UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Botany-I (Plant Diversity) **TIME ALLOWED: 30 mins.**
Course Code: BOT-101/11300 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART I – OBJECTIVE (10 MARKS)

Q.1 Multiple choice questions: Tick the correct answers. **(10 Marks)**

i. **A fully formed infectious viral particle is termed as:**

a) Viroid b) Virusoid c) Viron d) Capsid

ii. **The transmission of a double stranded piece of DNA from a donor bacterium to recipient through a tube is known as:**

a) Transformation b) Sex pilli c) Binary Fission d) Conjugation

iii. **Which structure is used by Prokaryotic cells for locomotion?**

a) Pilli b) Mitochondria c) Flagella d) Endospore

iv. **The siphonostele in which two cylinders of vascular tissue are present is called:**

a) Plectostele b) Haplostele c) Actinostele d) Polycyclic

v. **Gymnosperms are different from angiosperms in:**

a) Fruits b) Seeds c) Naked ovules d) Cones

vi. **In *Marsilea*, sori are produced in hard bodies known as:**

a) Basidiocarps b) Seeds c) Synangia d) Sporocarps

vii. **The type of fruiting body formed in *Ustilago* is:**

a) Perithecium b) Apothecium c) Basidiocarp d) Cleistothecium

viii. **Aeciospores are carried to wheat leaves where they germinate to form:**

a) Telia b) Basidia c) Uredinia d) Pycnia

ix. **Synangium is the characteristic feature of:**

a) Lycopodium b) Selaginella c) Marsilea d) Psilotum

x. **The spore germination results in formation of branched multi-cellular filament, protonema in:**

a) Riccia b) Funaria c) Anthoceros d) All Bryophytes

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Botany-I (Plant Diversity) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-101/11300 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART II, SUBJECTIVE

Q. 2. Answer the following questions briefly. **(20 MARKS)**

1. Briefly explain the TOBACCO MOSAIC VIRUS. Also draw its structure.
2. What are PLASMIDS? Give their significance.
3. Differentiate between TRANSDUCTION and TRANSFORMATION.
4. Differentiate between ASCOMYCETES and BASIDIOMYCETES.
5. What are LICHENS? What are their types on the basis of thallus.
6. Differentiate between the gametophyte of *Adiantum* and *Marselia.*
7. Write importance of fungi in medicine.
8. Define SEED HABIT. Give its importance.
9. Mycorrhizae is a mutualistic association. Comment on it.
10. Describe the THALLUS of *Anthoceros.*

Q. 3. Answer the following questions comprehensively. All questions carry equal marks.

(30 MARKS)

i. (a) Give an account on general characteristics of PTERIDOPHYTES **(5Marks)**

(b) Give an account on REPROCUCTION IN VIRUSES. **(5 Marks)**

ii. (a) Write down a note on VEGETATIVE REPRODUCTION in ALGAE. **(5 Marks)**
(b) Explain the life cycle of RUST FUNGI with illustration. **(5 Marks)**

iii. (a) Write a detail account on transverse structure of CYCUS LEAF. **(5 Marks)**
(b) Explain reproductive structure of the CHARA. Also draw its neat and labeled diagram. **(5 Marks)**

UNIVERSITY OF THE PUNJAB

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Second Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Botany-II **TIME ALLOWED: 30 mins.**
(Plant Systematic Anatomy & Development Theory) **MAX. MARKS: 10**
Course Code: BOT-103 / BOT-12300

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Q 1. MCQs

1. Region where integuments fuse with funiculus is termed
   a. chalaza b. nucellus c. raphe
2. Megaspore mother cell produces megaspore which undergoes mitotic divisions to form
   a. embryo sac of female gametophyte b. eggs c. endosperm
3. Stem cortex is a cylindrical region between epidermis and --------
   a. pith b. casparian strips c. vascular bundle
4. The xaxy substance found on wall of cork cells is
   a. Cutin b. Suberin c. Hemicellulose
5. In the leaves and stems of hydrophytes, ----------are formed which help them in floatation.
   a. air chambers b. gravity chambers c. water cells
6. Vascular cambium also increases the ---------- of stem.
   a. width b. length c. food storage capacity
7. C. Linnaeus formulated ---------- system of classification.
   a. Linnaeus system b. Phylogenetic system c. international system
8. Outer protective tissues of plants are
   a. cork and cortex b. cork and epidermis c. cork and pericycle
9. Annual rings are distinct in plants growing in
   a. temperate region b. tropical region c. artic region
10. Intercalary meristem results in
    a. secondary growth b. apical growth c. primary growth

UNIVERSITY OF THE PUNJAB

Second Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Botany-II
(Plant Systematic Anatomy & Development Theory)
Course Code: BOT-103 / BOT-12300

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Short Questions (10 x 2=20)

1. What are PHLOEM and XYLEM? What type of cells form these tissues?
2. Differentiate between CYMOSE and RACEMOSE inflorescence?
3. Give functions of fibers.
4. Differentiate between TAP ROOT and ADVENTITIOUS ROOT.
5. What is meant by double fertilization?
6. Differentiate between RETICULATE and PARALLEL venation.
7. Give different types of placentation in ovary.
8. Define CATKIN and UMBEL.
9. Write two botanical names of plants along with their common names belonging to family POACEAE.
10. Differentiate between arrangement of vascular bundles in stem and root.

Detailed Questions (30)

1. (A): Define Plant systematics. Differentiate between Phylogenetic and Artificial system of classification (5).
   (B): Write rules of Binomial nomenclature. (5)
2. Describe some characteristic features of members of family BRASSICACEAE. Also discuss the economic importance of this family. (10)
3. Write brief notes on (a) MERISTEM and its types (b) VESSELS and TRACHEIDS. (10)

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Roll No. .....

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

PAPER: Botany-III (Cell Biology, Genetics and Evolution) **TIME ALLOWED: 30 mins.**
Course Code: BOT-201/21300 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE PART

Q1. Every question has four options. Encircle the right option. **(10)**

a. Starch and cellulose are made up of

i. Glucose and Fructose respectively
ii. Glucose
iii. Fructose
iv. Glucose and Galactose

b. Golgi body is associated with:

i. Nucleus ii. Mitochondria iii. Cytoplasm
iv. Endoplasmic reticulum

c. Molecular model of plasma membrane was proposed by:

i. Singer and Nicolson ii. Miller and Skoog
iii. Danielli and Davson iv. Watson and Crick

d. Characteristic size and shape of chromosomes of an organism at mitotic metaphase is known as:

i. Genotype ii. Genome iii. Karyotype iv. Phenotype

e. Glyoxysomes perform:

i. Hydrolysis ii. Lipolysis iii. Proteolysis iv. None of these

f. Cell undergoes mitosis without interruption when it has entered:

i. S-phase ii. G2 phase iii. G1 phase iv. G0 phase

g. F1 particles are present in:

i. Chloroplasts ii. Mitochondria iii. Dictyosomes
iv. Nucleus

h. Which type of RNA contains unusual bases?

i. m-RNA ii. t-RNA iii. m-RNA iv. All of these

i. A cross between unlike organisms is called

i. Test cross ii. Heterosis iii. Back cross iv. Hybrid

j. PCR is related with:

i. DNA cloning ii. Amplification of DNA
iii. DNA selective replication iv. All of these

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Botany-III (Cell Biology, Genetics and Evolution) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-201/21300 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE PART

Q2. Answer the short questions. Attempt any 10. **(20)**

i. Mention functions of Golgi complex.

j. What is the chemical composition of Ribosomes?

k. What are Glyoxisomes and what is their function?

l. What are B-chromosomes?

m. What is Cytokinesis?

n. What is the role of Mitosis?

o. What is Karyotyping?

p. Differentiate between Nucleoside and Nucleotide.

q. What are Transposons?

r. What are Alleles?

s. What is Crossing over?

t. What is Mutation?

u. What is the difference between Active and Passive transport?

v. What are Plasmids and what is their role in bacteria?

w. What is Cell cycle?

Q3. Attempt any (2) two questions. **(15 + 15)**

1. a. What is Gene mutation? (7)
   b. Describe DNA replication in detail. (8)

2. a. Explain the structure and function of Plastids. (7)

   b. Describe Chromosomal Aberrations in detail. (8)

3. What is PCR and how it is used to form multiple copies of DNA segment? (15)

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Roll No. .....

Fourth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Botany-IV (Plant Physiology and Ecology) **TIME ALLOWED: 30 mins.**
Course Code: BOT-203 / BOT-22300 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART-1

Q.1. each question is followed by four possible answers. Choose the correct (most appropriate) answer by encircling it.

i. The unit of chemical potential is

a. J mol^{-1} b. J mol^{-2}
c. J mol^{-3} d. None

ii. The energy needed to separate molecules from the liquid phase and move them into the gas phase at constant temperature is called

a. Specific heat energy b. Latent heat of vaporization
c. Free energy change d. None

iii. The water in the deep and permanently saturated zone is called

a .Hygroscopic water b. Chemically combined water
c. Ground water d. Gravitational water

iv. Zeatin is an example of natural

a. Auxin b. Cytokinin
c. Gibberelin d. None of above

v. Stomatal opening is stimulated by

a. Blue light b. Red light
c. Green light d. UV light

vi. Which food chain does not start from plants?

a. Grazing b. Detritus food chain
b. Pond food chain c. Terrestrial food chain

vii. Water depth in the sedge meadow stage of hydrosere is

a. 6-8 feet b. 4-6 feet
c. 1 foot d. 1-2 inches

viii. Which one is not a feature of hydrophytes?

a. They have dorse-ventrally flattened leaves
b. They have lacunae in their tissues
c. They have whitish leaves d. They do not have structural tissues

xi. Alluvial parent materials are characterized by

a. Indiscriminate mixing and a specific shape of materials
b. Indiscriminate mixing and an indefinite shape of
c. Layered arrangement and a specific shape of materials
d. None of the above statements is true

ix. The state of water that moves in all directions is called

a. Capillary water b. Gravitational water
c. Hygroscopic water d. Combined water

UNIVERSITY OF THE PUNJAB

Fourth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Botany-IV (Plant Physiology and Ecology) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-203 / BOT-22300 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART-II

Q2. Answer the following questions with short answer. Each question carries two marks.

i. Differentiate between growth and development?
ii. Define respiratory quotient?
iii. Write down any two natural and synthetic auxins?
iv. What is the difference between photo-system I and II?
v. Write down various physiological reasons of seed dormancy?
vi. Differentiate between a food web and food chain.
vii. What is the autogenic change incurred during succession?
viii. How is wind an important environmental factor for plants?
ix. Give two main types of population growth.
x. Differentiate between soil structure and soil texture.

Q3. Answer the following questions briefly. (6x5= 30)

i. Describe three major pathways for water movement in plant cell?
ii. Classify and explain the plant mineral nutrients on the basis of biochemical functions.
iii. With the help of flow diagram write down the biosynthesis of cytokinins.
iv. What are the characteristics of xerophytes that help them to thrive under desiccating conditions.
v. Give in detail the characteristics of plant communities.
vi. Draw a graphic representation of the N cycle in nature. Write the salient features of this cycle.

UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Higher Fungi **TIME ALLOWED: 30 mins.**
Course Code: BOT-301 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

PART-I

Q1. Each question has four possible answers. Choose the correct answer and encircle it.

1. Receptive filament growing from the ascogonium is known as

a) Paraphysis b) Periphyses c) Spermatium d) Trichogyne

2. Stink horn is the common name of

a. Phallus b. *Agaricus* c. *Lycoperdon* d. None of the above

3. The fruiting body of Penicillium is called

a. Cleistothecium b. Perithecium c. Apothecium d. Stroma

4 By removing the Berbery, wheat rust cannot be controlled because

A). Basidiospores will not germinate

B). Aeciospores will not be formed

C). Urediniospores can attack again wheat

D). None of the above

5. Gills are produced in

a. *Ganoderma* b. *Russula* c. *Alternaria* d. *Hydnum*

6. Teliospores of smut fungi are formed by

A). Rounding off the mycelium B). Budding C). Fission C). None of these

7. Dolipore septa are the characteristic feature of _____ mycelium

a. Asomycetes b. Lichens c. Basidiomycetes d. Deuteromycotina

8. The thallus of lichen contains

a. Algal cells b. Fungal hyphae c. a&b d) None of these

9. Plants get benefit from the fungus forming symbiotic association in the form of

a. Water b. Minerals b. Carbohydrates d. a & b

10. Most of the lichens contain mycobiont

a) *Trebauxia* b) *Nostoc* c) *Chlaymydomonas* d) None of these

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Higher Fungi **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-301 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.
SUBJECTIVE TYPE

PART-II

2. Briefly answer the following questions. Each question carries two marks. 20 Marks

1. What is the difference between AGARICALES and APHYLLOPHORALES?
2. What is the ecological importance of fresh water hyphomycetes?
3. What are HOMOKARYOTIC and HETEROKARYOTIC mycelia?
4. Differentiate between THALLIC CONIDIUM and BLASTIC CONIDIUM.
5. Give a diagrammatic representation of ASCUS development?
6. Differentiate between a simple SPORE and CONIDIUM?
7. Differentiate between ASCOCARP and BASIDIOCARP.
8. What are OPERCULATE and INOPERCULATE DISCOMYCETES? Give some examples.
9. What is ERGOTISM?
10. Differentiate between ISOBASIDIUM and PHRAGMOBASIDIUM with labeled diagrams.

SUBJECTIVE QUESTIONS **30 Marks**

Q3. Answers the following questions.

1. What are GASTEROMYCETES? Briefly describe their spore dispersal mechanism. (05 marks)
2. Give general characters of LICHENS. Also explain their anatomy with suitable labeled diagram. (05 marks)
3. Explain PARASEXUALITY and its significance (05 marks)
4. Describe HETEROECISM in rust fungi. (05 marks)
5. What is CENTRUM? Write a note on different types of Centrum found in ASCOMYCOTINA. (10 marks)

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Roll No. .....

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

PAPER: Microbial and Molecular Genetics **TIME ALLOWED: 30 mins.**
Course Code: BOT-303 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE

A. Choose the correct answer: 10

1. Genes within an operon:

a) Tend to be regulated by a common regulatory mechanism

b) Are generally involved in the same biochemical pathway

c) Are expressed as a polycistronic RNA

d) All of the above

2. Mutations that impact evolution most occur in

a) somatic cells

b) brain cells

c) germ-line cells

d)sperm cells

3. Ultraviolet light can cause the formation of double bonds between adjacent pyrimidines, resulting in a formation called a

a) pyrimidine mispairing

b) pyrimidine-pyrimidine pairing

c) pyrimidine dimer

d) pyrimidine pseudopairing

4. Transposition can facilitate

a) Insertional activator
b) Gene amplification
c) Gene mobilization
d) Insertional reversion

(P.T.O.)

5. Which is not part of lac operon?

a) Repressor

b) Activator protein

c) Operator

d) Promotor

e) Structural gene

6. Plasmids can best be described as:

a) small, circular DNA molecules that can exist independently of chromosomes commonly found in bacteria

b) a complex membrane structure that covers the chromosome of bacteria

c) another name for a chloroplast

7. Recombination occur as a result of

a) Crossing over b) translocation c) synapsis d) mutation

8. The phages whose DNA can get integrated into the bacterial genome are called

a) Virulent b) T4 c) bacteriophage d) temperate

9. Specialized transduction is mediated by

a) lytic phages
b) lysogenic phages
c) Both lytic and lysogenic phages
d) T4 phages

10. 5-bromouracil is most likely to produce _____.

a) T-A transversions

b) T-C transitions

c) T-C transversions

d) T-A transitions

e) indel mutations

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Microbial and Molecular Genetics **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-303 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

B. Explain the following: **12**

I. Differentiate between

a) TRANSCRIPTION and TRANSLATION

b) SAMESENSE and NONSENSE mutations

c) LYTIC cycle and LYSOGENIC cycle

d) PARTIAL and COMPLETE DEGENERACY

e) TRANSFORMATION and TRANSDUCTION

f) BASE ANALOGUES and NITROGENOUS BASES

II. Define: **8**

i. ACRIDINES
ii. P-ELEMENTS
iii. CONDITIONAL LETHAL MUTATIONS
iv. HISTONE proteins

C. Write brief answers: **30**

1. Write about the general nature of GENETIC CODE.

2. Comment on the statement "COMPLEMENTATION within the same CISTRON is not possible".

3. Write in detail about the functions of various components present in *lac*-OPERON.

4. What is meant by PHENOTYPIC MIXING? Draw diagrams to explain.

5. Are TRANSPOSABLE elements ever beneficial for their hosts? Explain and give examples.

6. Explain the process of SPECIALIZED TRANSDUCTION with the help of diagrams.

UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Evolutionary Trends in Trachaeophytes **TIME ALLOWED: 30 mins.**
Course Code: BOT-305 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

1. Multiple Choice Question (10)

Encircle the correct option.

1) Molecular evidence suggests that _____ group of algae is closest in evolutionary terms to land plants.
(a) Chlorophycea (b) Charophyceae (c)Chrysophycea (d) Phaeophyceae

2) The presence of _____ in spore walls and cuticles in the early fossil record is often taken to indicate an important stage in the terrestrialization process.
(a) lignin (b) suberin (c) sporopollenin (d) chitin

3) Cycadales are

(a) Monocious (b) Dioecious

(c) Monoecious by fossil record (d) Dioecious with some monoeciuos species

4) According to the _____theory the elementary process of "reduction" of telomes accounts for the origin of the microphyllous type of leaf.

(a) enation (b) antithetic (c) telome (d) fusion

5) Selaginella is
(a) homogametic (b) heterosporous
(c) heterosporous and heterogametic (d) homosporous and homogametic

6) Which of the following specimen has prominent ridges in transverse section of stem?
(a) Lycopodium (b) Selaginella (c) Lepidodendron (d) Equisetum

7) The stele prevalent in Rhyniophytes stem is
(a) protostele (b) plectostele (c) Siphonostele (d) haplostele

8) First true seeds appeared in
(a) seed ferns (b) progymnosperms (c) gymnosperms (d) angiosperms

9) Microphylls are first time evoleved in
(a) Psilopsids (b) lycopsids (c) Sphenopsids (d) Pteridosperms

10) Example of living fossil with dichotomous leafless branches and terminal sporangia is
(a) Sphenodendron (b) Lepidodendron (c) Tmesipteris (d) Cooksonia

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Evolutionary Trends in Trachaeophytes **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-305 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.
SUBJECTIVE TYPE

2. Attempt any TEN) (2x10=20)

i. Name the two groups of seed plants that were established by early carboniferous.

ii. Define the term **ORGANOGRAPHY.**

iii. Differentiate between **PROTOSTELE** and **SIPHONOSTELE.**

iv. Why ***Ginkgo biloba*** is often described as a living fossil?

v. Briefly explain the term **COMPRESSION FOSSIL.**

vi. Differentiate between **EXARCH** and **ENDARCH XYLEM.**

vii. Differentiate between **MICROPHYLL** and **MEGAPHYLL.**

viii. What is **SPOROPOLLENIN**?

ix. Write down the names of two major clades of **LYCOPHYTINA.**

x. Define the term **APOSPORY.**

xi. Write down the names of two extant genera of psilopsids.

xii. Define the terms **SORUS** and **INDUSIUM** in ferns.

xiii. Differentiate between **pith cast** and **premineralized** stems of Calamites.

xiv. Differentiate between **LEPIDODENDRALES** and **ISOETALES.**

xv. Why ^{14}C-dating is considered more useful in dating biological systems?

3. Attempt any TWO (15 + 15)

Q.1

a) Briefly describe evolutionary trends in gymnosperm to angiosperm evolution.

b) Define seed and explain evolution of Seed Habit

Q. 2

a) What is strobilus? Explain its structure and role in an arthrophyte..

b) Describe morphology of gametophyte of Lycopodium.

Q. 3

a) Describe the general characteristics of angiosperms.

b) How does **Leptosporangium** differ from **Eusporangium**? Explain ontogeny of Leptosporangium.

UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Environmental Biology **TIME ALLOWED: 30 mins.**
Course Code: BOT-307 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.
OBJECTIVE TYPE

Q 1. Encircle correct option of the statements given below. **10**

(i) Name of extremely effective fire extinguishing agent is

(a) Helium (b) Halons (c) Halogens (d) Argon

(ii) Unit to measure noise by using sound meter is

(a) Decibel (b) Hertz (c) Joule (d) Micron

(iii) Ozone layer in atmosphere is located in

(a) Exosphere (b) Mesosphere (c) Stratosphere (d) Troposphere

(iv) Species restricted only to a particular habitat or locality and not found anywhere is known as

(a) Rare species (b) Indicator species (c) Endemic Species (d) Endangered species

(v) Mustard gas (HD) is a

(a) Nerve gas (b) Harassing agent (c) Incapacitating agent (d) Riot control gas

(vi) Game fish simply survives but does not reproduce at a temperature above

(a) 8°C (b) 9°C (c) 10°C (d) 11°C

(vii) Small hemorrhages and black spots on the body are symptoms of

(a) Bubonic plague (b) Pneumonic plague (c) Psittacosis (d) Tularemia

(viii) Major contribution in global warming is that of

(a) CFCs (b) Methane (c) CO_2 (d) N_2O

(ix) Higher the ICV, higher is the radio-sensitivity in

(a) Higher animals (b) lower plants (c) Invertebrates (d) Higher plants

(x) Which of the following group of organisms is most sensitive to radiations

(a) Plants (b) Mammals (c) Insects (d) Amphibians

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Environmental Biology **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-307 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.
SUBJECTIVE TYPE

Q 2. Write short notes on the following **(2.5 x 8)**

(i) Algal Blooms and their significance
(ii) Adverse effects of Air pollution on Human health
(iii) Enlist various Parameters of Polluted water
(iv) The Fallout problem
(v) What are effects of Thermal pollution?
(vi) Impacts of Noise pollution
(vii) Chemical Warfare
(viii) Effects of Marine pollution

Give detailed answers of the following

Q 3. What do you understand by Environmental crisis? Briefly discuss effects of **10**
(a) Global Warming
(b) Ozone Hole
(c) Acid Rain

Q 4. Define and classify Pesticides. Give an account of their characteristics and environmental problems associated with their extensive use. **9**

Q 5. What is Radiation Pollution? Classify and characterize types of Radiations. Write down effects of Radiations at Ecosystem level. What is fate of radio-nuclides in the environment? **11**

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Plant Anatomy (Advance Course) **TIME ALLOWED: 30 mins.**
Course Code: BOT-311 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Part I

Complete Part I in first 30 minutes and return it to the examiner. Cutting and over-writing is not allowed.

Q.1: Encircle the correct answer from the given options. **(10)**

i. Trichomes secreting the sticky substances are
(a) Glands (b) Colleters (c) Stinging hairs (d) Papillae

ii. In grafting stock serves as
(a) Root system (b) Vegetative bud (c) Meristematic region
(d) Cambial region

iii. Meristeles are individual vascular bundles in
(a) Atactostele (b) Solenostele (c) Dictyostele (d) Polystele

iv. The ability of wood to withstand rotting is
(a) Pliability (b) Texture (c) Strength (d) Durability

v. The peripheral functional part of the secondary xylem is
(a) Latewood (b) Sapwood (c) Earlywood (d) Heartwood

vi. Association between fugal hyphae and roots of higher plants is
(a) Colonization (b) Mycorrhizae (c) Haustoria (d) Rhizobium

vii. A leaf in which palisade parenchyma is present on both abaxial and adaxial leaf surfaces is termed as
(a) Bifacial leaf (b) Isobilateral leaf (c) Dorsiventral (d) Foliage leaf

viii. Guttation is a process characteristic to
(a) Nectaries (b) Laticifers (c) Hydathodes (d) Resin ducts

ix. Casparian strips are present on the walls of
(a) Epidermal cells (b) Hypodermal cells (c) Endodermal cells (d) Peridermal cells

x. The additional growth rings resulting from injury are called
(a) Multiple growth rings (b) Annual growth rings (c) False growth rings (d) Abrupt growth rings

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Plant Anatomy (Advance Course) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-311 **MAX. MARKS: 50**

Part II

Attempt all questions from part II on separate answer sheet provided

Q. 2. Briefly answer the following questions. **(10×2 = 20)**

i. Define unusual secondary growth. From where does it take place?
ii. Name and define the three types of protostele.
iii. Differentiate between conjoint and concentric vascular bundles.
iv. Why is the heartwood darker in color than sapwood?
v. How is fascicular cambium different from inter-fascicular cambium?
vi. What is paratracheal parenchyma? Name its different types.
vii. Differentiate between bundle sheath and bundle sheath extension.
viii. Define reaction wood. Name its types.
ix. Name the plants that possess haustoria. What role do these roots play?
x. What do you understand by the terms hydathodes and guttation? How are these terms inter-linked to each other

Q. 3. Write detailed answers to the following questions. Draw figures to support your answers as required.

I. Give a detailed account on root-shoot transition. **(10)**

II. Explain the histology of angiosperm leaf. **(10)**

III. What is the relationship between the microscopic structure and wood properties? Explain any three features in detail. **(10)**

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Gene Cloning (Advance Course) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-313 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART-II

SHORT QUESTIONS **2×10=20 Marks**

Q2. Answer briefly the following questions. Each question carries two marks.

1. Define genetic engineering.
2. Enlist different techniques for isolation of DNA.
3. What is transformation? Give transformation method in plants.
4. Differentiate between conjugative and non conjugative plasmids.
5. What is the function of Taq Polymerase?
6. What is the function of Agarose Gel?
7. What are cosmids?
8. Define Western Blotings?
9. Explain copy number of plasmids.
10. What is defined medium?

SUBJECTIVE QUESTIONS **(30 Marks)**

Q3. Answer the following questions.

1. a) Classify Plasmids. Explain its various types. 5

   b) Write a note on importance of gene cloning in Agriculture. 5

2. Describe briefly about the steps involved in Recombinant DNA Technology. 10

3. a) Write a note on basic features of Bacteriophage. 5

   b) How you can measure DNA Concentration? 5

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Gene Cloning (Advance Course) **TIME ALLOWED: 30 mins.**
Course Code: BOT-313 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART-I

Q1. Each question has four possible answers. Choose the correct answer and encircle it.

1. DNA extracted from an organism is cut in to gene size pieces with
   a) polymerase enzymes b)Helicase enzyme c) Gyrase enzyme d) Restriction enzyme

2. For cloning, DNA samples are taken from

   a) Same individual b) Different individual c) Same species d) None of above

3. Process in which bacterial cell wall is disrupted by using small electric pulses is
   a) Electroporation b) electric shock c) electric fragmentation d) electrolysis

4. Small circles of DNA present in bacterial cells are called
   a) Enzymes b) Ribosomes c) Plasmids d) none of above

5. Restriction enzymes are also called as
   a) Biological scissors b) Molecular scalpels c) Molecular knives d) All of these

6. Detergents aid the process of lysis by removing ---------- molecules and thereby cause disruptions of the cell membrane

   a) Protein b) Lipids c) Carbohydrates d) a And c

7. Some plasmids especially the larger one are ----------and have a low copy number of just one or two per cells
   a) Relaxed b) Stringent c) Episomes d)Both b and c
8. A PCR reaction that continues for 30 cycles will produce approximately how many PCR products from a single template DNA molecule?
   a) 64 b) 128,000 c) Approximately 1 million d) Approximately 1 billion

9. Which of the following is NOT required for a PCR reaction?
   a) A thermostable DNA polymerase b) Dideoxy-dNTPs c) Primers d) Template DNA

10. Which of the following methods for introducing DNA into cells is used only for plants?

    a) A gene 'gun' b) Electroporation c) Microinjection d) Transformation of competent cells

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Plant Tissue Culture (Advance Course) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-315 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART-II

Q2. QUESTIONS WITH SHORT ANSWERS (10×2=20 Marks)

1. Differentiate between somatic embryogenesis and somatic hybridization.
2. Why are fluorescent lamps more advantageous than incandescent lamps in a tissue culture set up?
3. What are the uses of plant protoplast cultures?
4. Name any two 'naturally-existing' as well as 'lab-synthesized' growth regulators.
5. What health-hazards are associated with the use of hypochlorite solution?
6. Define cellular totipotency. Which type of cells show this characteristic?
7. Differentiate between dry-heat and wet-heat sterilization.
8. Write down couple of sentences on 'medium undefined'.
9. How are protoplasts isolated mechanically and enzymatically?
10. Define callus. How are 'friable' and compact callus cultures different from each other?

Q3. QUESTIONS WITH BRIEF ANSWERS (10×3=30 Marks)

1. Define synthetic media. Give various components of media necessary for plant growth.
2. What is the benefit of culturing meristems in a tissue culture setup? Elaborate.
3. What is somatic embryogenesis? How is this phenomenon different in monocot and dicotyledonous plant species?

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Plant Tissue Culture (Advance Course) **TIME ALLOWED: 30 mins.**
Course Code: BOT-315 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART-I

Each question has four possible answers. Choose the correct (best) answer by encircling it. Each question statement carries equal marks.

Multiple choice questions

Q1. Encircle the correct option (10)

1. Part of a plant used for tissue culture is usually referred to as

a) Scion b) Explant c) Stock d) all (a, b and c) are true

2. Protoplasts are the cells which at the time of isolation are devoid of

a) cell wall b) cellular membrane c) both a and b are correct

d) both a and b are false

3. A widely used chemical for protoplast fusion is

a) Manitol b) Sorbitol c) Poly ethylene glycol (PEG)

d) all (a, b and c) may be used

4. Which of the following plant tissues may potentially show cellular totipotency?

a) xylem vessels b) Meristem c) Cork cambium d) option 'b' and 'c' are true

5. A medium which is composed of chemically defined compounds is called

a) Artificial medium b) Synthetic medium c) PTC medium
d) all (a, b and c) are true

6. The best method of hybridization of plants is achieved through

b) Cell cultures b) Protoplast cultures c) Embryo culture

d) Anther cultures

7. The unorganized growth of cells is usually referred to as

a) Callus b) Tissue c) Explants d) Plant culture

8. Anther culture technique is usually used to produce

a) Diploid plants b) Hybrid plants c) Haploid plants d) all of these

9. The sensitive media having certain kind of vitamins are sterilized by using

a) an Oven b) an Autoclave c) Ultra-filtration d) 'a', 'b' and 'c' are true

10. The ability of each callus cell to form a whole plant is known as

a) Re-differentiation b) De-differentiation c) Totipotency d) 'a', 'b' and 'c' are true

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Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Palynology (Advance Course) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-317 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Part II

Q.2 Answer the following short questions. (2x10)

I. Differentiate clearly between **Neopalynology** and **Paleopalynology**.

II. What is **Thermal Maturation**?

III. How does Palynology help in Medicines to control **Allergies** and **Asthama**?

IV. Write a note on **Aeropalynology.**

V. Differentiate between **Sulcus and Colpus**.

VI. How Paleopalynology does help in reconstruction of **Past Plant Communities**?

VII. What do these codes indicate about spores and pollen:

Sao, Scz, Pd5, Pv2.

VIII. Differentiate between **Psilate and Laevigate** Pollen Exine.

IX. Describe **Heavy Liquid Separation** in Maceration.

X. How will you identify **Reworking**?

Answer the following Long Questions. (10x3)

Q.3: **Define Maceration.** Describe in detail complete procedure of **Collection and Maceration** of flowers from different plants for the isolation of **Pollen / Spores**.(10 Marks)

Q.4: Give **Potonie's** System of Classification. (10 Marks)

Q.5: **a)** Write a note on Production and dispersal of Spores and Pollen. (05 Marks)

b) Describe in detail the procedure to prepare **Glycerin Jelly**. (05 Marks)

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Palynology (Advance Course) **TIME ALLOWED: 30 mins.**
Course Code: BOT-317 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Part-I

Q.1 Select the correct option and encircle it.

I. **Palynology** is the study of

a. Pollen **b.** Spores **c.** Microfossils **d.** Palynomorphs

II. **The range of Occurrence for Cryptospores is**:

a. Precambrian-recent **b.** Cambrian-Silurian **c.** Cambrian-Permian **d.** Silurian to recent

III. **Turmal System of Classificaction** was given by _____ .

a. Habib Kahn **b.** Potonie **c.** Manum **d.** Loronte

IV. **Particles** those originally were fragments of plants are called:

a. Palynodebris **b.** Varia **c.** Phytoclast **d.** Cyst

V. **HF** is used in maceration of sedimentary rocks for removal of

a. Catagenesis **b.** Diagenesis **c.** Metagenesis **d.** Metamorphosis

VI. The process of **Coalification** of **dispersed organic matter** is called

a. Monosaccate **b.** Bisaccate **c.** Colpate **d.** Porate

VII. Palynological preparations contain more or less organic **"Junk"** not referable to specific palynomorphs:

a. varia **b.** palynodebris **c.** palynofacies **d.** pollen

VIII. **Refractive Index (RI) of Sporopollenin** is

a. 1.4 **b.** 1.43 **c.** 1.46 **d.** 1.48

IX. **Color of exine** of palynomorphs is an indicative of

a. Biostratigraphy **b.** Organic Thermal Maturity **c.** Paleobiogeography **d.** Palaeontology

X. The chances of finding fossil pollen and spores is more likely in

a. Coarse grained sandstone **b.** Fine grained sandstone **c.** Silt stone **d.** clay stone

UNIVERSITY OF THE PUNJAB

Roll No. .....

Seventh Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Air Pollution its Impacts and Control **TIME ALLOWED: 30 mins.**

Course Code: BOT-401 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q 1. Encircle correct option of the statements given below. 10

(i) Amount of energy present in residual nuclear radiations after atomic blast is

(a) 8% (b) 10% (c) 12% (d) 15%

(ii) Particulate air pollution from automobile exhaust is due to

(a) Zinc (b) Cadmium (c) Lead (d) Mercury

(iii) Brown Haze (colour) of photochemical smog is due to

(a) NO_2 (b) O_3 (c) N_2O (d) NO

(iv) The major contributor of carbon monoxide in the air is

(a) Motor vehicles (b) Industrial processes (c) Stationary fuel combustion (d) None of a, b or c

(v) Excessive mucous secretions in the bronchial tree is due to

(a) Asthma (b) Chronic Bronchitis (c) Pulmonary Emphysema (d) All a, b and c

(vi) Ozone in upper atmosphere is found in

(a) Mesosphere (b) Ionosphere (c) Stratosphere (d) Exosphere

(vii) Ozone in upper atmosphere is farmed by a photochemical reaction with

(a) UV radiations (b) Infra-red radiations (c) Visible radiation (d) All a, b and c

(viii) Which of the following is used as anti-knocking agent in gasoline in motor vehicles?

(a) Tetramethyl lead (b) Tetraethyl lead (c) Trimethyl lead (d) Triethyl lead

(ix) Without insulating effect of atmosphere, daytime temperature at equator would rise to

(a) 160°F (b) 170°F (c) 180°F (d) 190°F

(P.T.O.)

(x) Volcanos and combustion of coal and oil are sources of

(a) Cl (b) NO (c) HF (d) SO_2

(xi) Acid Precipitation is a type of

(a) Wet Deposition (b) Dry deposition (c) Both a & b (d) None of a & b

(xii) Without atmosphere, there would be no

(a) Fire (b) Clouds (c) Sound (d) All a, b and c

(xiii) 99% of earth's atmosphere lies within an altitude of

(a) 10 miles (b) 13 miles (c) 16 miles (d) 19 miles

(xiv) Higher the Inter-phase Chromosome Volume (ICV), higher the radio-sensitivity in

(a) Higher animals (b) Lower plants (c) Higher plants (d) Invertebrates

(xv) Which of the following radionuclide occur naturally contributing to the background radiation and is also an essential constituent of an organism

(a) $Carbon^{14}$ (b) $Potassiam^{40}$ (c) $Sodium^{24}$ (d) $Zinc^{65}$

(xvi) Miners suffer from lung damage due to accumulation of

(a) CO (b) Particulate matter (c) SO_2 (d) NO_2

(xvii) Heat absorption capacity of N_2O molecule is higher than that of CO_2 molecule by

(a) 230 times (b) 150 times (c) 100 times (d) 30 times

(xviii) Example of a photochemical pollutant is

(a) NO_2 (b) PAN (c) SO_2 (d) NO

(xix) Maximum stratospheric ozone concentration is

(b) 10 ppm (b) 11 ppm (c) 12 ppm (d) 13 ppm

(xx) Radionuclide that accumulates in thyroid gland of man is

(a) $Strontium^{90}$ (b) $Cesium^{137}$ (c) $Iodine^{131}$ (d) $Zinc^{65}$

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Air Pollution its Impacts and Control **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-401 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q 2. Write short notes of 6 to 8 lines on the following: 20

(i) Photochemical Pollutants
(ii) Effects of Chernobyl event on living organisms
(iii) Major respiratory diseases in human beings due to Air Pollution.
(iv) Fate of Radionuclides in the environment.
(v) Acid Rain and its adverse effects
(vi) Explain the phenomenon of Nuclear Winter
(vii) Sources and impacts of Mercury Pollution.
(viii) Exhaust emissions from motor vehicles.

Q 3. (a) Define Aerosols. Give an account of their chemical composition, physical and physiological impacts. 5
(b) What are Primary Air Pollutants? Classify and discuss their sources, characteristics and impacts. 5

Q 4. Define Greenhouse effect, Global Warming and Climate change. Give an account of culprit gases and their warming potential. Briefly discuss impacts of Global Warming. 10

Q 5. Define Air Pollution. What are Air Quality Standards? How Air Pollution can be controlled at source? 10

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Biohazards, Biosafety, Bioethics **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-403 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART-II

Q2: Answer the following: **20**

i. What do you understand by the term Biohazards? 3
ii. Microorganisms are sources of diseases. Comment. 3
iii. What do you understand by the term Therapeutic Cloning? 3
iv. Write about the toxic substances released in the environment from various industries 4
v. Write briefly about the rules and regulations regarding protection of workers from radiation. 3
vi. What do you understand by the terms dry heat sterilization and ultrafiltration? 4

Q3: Explain in detail: **30**

a. Write about the characteristic features of alpha, beta and gamma radiations.
b. Write a note on the beneficial use of radiations in the field of health.
c. Write a note on microbial cell culture.
d. Write about the patent issues regarding animal and human cloning.
e. Write about the causal organisms, symptoms and precautionary measures of some diseases caused by fungi.
f. What do you mean by the term Environmental Law. Explain in detail.

UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Biohazards, Biosafety, Bioethics **TIME ALLOWED: 30 mins.**
Course Code: BOT-403 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART-I

Q1. Choose the correct answer: **10**

1. What are some of the symptoms of acute radiation syndrome?
a. Nausea
b. blistering of the skin
c. loss of hair
d. all of the above

2. In comparison to regular cell phones, smart phones emit how much radiation?
a. less
b. more
c. about the same
d. none at all

3. What characteristics allow microwaves to be used in cooking?
a. They are reflected by metal.
b. They pass through glass, paper, plastic and similar materials.
c. They are absorbed by foods.
d. all of the above

4. What do we know about the risk of exposure to power lines?
a. Living near power lines definitely increases the risk of cancer.
b. Cows raised underneath power lines give radioactive milk.
c. Living near power lines may increase the risk of cancer.
d. There are no harmful effects from living near power lines.

5. What precautions are taken when radioactive materials are transported by truck, train, plane or boat?
a. specially designed shipping containers
b. specially trained drivers
c. carefully chosen routes
d. all of the above

P.T.O.

6. Atomic bomb was used against Japan in
   a. 1945
   b. 1950
   c. 1960
   d. 1949

7. Most diseases are
   a. Air born
   b. Soil born
   c. Water born
   d. None of the above

8. Dolly was cloned in
a. 1997
b. 1920
c. 1930
d. 1980

9. Bt cotton is not
a. A GM plant
b. Insect resistant
c. A bacterial gene expressing system
d. Resistant to all pesticides

10. What is a concern about G.M.O.?

   a. People can get seriously ill or die

   b. People can get allergies

   c. People can get cancer

   d. All of the above

UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Plant Nutrition and Soil Fertility **TIME ALLOWED: 30 mins.**
Course Code: BOT-405 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART-I

Q1. Choose the correct answer and encircle it. **10**

1. Plants prefer to take up Nitrogen in the form of

(a) N_2 (b) NH_4^+

(c) NO_3^- (c) All of these

2. _____is the manifestation of morphological characteristics and adaptations to environmental characteristics.

(a) Genotypic characteristics (b) Phenotypic Plasticity

(c) Ecological amplitude (d) Ecospecies

3. The ability of the soil to hold essential elements in soil so plants can access them during plant growth is called:

(a) Nutrient level (b) pH

(c) Fertilization level (d) Cation exchange capacity (CEC)

4. Which of the following is a bacterium involved in denitrification:

(a) *Azotobacter* (b) *Nitrosomonas*

(c) *Pseudomonas* (d) *Nitrobacter*

5. Soil particles that are 0.2-2 mm in diameter are called

(a) Sand (b) Salt

(c) Clay (d) Loam

6. 95 % portion of plant tissues are made up of

(a) N, P and K (b) C, Hand O

(c) Ca, Mg and C (c) None of these

7. Extreme Chlorosis occurred by the deficiency of

(a) K (b) N

(c)Mg (c) Fe

8. First experiment related to the method of hydroponics was done by:

(a) Knop (b) Scahs

(c) Arnon (d) Hill

9. The well-known group of bacteria that act as primary symbiotic N fixer

(a) Rhizobia (b) Phyllobacterium

(c) Archaebacterium (d) None of these

10. Alkaline soils can be reclaimed by the addition of:

(a) Gypsum (b) Nitrogen fertilizer

(c) Manure (c) All of these

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Plant Nutrition and Soil Fertility **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-405 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART-II

SHORT QUESTIONS 5×4=20

Q2. Answer briefly the following questions. Each question carries 4 marks.

1. Illustrate phosphorus cycle, mention which form of P is available to plants?
2. Describe the role of nutrient elements as Activators, Cofactors or Regulators of enzymes.
3. Differentiate between saline and sodic soils. How can these soils be managed?
4. What do you know about Cation Exchange Capacity (CEC)? Briefly discuss its importance.
5. Write down deficiency symptoms of Nitrogen, Boron and Phosphorus in plants.

SUBJECTIVE QUESTIONS 10×3=30

Q3. Answer the following questions. Each question carries 10 marks.

1. How symbiotic association occurs between plants and bacteria? Discuss in detail the mechanism of nodule formation.
2. What are basic types of fertilizers? How fertilizers improves the water use efficiency of crops.
3. Write note on the following:
   a) Ecotype concept
   b) Liming and its application

UNIVERSITY OF THE PUNJAB

Roll No. .....

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

PAPER: Biodegradation and Bioremediation **TIME ALLOWED: 30 mins.**
Course Code: BOT-407 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1. Multiple choice questions: Tick (√) the correct answer. (10 Marks)

i. A non-directed physio-chemical interaction between heavy metals and surface of microorganisms is called

A. Biotransformation
B. Biomagnifications
C. Bioaccumulation
D. Biosorption

ii. Which of the following have not been used for bioremediation?

A. Aerobic Bacteria
B. Plants
C. Filamentous Fungi
D. Viruses

iii. Generally, enzymes which can transform organic pollutants are

A. Specific
B. Non-specific
C. Have high molecular weight
D. Resistant to high temperature

iv. When genes from different organisms are brought together in single organism to form specific metabolic pathway, the technique is known as

A. Rational approach
B. Bioaugmentation
C. Directed evolution
D. Biostimulation

v. Biological treatment of sewage by microorganisms (mainly decomposers) would most likely occur at which stage of waste water treatment?

A. Primary B. Secondary C. Tertiary D. Advanced

vi. _____ does not need detailed knowledge of genes.

A. Rational approach
B. Directed Evolution
C. Construction of complete metabolic pathway
D. Development of new metabolic pathway

vii. Bioremediation uses

A. Microorganisms natural capacities to break materials down
B. *Aspergillus* and *Puccinia*
C. *Albugo* and *Puccinia*
D. All of these

viii. *Ex situ* remediation involves the

A. degradation of pollutants directly
B. Degradation of pollutants by genetically engineered microbes
C. removal of pollutants and collection at a place to facilitate microbial degradation
D. None of these

ix. Microbial control of pollutions is thus a technology in its:

a) maturity b) decline c) prime time d) infancy

x. The term *sorption* is used to include both absorption and -----.

a) adhesion b) cohesion c) addition d) absorption

UNIVERSITY OF THE PUNJAB

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

Roll No. .....

PAPER: Biodegradation and Bioremediation **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-407 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SHORT QUESTIONS (20- Marks)

Q. 2. Answer the following questions briefly.

1. What do you mean by chemoautotrophic bacteria?
2. Differentiate between Biofilters and Bioscubbers.?
3. What are Recalcitrant Molecules?
4. What is synergism?
5. What is Defusing?
6. Define Recalcitrant molecules.
7. Differentiate between "Grey list" and "Black list".
8. What is point source pollution?
9. What is detoxification? Enlist mechanisms may involve in detoxification.
10. Define Biorestoration?

Q. 3. Answer the following questions. (30)

1. Define acclimation. Enlist factors affecting acclimation. **(2+8) 10 Marks**

2. Write a detailed note on Microbial treatment of heavy metals. **(10 Marks)**

3. Describe in detail Landfill as a traditional approach to pollution control. **(10 Marks)**

UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Microbes, Man and the Environment **TIME ALLOWED: 30 mins.**

Course Code: BOT-409 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART I – OBJECTIVE (10 MARKS)

Q. 1. Multiple choice questions: Tick (√) the correct answer. **(10 Marks)**

1. What is a pathogenic microorganism?
   (a) A microorganism that multiplies
   (b) A microorganism that grows in a host
   (c) A microorganism that is small
   (d) A disease-causing microorganism
2. 2. Which structure is used by Prokaryotic cells for attachment?

   (a) Pili (b) Mitochondria (c) Flagella (d) Endospore

3. During lactic acid fermentation Pyruvate is

   (a) Oxidized (b) Reduced (c) Produced (d) Broken

4. The group of organisms which are more primitive.

   (a) Cyano bacteria (b) Eubacteria (c) Archeobacteria (d) Gram –ve Bacteria

5. The bacteria involved in symbiotic N_2 fixation

   (a) *Pseudomonas* . (b) *Rhizobium*

   (c) *E. coli* (d) *Salmonella*

6. Incorporation of Nitrogen in complex organic compounds by plants is
   (a) Nitrification (b) Assimilation
   (b) Ammonification (D) Denitrification
7. Any living organism harmful to crops is
   (A) Insect (C) Parasite
   (B) Pathogen (D) Pest

8. Fungi are important to sustain an ecosystem because they are

   (A) Reducer (C) Decomposer
   (B) Recycler (D) Pathogen

9. The synthesis of ever first DNA molecule was

   (A) Inorganic evolution (C) Organic evolution

   (B) Organismic evolution (D) Convergent evolution

10. ..... are the first microbes to digest new organic plant and animal residues in the soil.

    a) Fungi b) Bacteria c) Protozoans d) Insects

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Microbes, Man and the Environment **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-409 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q. 2. Answer the following: (20)

1. How can a bacterial cell act as factory?
2. Write down the role of microbes in Beverage production.
3. What are the most dangerous viral disease of man?
4. How bacteria can plays role in the process of Bioremediation?
5. How can a fungus replicate?
6. Name some fungal disease of Plant. Mention name of causal organism also.
7. What are the major difference between primary and secondary metabolites.
8. How many types of energy generating system exist in microbes?
9. Give the two example of Mycorrhizal association with plants?
10. Draw life cycle of Ascomycetes

Q. 3: Answer the following: (5×6=30)

1. How fungi can be used in food industry?
2. Explain mechanism of nodule formation.
3. Explain the term "biopesticides"?
4. Suggest how the early earth made the origin of life possible.
5. Write a note on Bacteriophage.
6. Explain waste water treatment?.

UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Water Pollution, its Management and Control **TIME ALLOWED: 30 mins.**
Course Code: BOT-411 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q1. OBJECTIVE PART (10)

Choose a correct option from below

1. Permanent hardness of water is due to
   (a) Carbonates of Ca and Mg (b) Chlorides of Ca and Mg (c) Sulfates of Ca and Mg
   (d) None of the above
2. Which one is not a source of thermal pollution
   (a) Deforestation (b) Industrial sewage (c) vegetation(d) Eutrophication
3. DO is required for
   (a) Aquatic life (b) terrestrial life (c) microbes (d) a & c
4. Optimal range of DO for aquatic growth activity is
   (a) 4.0 (b) 2.2 (c) 5.0 (d) 7.5
5. At 20^0C Oxygen solubility is
   (a) 14.6 (b) 10.7 (c) 11.3 (d) 9.2
6. The most important source of P loading in water bodies is
   (a) Industrial sewage (b) Erosion from banks of water bodies (c) runoff of rain water (d) all of the above
7. Biodegradable pesticides include
   (a) Herbicides (b) Rotenoids (c) organophosphates (d) all of the above
8. Poikilothermic animals live under
   (a) Low temperature (b) high temperature (c) medium temperature
   (d) neutral environment
9. The main cause of anemia in human beings is the metal
   (b) mercury (b) cadmium (c) lead (d) arsenic
10. Eutrophication occurs due to water enrichment by
    (a) Nutrients (b) fats (c) carbohydrates (d) metal ions

(P.T.O.)

11. The NEQS for municipal and liquid industrial effluents for TDS should not exceed

(a) 2500 mg/L (b) 3000 mg/L (c) 3500 mg/L (d) 4000 mg/L

12. Which of the following are not pesticides

(a) Plant growth substances (b) Pheromones (c) Fertilizers (d) Chemical attractants

13. Parathion and Malathion pesticides belong to

(a) organochlorines (b) organophosphates (c) herbicides (d) carbamate pesticides

14. Integrated pest management is a method of controlling pests by their

(a) mutualistic symbionts (b) natural predators (c) biological associates (d) all of the above

15. The problem of mercury and cadmium pollution is acute in

(a) developing countries (b) industrially advanced countries (c) African countries (d) a and c

16. According to WHO, the standard regarding viruses in drinking water is

(a) only one plaque forming unit/L (b) only two plaque forming units/L (c) only one plaque forming unit/ 200 ml (d) only two plaque forming unit/ ml

17. The cause of Minamata disease was the metal

(a) cadmium (b) mercury (c) lead (d) zinc

18. Fish tainting is cased by

(a) thermal pollution (b) metal pollution (c) oil pollution (d) eutrophication

19. The percentage of oil lost through evaporation from ocean surface is approximately

(a) 10% (b) 25% (c) 40% (d) 50%

20. BOD is a measure of

(a) eutrophication (b) organic pollution (c) metal pollution (d) oil pollution

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Water Pollution, its Management and Control **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-411 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q2. Give short answers of the Questions (20)

1) Define water pollution and enlist its different sources.
2) What is oil pollution? Write some ways to control it.
3) What is meant by PHs and TCDD?
4) Give some beneficial and harmful aspects of eutrophication.
5) What are persistent organic pollutants? How do they affect reproductive system?
6) How heavy metals adversely affect the aquatic ecosystem.
7) Define BOD, COD and DO.
8) Give some beneficial aspects of thermal pollutions.

Q3. Define and characterize pesticides. Highlight the entry and adverse effects of pesticides on the aquatic ecosystem. **(10)**

Q4. (a) What are different biological treatments of water **(6)**

(a) Define heavy metal and discuss toxic effects of lead. **(4)**

Q5. (a) What is eutrophication and how does it develop? Discuss the effects and control of eutrophication. **(6)**

(a) How can sludge be put to a beneficial use? **(4)**

UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Challenges of a Changing Earth **TIME ALLOWED: 30 mins.**
Course Code: BOT-413 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q 1. Encircle correct option of the statements given below. **10**

(i) Cryosphere is the part of the climate system that includes

(a) Snow (b) All forms of ice (c) Perma frost (d) All a, b and c

(ii) The range of predicted global mean warming from 1990 to 2100 is

(a) 1.1 to 4.8°C (b) 1.2 to 5.1°C (c) 1.3 to 5.6°C (d) 1.4 to 5.8°C

(iii) Ozone hole is located on

(a) Arctic (b) Equator (c) Antarctic (d) Alpine

(iv) Dams built on the rivers

(a) Regulate river flow (b) trap sediments (c) Increase consumption of river water (d) All a, b & c

(v) The reservoir for Nitrogen is located in

(a) Oceans (b) Sedimentary Rocks (c) Atmosphere (d) All a, b and c

(vi) Percentage proportion of world's fisheries present in the coastal zone is

(a) 90% (b) 80% (c) 75% (d) 70%

(vii) Sea water level rise due to global warming is caused by

(a) Melting of polar ice caps (b) Melting of glaciers (c) Thermal expansion of sea water (d) All a, b and c

(viii) Of the total global animal and plant species, those living in the rain forests is more than

(a) 40% (b) 45% (c) 50% (d) 60%

(ix) General circulation models of climate systems are based on

(a) Chemical processes (b) Laws of classical Physics (c) Biological processes (d) None of a, b or c

(x) Earth's surface occupied by coastal zone on a global scale is about

(a) 20% (b) 25% (c) 30% (d) 35%

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Challenges of a Changing Earth | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-413 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q 2. Answer the following questions briefly **(8 x 2.5)**

(i) What are Climate Effects on marine Ecosystem?
(ii) What is Cryosphere and its role in Climate System?
(iii) What are Anthropogenic changes and the challenges for the future?
(iv) Climate predictions for the future based on climate models
(v) Briefly describe Terrestrial Carbon Cycle
(vi) What are causes and effects of Acid rains in Northeast Asia?
(vii) What is role and impacts of development of Dams?
(viii) What are General Circulation Models (GCMs)? How will they simulate present climate?

Q 3: Give an account of Empirical Evidence and Impacts of Global Warming / Climate Change in the high latitudes. **(10)**

Q 4: Critically discuss impact of population growth on air pollution and climatic changes in coastal zone of South east Asia. **(10)**

Q 5: Give a detailed account of emissions from oceans to the atmosphere and their role in bio-geo-chemical cycles and climate regulation. **(10)**

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Roll No. .....

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Microbiology **TIME ALLOWED: 30 mins.**
Course Code: BOT-415 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

PART I – OBJECTIVE (10 MARKS)

Q. 1. Multiple choice questions: Tick (√) the correct answer. **(10 Marks)**

1. Bacterial DNA cannot be transferred by

(a) Transformation (b) Transduction
(c) Binary fission (d) Conjugation

2. The virus that attack bacteria is called

a. Plant virus b. Animal virus c. Bacteriophage d. None of these

3. Which of the following bacteria lack a cell wall.

a. *Cyanobacteria* b. *E.coli* c. *Mycoplasma* d. *Bacillus*

4. Which of the following is/are not a gram-positive bacteria?

a. *Streptococcus* b. *E. coli* c. *Bacillus* d. *Mycobacterium*

5. Chemotherapy was introduced by

(a) Ignaz Semmelweis (b) Louis Pasteur (c) Paul Ehrlich (d) Koch

6. Rhizobium has symbiotic association with

(a) Legume (b) Non-Legume (c) Sugar cane (d) Paddy

7. In an oxygenic photosynthesis, the green and the purple bacteria do not use which of the following one as an electron source?

(a) H_2O (b) H_2 (c) H_2S (d) S (elemental sulfur)

8. A cluster of polar flagella is called:

(a) Monotrichous (b) Lophotrichous
(c) Peritrichous (d) Amphitrichous

9. The concept that living organisms arise from living material is called:

(a) Biogenesis (b) cell theory
(c) Spontaneous generation (d) Relativity

10. Prokaryotic cells use_____ for attachment.

(a) Pili (b) mitochondria (c) Flagella (d) endospore

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Microbiology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: BOT-415 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

PART II –SUBJECTIVE (50 MARKS)

SHORT QUESTIONS (20- Marks)

Q. 2. Answer the following questions briefly.

1. Give the classification of virus on the basis of their genetic material.
2. What is the function of Ribosome in a bacterial DNA?
3. Define Sterilization.
4. How many types of culture media are used for bacterial growth in a lab?
5. Differentiate between different types of fermentation.
6. What is pure culture technique?
7. What is the difference between Gram positive and Gram negative cell wall of bacteria?
8. What is the effect of pH on the growth of bacteria?
9. What is Lysogenic cycle of viruses?
10. How viruses can be transmitted.

Q. 3. Answer the following questions. **(30)**

I. (a) Give an account on transmission of viruses **(05 Marks)**

(b) Draw labeled diagram of a typical bacterial cell with ultrafine structure. **(05 Marks)**

II. (a) Describe life cycle of Bacteriophage. **(05 Marks)**

(b). Explain metabolism of virus infected plants **(05 Marks)**

III. What characters are used for the identification and classification of bacteria? **(10 Marks)**