid (b) Gibberellic acid
(c) Ethylene (d) Cytokinin

Q. 2. Answer the following questions (Any two)

[20]

1. What is enzyme? Explain mechanism of enzyme action.
2. Explain nitrate reduction process.
3. What is respiration? Describe the steps in glycolysis.

Q. 3. Write short notes (Any four)

[20]

1. Blue green algae in symbiosis.
2. Nif genes
3. Properties of enzyme
4. Causes of seed dormancy
5. Hypogeal type of seed germination.
6. Anaerobic respiration

SHIVAJI UNIVERSITY KOLHAPUR

B.Sc. Part II, Semester IV Examination (CBCS)

March/April 2023

Paper Number VII (Inorganic Chemistry)

Day and Date: Monday, 12/06/2023

Marks: 50

Time: 10.30 a.m.-12.30 p.m.

Instructions: 1) All Questions are Compulsory

2) Figures to the right indicate full marks.

Que 1) Choose the correct alternative from the following and rewrite the sentences 10 Mark

i) $[\text{NiCl}_4]^{2-}$ ion is.....

- a) Square planar b) tetrahedral c) tetragonal d) octahedral

ii) More stable metal chelate generally contains.....membered ring.

- a) five b) four c) six d) seven

iii) The structure of Ammonia is

- a) Angular b) trigonal pyramidal c) tetrahedral d) octahedral

iv) DMG is used to precipitate.....

- a) Fe b) Ni c) Mg d) Al

v) Paramagnetism is associated with,.....

- a) Absence of electrons b) neither paired nor unpaired electrons c) paired electrons d) unpaired electrons

vi) chela means.....

- a) Scorpions legs b) crabs claw c) fingers of hand d) student

vii) Elements in which last electron enters the....orbital called P-block elements

- i) s ii) d iii) p iv) f

viii) Diamond is.....

- a) Diamagnetic b) hard c) bad conductor of electricity d) all of these

ix) Oxidation state of Mn in KMnO_4 is.....

- i) 5^+ ii) 7^+ iii) 6^+ iv) 4^+

x) Oxalic acid isdentate chelating agent.

- i) Mono b) bi c) tri d) tetra

Que 2. Answer the following (Any Two)

20

Mark

- Explain the applications of chelation with reference to EDTA and DMG
- What is mean by transition elements? Give the position of 3d series in the periodic table and write electronic configuration.
- What is solubility product? Give separation of Cl^- , Br^- and I^- by any one of the oxidation reduction methods.

Que 3. Answer the following questions (Any Four)

20 Mark

- Distinguish between Double salt and Complex salt
- Explain the structure of $[\text{FeF}_6]^{3-}$ on the basis of VBT.
- Explain the structure of Diborane
- What is co-ordinate bond? Give the conditions for the formation of co- ordinate bond.
- Define and explain Common ion effect.
- What are the postulates of VBT?

SHIVAJI UNIVERSITY KOLHAPUR

B.Sc. Part II, Semester IV Examination (CBCS)

March/April 2023

Paper Number VII (Inorganic Chemistry)

Day and Date: Monday, 12/06/2023

Marks: 50

Time: 10.30 a.m.-12.30 p.m.

Instructions: 1) All Questions are Compulsory

2) Figures to the right indicate full marks.

Que 1) Choose the correct alternative from the following and rewrite the sentences 10 Mark

i) Weight of solid sample used in semi-micro qualitative analysis ranges between.....gram

a) 0.1 to 1 b) 0.01 to 0.1 c) 0.001 to 0.01 d) 0.0001 to 0.001

ii) More stable metal chelate generally contains.....membered ring.

a) five b) four c) six d) seven

iii).....element is a metalloid

b) Pb b) Ge c) C d) Bi

iv) DMG is used to precipitate.....

a) Fe b) Ni c) Mg d) Al

v) Paramagnetism is associated with,.....

b) Absence of electrons b) neither paired nor unpaired electrons

c) c) paired electrons d) unpaired electrons

vi) chele means.....

b) Scorpions legs b) crabs claw c) fingers of hand d) student

vii) Elements in which last electron enters the....orbital called P-block elements

ii) s ii) p iii) d iv) f

viii) Oxidation state of metal is designated by....in complex name

b) Arabic figure b) natural numbers c) roman figures d) Indian figures

ix) Oxidation state of Cr in $K_2Cr_2O_7$ is.....

ii) 5^+ ii) 7^+ iii) 6^+ iv) 4^+

x) Oxalic acid isdentate chelating agent.

- ii) Mono b) bi c) tri d) tetra

Que 2. Answer the following (Any Two)

20 Mark

a) Describe the structure of Borazine

b) What are transition elements? Give the position and electronic configuration of 3d series.

c). Explain the applications of chelation with reference to EDTA and DMG

Que 3. Answer the following questions (Any Four)

20 Mark

a) Distinguish between Primary Valency and Secondary Valency

b) Explain the structure of $[\text{FeF}_6]^{3-}$ on the basis of VBT.

c) Explain the allotropes of carbon

d) Write short note on Complex formation.

e) What are the postulates of VBT?

f) Write short notes on spot test analysis.

viii. Percentage of water on the earth present in ocean is

- a) 97.2%
- b) 93.2%
- c) 80.12%
- d) 91.2%

ix. Following type of the ecological pyramid is always upright.

- a) Pyramid of Number
- b) Pyramid of biomass
- c) Pyramid of energy
- d) None of the above

x. Which gas is responsible for degradation of ozone layer?

- a) Oxygen
- b) Hydrogen
- c) Chlorofluorocarbon (CFC)
- d) Sulphur dioxide

Q 2) Answer any three of the following. [15]

- a. Explain the concept of conservation of biodiversity.
- b. Explain reasons of ozone layer degradation and its impact on environment
- c. Describe methods of solid waste management
- d. Impact of mining of environment
- e. Explain impact of consumption of energy on the environment.

Q 3) Write short notes on any three of the following. [15]

- a. Importance of Forest
- b. Food web
- c. Deforestation
- d. Role of individual in prevention of pollution.
- e. Importance of environmental studies

Q 4) What is natural disaster? Discuss disaster management in relation to drought. [10]

OR

Describe soil pollution and its effects on environment.

Q 5) Give formation of environmental hazard of acid rain and ozone depletion. [10]

OR

What are sources of water pollution? Describe its effects and control measures.

Q 6) What is an environment? Describe reasons of environmental degradation. [10]

OR

Describe reasons of sound pollution and its side effects.

c) $\sum v_n$ is convergent if $\sum u_n$ divergent d) $\sum u_n$ is divergent if $\sum v_n$ divergent

7) Consider the statements

I) every absolutely convergent series is convergent

II) Every convergent series is absolutely convergent.

a) Only I) is true

b) Only II) is true

c) Both I) and II) are true

d) Both I) and II) are false

8) The positive p-series $\sum \frac{1}{n^p}$ is divergent for

a) $p < 1$

b) $p \leq 1$

c) $p \geq 1$

d) $p > 1$

9) A non-increasing sequence which is not bounded below

a) Converges to 0

b) converges to 1

c) Diverges to ∞

d) diverges to $-\infty$

10) $\lim_{n \rightarrow \infty} \left\{ \frac{n^2}{n+5} \right\}_{n=1}^{\infty} = \dots\dots\dots$

a) 0

b) 1

c) ∞

d) $-\infty$

Q2) Attempt any two of the following.

[20]

1) If $0 < x < 1$ then $\{x^n\}_{n=1}^{\infty}$ converges to 0

2) Show that the series $\sum \frac{1}{n}$ does not converges.

3) If the alternating series $u_1 - u_2 + u_3 - u_4 + \dots$ ($u_n > 0$ for all n) is such that

i) $u_{n+1} \leq u_n; \quad \forall n$

ii) $\lim_{n \rightarrow \infty} u_n = 0$ then the series converges.

Q3) Attempt any four of the following.

[20]

1) Test the convergent of the following series

i) $\sum \frac{1}{x^n + x^{-n}}, x > 0$

2) Show that every absolutely convergent series is convergent

3) Discuss the convergence of the following sequence

i) $\left\{\frac{3n}{n+7\sqrt{n}}\right\}$ ii) If $s_n = \{(-1)^n\}_{n=1}^{\infty}$ then find $\limsup_{n \rightarrow \infty} s_n$

4) If the sequence of real numbers $\{S_n\}_{n=1}^{\infty}$ is convergent then $\{S_n\}_{n=1}^{\infty}$ is bounded

5) Show that necessary condition for the convergence of an infinite series $\sum_{n=1}^{\infty} u_n$ is that $\lim_{n \rightarrow \infty} u_n = 0$

6) If $\{s_n\}_{n=1}^{\infty}$ is sequence of real numbers and $\limsup_{n \rightarrow \infty} s_n = \liminf_{n \rightarrow \infty} s_n = L$

then $\{s_n\}_{n=1}^{\infty}$ is convergent and $\lim_{n \rightarrow \infty} s_n = L$

.....

- a) $\sum u_n$ is convergent if $\sum v_n$ divergent b) $\sum u_n$ is convergent if $\sum v_n$ convergent
 c) $\sum v_n$ is convergent if $\sum u_n$ divergent d) $\sum u_n$ is divergent if $\sum v_n$ divergent

7) Consider the statements

- I) every absolutely convergent series is convergent
 II) Every convergent series is absolutely convergent.

- a) Only I) is true b) Only II) is true
 c) Both I) and II) are true d) Both I) and II) are false

8) The positive p-series $\sum \frac{1}{n^p}$ is divergent for

- a) $p < 1$ b) $p \leq 1$ c) $p \geq 1$ d) $p > 1$

9) If $s_n = \{n\}_{n=1}^{\infty}$ then $\liminf_{n \rightarrow \infty} s_n = \dots$

- a) 0 b) ∞
 c) $-\infty$ d) 1

10) The limit superior and limit inferior of the sequence $\{1, 2, 3, 1, 2, 3, 1, 2, 3, \dots\}$ are respectively...

- a) 3, 1 b) 1, 3
 c) 2, 2 d) 0, 3

Q2) Attempt any two of the following. [20]

1) The positive term geometric series $\sum_{r=0}^{\infty} r^n$ converges for $r < 1$ and diverges to infinity $r \geq 1$

2) Show that the sequence $\left\{ \left(1 + \frac{1}{n}\right)^n \right\}_{n=1}^{\infty}$ is convergent.

3) If the alternating series $u_1 - u_2 + u_3 - u_4 + \dots$ ($u_n > 0$ for all n) is such that

- i) $u_{n+1} \leq u_n; \quad \forall n$
 ii) $\lim_{n \rightarrow \infty} u_n = 0$ then the series converges.

Q3) Attempt any four of the following. [20]

1) Discuss the convergence of the following sequence

i) $\left\{\frac{3n}{n+7\sqrt{n}}\right\}$ ii) If $s_n = \{(-1)^n\}_{n=1}^\infty$ then find $\limsup_{n \rightarrow \infty} s_n$

2) Show that every absolutely convergent series is convergent

3) Test the convergent of the following series

i) $\sum(\sqrt{n^4 + 1} - \sqrt{n^4 - 1})$

4) If the sequence of real numbers $\{S_n\}_{n=1}^\infty$ is convergent then $\{S_n\}_{n=1}^\infty$ is Cauchy sequence

5) Show that necessary condition for the convergence of an infinite series $\sum_{n=1}^\infty u_n$ is that

$$\lim_{n \rightarrow \infty} u_n = 0$$

6) If $\{s_n\}_{n=1}^\infty$ is sequence of real numbers and $\limsup_{n \rightarrow \infty} s_n = \liminf_{n \rightarrow \infty} s_n = L$

then $\{s_n\}_{n=1}^\infty$ is convergent and $\lim_{n \rightarrow \infty} s_n = L$

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SHIVAJI UNIVERSITY KOLHAPUR
Faculty: B. Sc. Examination CBCS B. Sc. II Semester IV
March/April 2023(Held in June 2023)
Mathematics Paper VIII
Algebra II
Subject code -78907

Day & Date: Friday, 16/06/2023

Time: 10.30 to 12.30 pm

Marks: 50

Center: MatoshriBayabaiShripatraoKadamKanyaMahavidyalaya, Kadegaon

Q1) Select the correct alternative for each of the following: [10]

- 1) Factor group of a cyclic group
 - a) cyclic
 - b) abelian but not cyclic
 - c) neither abelian nor cyclic
 - d) abelian
- 2) If H is a subgroup of a finite group G and $o(G) = 30$ & $o(H) = 3$ then $[G:H] = \dots$
 - a) 3
 - b) 12
 - c) 10
 - d) 9
- 3) The order of symmetric group S_3 is
 - a) 3
 - b) 9
 - c) 6
 - d) 1.
- 4) One –one homomorphism is called
 - a) isomorphism
 - b) monomorphism
 - c) epimorphism
 - d) endomorphism
- 5) the theorem that for any integer a and prime p, $a^p \equiv a \pmod{p}$ is called ---
 - a) Fermat's theorem
 - b) Euler's theorem
 - c) Sylows theorem
 - d) Lagrange's theorem
- 6) Let H be a subgroup and K be normal subgroup of the group G, then is normal in H
 - a) $H \cup K$
 - b) $H \cap K$
 - c) $H + K$
 - d) none of these
- 7) If G is a finite Group and $aa \in G$ then
 - a) $o(G) \setminus o(a)$
 - b) $o(a) \setminus o(G)$
 - c) $o(a) > o(G)$
 - d) None of These
- 8) Every subgroup of an abelian group is
 - a) a normal subgroup
 - b) abelian but not normal

SHIVAJI UNIVERSITY KOLHAPUR
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March/April 2023(Held in June 2023)
Mathematics Paper VIII
Algebra II
Subject code -78907

Day & Date: Friday, 16/06/2023

Time: 10.30 to 12.30 pm

Marks: 50

Center: MatoshriBayabaiShripatraoKadamKanyaMahavidyalaya, Kadegaon

Q1) Select the correct alternative for each of the following: [10]

- 1) the theorem that for any integer a and prime p , $a^p \equiv a \pmod{p}$ is called ---
 - a) Fermat's theorem
 - b) Euler's theorem
 - c) Sylows theorem
 - d) Lagrange's theorem
- 2) If H is a subgroup of a finite group G and $o(G) = 36$ & $o(H) = 3$ then $[G:H] = \dots$
 - a) 3
 - b) 12
 - c) 4
 - d) 9
- 3) If G is a finite Group and $aa \in G$ then
 - a) $o(G) \setminus o(a)$
 - b) $o(a) \setminus o(G)$
 - c) $o(a) > o(G)$
 - d) None of These
- 4) Every subgroup of an abelian group is
 - a) a normal subgroup
 - b) abelian but not normal
 - c) neither abelian nor normal
 - d) none of these
- 5) Factor group of a cyclic group
 - a) cyclic
 - b) abelian but not cyclic
 - c) neither abelian nor cyclic
 - d) abelian
- 6) Let H be a subgroup and K be normal subgroup of the group G , then is normal in H
 - a) $H \cup K$
 - b) $H \cap K$
 - c) $H + K$
 - d) none of these
- 7) The order of symmetric group S_3 is
 - a) 3
 - b) 9
 - c) 6
 - d) 1.

- 8) One –one homomorphism is called
- a) isomorphism b) monomorphism c) epimorphism d) endomorphism
- 9) A homomorphic image of a cyclic group is
- a) cyclic b) non-cyclic c) non-abelian d) symmetric group
- 10) Which of the following are zero divisors in a ring $(Z_{18}, \oplus_{18}, \odot_{18})$
- a) 6, 3 b) 9,2 c) 6,4 d) both (a) and (b)

Q2) Attempt any two of the following. [20]

- 1) Show that if H is a subgroup of a finite group G then $o(H)$ divides $o(G)$
- 2) Every finite group G is isomorphic to a permutation group.
- 3) Show that the center $Z(G)$ of group G is a normal subgroup of G

Q3) Attempt any four of the following. [20]

- 1) Show that HK is subgroup of G if and only if $HK=KH$
- 2) If a is any integer and p is prime then $a^p \equiv a \pmod{p}$
- 3) Let $\langle Z, + \rangle$ be the group of integers. Let $H = \{mx/x \in Z\}$ be subgroup of Z, where m is fixed positive integer . Write the element of quotient group $\frac{Z}{H}$
- 4) Show that the set of integers Z under addition and multiplication form a commutative ring with unity element 1.
- 5) Show that homomorphic image of an abelian group is abelian.
- 6) Show that the index of any subgroup of a finite group is a divisor of any order of the group.

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SHIVAJI UNIVERSITY KPLHAPUR
B.Sc. II, Semester IV Examination (CBCS)
March/April 2023 (Held in June 2023)

MICROBIOLOGY

Paper - VIII (DSC - D26): Basics in Medical Microbiology & Immunology

Subject Code: 78914

Day and Date: Thursday, 15/06/2023

Marks:50

Time: 10.30 to 12.30 pm

Instructions: 1) All Question are Compulsory.

2) Figures to the right indicate full marks.

Q 1. Select the correct alternatives from the following.

10

- 1) The type of immunity that develops because of natural contact with an antigen is called as Immunity.
a) Natural, active b) Natural, passive c) Artificial, active d) Artificial, passive
- 2) is an organism that derives nutrition from dead and decaying organic matter.
a) Opportunistic b) Host c) saprophytes d) commensals
- 3) Bacterial attachment to host cells is increased by
a) Mucous secretion b) Enzymes c) Adhesins d) Acids
- 4) A person how has recovered from disease but continues to harbor the pathogen is called Carrier.
a) Active b) Passive c) Convalescent d) Healthy
- 5) The process of phagocytosis was discovered by
a) Louis Pasteur b) Robert Koch c) Karl Landsteiner d) Elie Metchnikoff
- 6) A substance that does not induce immune response itself but can react with products of immune response called.....
a) Antigen b) Hapten c) Properdin d) Epitope
- 7) Antibody labeled with enzymes are used in Test.
a) Immunofluorescence b) ELISA c) Complement fixation d) Neutralization
- 8) Toxins that interfere with the normal transmission of nerve impulses are called toxins.
a) Exo b) Endo c) Neuro d) Entero
- 9) Passive immunization is done by using.....
a) Vaccines b) toxoids c) immune sera d) toxins
- 10) Infection produced by a physician is called Infection.
a) Iatrogenic b) Acute c) Mixed d) Primary

Q.2 Attempt any two of the following.

20

- 1) Define virulence and discuss in brief different types of virulence factors.
- 2) Define immunity. Describe in detail the various types of immunity.
- 3) Define disease and describe in brief epidemic, endemic, pandemic and sporadic disease with one example each.

Q.3 Write a short note (Any four).

20

- 1) Clonal selection theory.
- 2) Morbidity rate.
- 3) Passive immunity.
- 4) Exotoxin.
- 5) Types of antibodies.
- 6) Mortality rate.

SHIVAJI UNIVERSITY KPLHAPUR
B.Sc. II, Semester IV Examination (CBCS)
March/April 2023 (Held in June 2023)

MICROBIOLOGY

Paper - VII (DSC - D25): Microbial Genetics & Molecular Biology

Subject Code: 78914

Day and Date: Wednesday, 14/06/2023

Marks:50

Time: 10.30 to 12.30 pm

Instructions: 1) All Question are Compulsory.

2) Figures to the right indicate full marks.

Q 1. Select the correct alternatives from the following.

10

- 1) Point mutation involves.....
a) Deletion b) Insertion c) Duplication d) Change in single base pair
- 2) X ray causes mutation by
a) Deletion b) Transition c) Transversion d) base substitution
- 3) is an initiation codon.
a) AUG b) UGA c) UAG d) UAA
- 4) Point mutation involves
a) Deletion b) Insertion c) Duplication d) Change in single base pair
- 5)is a left-handed helical DNA.
a) A b) B c) C d) Z
- 6) The ability of cells to take up DNA fragments from surrounding is called
a) transfection b) transduction c) transformation d) conjugation
- 7) are the different terms given for the methods of transmission of genetic information that occur in bacteria.
a) transcription b) transduction c) transformation d) conjugation
- 8) The transfer of genes from one cell to another by a bacteriophage is known as
a) recombination b) transduction c) transformation d) conjugation
- 9) The Plasmid can be eliminated from a cell by the process known as.....
a) curing b) breaking c) fixing d) expulsion
- 10) Ti plasmid are Plasmids.
a) tumor inducing b) degradation c) high copy number d) mammalian

Q.2 Attempt any two of the following.

20

- 1) Discuss various properties of genetic code.
- 2) Explain in detail transfer of gene by conjugation process.
- 3) Describe in detail different forms of DNA.

Q.3 Write a short notes (Any Four)

20

- 1) Spontaneous mutation.
- 2) Applications of plasmids.
- 3) Split genes.
- 4) Fate of exogenote.
- 5) Codons and anticodons.
- 6) Dark repair mechanism.

SHIVAJI UNIVERSITY KOLHAPUR
B.Sc. II Semester IV Examination (CBCS)
March/April 2023 (held in June 2023)
Physics Paper –VII DSC-C2
Thermal Physics and Statistical Mechanics-II
Subject code - 78908

Day & Date: Thursday 14/06/2023

Time: 10.30 to 12.30pm

Marks: 50

.....
Q.1. Choose the correct alternatives.

10

1) The change in internal energy of system is-----

a) $dU = TdS + PdV$

b) $dU = TdS - PdV$

c) $dU = SdT - PdV$

d) $dU = SdT + PdV$

2) Enthalpy H of thermodynamic system is.....

a) $H = U + PV$

b) $H = U - PV$

c) $H = U + PT$

d) $H = TdS - PdV$

3) For ideal gas, Joule-Thomson effect is

a) zero

b) positive

c) negative

d) infinite

4)remains constant during throttling process.

a) Entropy

b) Enthalpy

c) Volume

d) Pressure

5) The volume of a cell in phase is.....

a) \hbar

b) \hbar^2

c) \hbar^3

d) \hbar^4

6) Many differentmay correspond to the same macrostate.

a) microstates

b) phase points

c) phase densities

d) space points

7) For the distribution to be most probable,.....

VII). The path difference $\lambda/4$ is equivalent to phase difference -----

- a) $\pi/2$ b) $\pi/8$ c) $\pi/4$ d) π

VIII). In Newton's rings experiment, radius (r_n) of n^{th} ring is proportional to -----

- a) \sqrt{n} b) n^2 c) n d) $\frac{1}{n}$

IX) In a zone plate, radius of n^{th} zone is -----

- a) $\sqrt{nb\lambda}$ b) $nb\lambda$ c) $\pi b\lambda$ d) $n\pi b\lambda$

X) The fringes in straight edge diffraction pattern are -----

- a) formed in a geometrical shadow region b) equispaced
c) formed in an illuminated region d) of equal thickness

2. Attempt any two of the following **20**

- I) Describe Fresnel's theory of half period zones and obtain an expression for resultant amplitude at a point due to entire wavefront.
- II) Define resolving power of an optical instrument. Obtain an expression for resolving power of plane diffraction grating.
- III) What is meant by wedge shaped thin film? Obtain an expression for fringe width of interference fringes due to light reflected from wedge shaped thin film.

3. Attempt any four of the following **20**

- I) With neat ray diagram, derive Newton's formula for lens system.
- II) Compare zone plate with convex lens.
- III) Explain Lloyd's single mirror experiment for determination of wavelength (λ) of monochromatic light.
- IV) Describe polarimeter experiment to determine specific rotation of the sugar solution.
- v) State and explain Rayleigh's criterion for limit of resolution.
- VI) What is double refraction? Explain positive and negative crystals.
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Total No. of Pages: 2

SHIVAJI UNIVERSITY, KOLHAPUR
B.Sc. (Part – II) (Semester – IV) Examination (CBCS)
March/April 2023 (Held in June 2023)
ZOOLOGY (Paper - VII)
Reproductive Biology
Sub. Code:78911

Day and Date: Friday,16/06/2023
Time: 10:30-12:30 pm

Total Marks: 50

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. 10 M

1. Corpus luteum produces.....
a) Luteinizing hormone b) Progesterone c) Luteotrophic hormone d) Inhibin
2. Sperms are mainly stored in
a) Epididymis b) Prostate gland c) Bulbourethral gland d) Urethra
3. Epispadia is an abnormality of
a) Prostate b) Penis c) Urinary bladder d) Seminal vesicle
4. Menstrual flow occurs due to lack of.....
a) Vasopressin b) Progesterone c) FSH d) Oxytocin
5. The unpaired structure in the male reproductive system is.....
.....
a) Testis b) Seminal vesicle c) Bulbourethral gland d) Prostate gland
6. In retrograde ejaculation, the semen enters.....
a) Prostate gland b) Epididymis c) Seminal vesicle d) Urinary bladder
7. Placenta is formed in humans by.....
a) Amnion b) Chorion c) Allantois d) All of the above
8. In spermatogenesis, the reduction in number of chromosomes takes place in-----
a) Multiplication phase b) Growth phase c) Spermiogenesis d) Maturation phase
9. Higher level of which hormone has a negative feedback effect on FSH?
a) Estrogen b) Thyroxine c) Adrenaline d) Progesterone
10. Newly released mammalian egg has outermost covering of
a) Plasma membrane b) Neural membrane c) Vitelline membrane d) Zona pellucida

Q.2 Attempt any two of following. 20M

1. What is parturition? Which hormones are involved in parturition?
2. Describe histological structure of human testis.
3. What are contraceptives? Describe IUD and oral contraceptives

Q.3 Attempt any four of the following.

20M

1. Pregnancy diagnosis.
2. Write a note on seminal vesicles.
3. Write a note on vasectomy.
4. Corpus luteum
5. Describe hormonal regulation of spermatogenesis.

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Total No. of Pages: 2

SHIVAJI UNIVERSITY, KOLHAPUR
B.Sc. (Part – II) (Semester – IV) Examination (CBCS)
March/April 2023 (Held in June 2023)
ZOOLOGY (Paper - VIII)
Applied Zoology
Sub. Code:78911

Day and Date: Saturday,17/06/2023
Time: 10:30-12:30pm

Total Marks: 50

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. 10 M

1. is an organism which provides shelter and nourishment for parasite.
a) Parasite b) Host c) Animal d) Virus
2. Typhoid fever spread through
a) Polluted air b) Contaminated water by typhoid bacteria
c) Contaminated water and food by typhoid bacteria d) Fecal and oral rout of infected person
3. Poultry birds needs moderate temperature of about
a) 5-10° C b) 10-15° C c) 10-21° C d) above 30° C
4. The obtain various benefits such as shelter, nutrition, reproduction and development from host.
a) Hosts b) Human c) Pig d) Parasites
5. Steptomycin and PAS (para aminosalicylic acid) anti microbial agent used to treat
a) Tuberculosis b) Typhoid c) Dysentery d) laprosy
6. The common name of *Helicoverpa armigera* is -----
a) Sugarcane borer b) pulse beetle c) Cotton bollworm d) Rice weevil
7. *Rickettsia prowazekii* belongs to -----
a) spotted fever group b) Typhus fever group c) Yellow fever d) Rocky mountain spotted fever
8. *Papilio demoleus* is a common pest of -----
a) Stored grains b) citrus plants c) sugarcane d) cotton
9. *Borrelia recurrentis* and *Treponema pallidum*, these two are pathogenic
a) Spirochaetes b) Viruses c) Protozoans d) Plants
10. In *Sitophilus oryzae* larval and pupal stage are completed in the.....
a) soil b) in the grain c) in pod d) in flower

Q.2 Attempt any two of following. 20M

1. Describe Biology, Control and damage caused by *Helicoverpa armigera*.
2. Describe the Transmission, Prevention, and control of tuberculosis.

3. Give an account on Zoonosis and explain its types giving classification.

Q.3 Attempt any four of the following.

20M

1. Commensalism
2. Treatment of Typhoid fever.
3. Life Cycle of *Callosobruchus chinensis*
4. Coronavirus disease.
5. Nutrients of poultry birds.