

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(First Semester)

Branch - **MICROBIOLOGY**

FUNDAMENTALS OF MICROBIOLOGY

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Who is known as the father of Microbiology? a) Edwin John Butler b) Ferdinand Cohn c) Robert Koch d) Antoni van Leeuwenhoek	K1	CO1
	2	Which scientists' first disproved spontaneous generation by showing that maggots only appear on decaying meat that has been exposed to flies? a) Francesco Redi b) Joseph Lister c) Louis Pasteur d) Robert Hooke	K2	CO1
2	3	What is the approximate size of the bacterial cell? a) 1mm in diameter b) 0.5 to 1.0 micrometer in diameter c) 2mm in diameter d) 2 micrometer in diameter	K1	CO2
	4	Bacteria having clusters of flagella at both poles of cells are known as? a) Amphitrichous b) Monotrichous c) Peritrichous d) Lophotrichous	K2	CO2
3	5	All algae have a) Chlorophyll a and carotene b) Chlorophyll b and carotene c) Chlorophyll a and Chlorophyll b d) Phycobilins and carotene	K1	CO3
	6	The inner cell wall in algae is made up of _____ a) Pectin b) Cellulose c) Chitin d) Lipids	K2	CO3
4	7	This fungi division includes 'Club fungi' a) Zygomycota b) Deuteromycota c) Basidiomycota d) Ascomycota	K1	CO4
	8	The Fungal cell walls are typically made up of _____ a) chitin b) cellulose c) pectin d) starch	K2	CO4
5	9	Which of the following comprises large cone-shaped protozoa? a) Didinium b) Vorticella c) Stentor d) Colpoda	K1	CO5
	10	Conjugation as a mode of reproduction is present in a) ciliata b) flagellata c) Sarcodina d) sporozoa	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain in brief about the scope of Microbiology.	K2	CO1
	(OR)			
	11.b.	Give outline note on Contributions of Louis Pasteur.	K2	CO1
2	12.a.	Apply your critical knowledge about inclusion bodies.	K3	CO2
	(OR)			
	12.b.	Identify various stains involved in Differential staining	K3	CO2
3	13.a.	Analyze briefly about different mode of algal nutrition.	K3	CO3
	(OR)			
	13.b.	Select some commercial products derived from algae and mention their applications.	K3	CO3
4	14.a.	Conclude your views on characters of Ascomycetes.	K4	CO4
	(OR)			
	14.b.	Categorize various stages of fungal reproduction with suitable diagrams.	K4	CO4
5	15.a.	Examine elaborately about morphology of Protozoa.	K4	CO5
	(OR)			
	15.b.	List various stages involved in Binary fission of protozoa.	K4	CO5

SECTION -C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Classify different experiments carried out to prove and disprove theory of Spontaneous generation.	K4	CO1
2	17	Infer your views on Ultra structure of Flagella.	K4	CO2
3	18	Construct a brief account on characteristic features of Algae.	K4	CO3
4	19	Analyze your views on metabolism and nutrition of Fungi.	K4	CO4
5	20	Categorize different nutritive mode of Protozoa.	K4	CO5

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Write a short note on parts of microscope.	K2	CO 1
		(OR)		
	11.b.	Phase contrast Microscope - Explain.		
2	12.a.	Write about the Principle of gram staining.	K3	CO 2
		(OR)		
	12.b.	Discuss in details about the Micrometry.		
3	13.a.	Explain in details about the principle of autoclave and its applications.	K3	CO 3
		(OR)		
	13.b.	Explain in details about the pasteurization.		
4	14.a.	Explain in details about the properties of chemical agents.	K4	CO 4
		(OR)		
	14.b.	Discuss about quaternary ammonium compounds.		
5	15.a.	Elaborate the streak plate methods.	K4	CO 5
		(OR)		
	15.b.	Explain about the anaerobic cultivation techniques.		

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe in details about the difference between SEM and TEM.	K4	CO 1
2	17	Explain the about the differential staining methods.	K4	CO 2
3	18	Elaborate the moist and dry heat method of sterilization.	K4	CO 3
4	19	Give an account on mechanism of action of chemical agents.	K4	CO 4
5	20	Write an essay on preservation methods of microorganisms.	K4	CO 5

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(First Semester)

Branch - MICROBIOLOGY

INTRODUCTION TO WEB DESIGNING

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

$$(10 \times 1 = 10)$$

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following is used to read a HTML page and render it? a) Web server b) Web matrix c) Web browser d) Web Crowler	K1	CO1
	2	How do we write comments in HTML? a) </.....> b) <!.....> c) </...../> d) <.....!>	K2	CO1
2	3	Which tag is used to create a numbered list in HTML? a) b) c) d) <ll>	K1	CO2
	4	Which of the following tag is used to embed css in html page? a) <css> b) <!DOCTYPE html> c) <script> d) <style>	K2	CO2
3	5	What is the color of an unvisited link? a) red b) blue c) purple d) green	K1	CO3
	6	For table heading we can use _____ a) <td> b) <tr> c) <thead> d) <th>	K2	CO3
4	7	Which of the following is not used with password attribute? a) name b) size c) maxlength d) min	K1	CO4
	8	Which attribute is used with <select> element? a) multiple b) selected c) name d) value	K2	CO4
5	9	What will happen if height and width of video are not set while video loads? a) page flickers b) page does not load c) page crash d) page closes	K1	CO5
	10	Which is not <iframe> attribute? a) Seamless b) Srcdoc c) Sizes d) Sandbox	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Analyse paragraph, heading tags with an example.	K4	CO1
		(OR)		
	11.b.	Inference body tag with its attributes.		
2	12.a.	Determine font attributes in CSS.	K5	CO2
		(OR)		
	12.b.	Explain in detail about unordered list tag.		
3	13.a.	Examine the procedure to create link to email address.	K4	CO3
		(OR)		
	13.b.	Illustrate row and heading tag in table.		
4	14.a.	Create a html script to implement textarea element with an example.	K6	CO4
		(OR)		
	14.b.	Demonstrate menu element with an example.		
5	15.a.	Elaborate the characteristics of an object element.	K5	CO5
		(OR)		
	15.b.	Examine the characteristics of source element.		

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyse the structure of HTML document.	K4	CO1
2	17	Examine image tags with relative and absolute path.	K4	CO2
3	18	Evaluate various types of links available in html.	K5	CO3
4	19	Determine field set and combo box elements in html.	K5	CO4
5	20	Create script to implement audio and video elements in html page.	K6	CO5

Z-Z-Z END

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Write a short note on Passive active transport	K2	CO1
	(OR)			
	11.b.	Secondary active transport - Explain.		
2	12.a.	Write about the Bacterial growth?	K3	CO2
	(OR)			
	12.b.	Discuss in details about the batch culture of bacteria.		
3	13.a.	Explain in details about the Methanogenesis?	K3	CO3
	(OR)			
	13.b.	Explain in details about the Beta oxidation?		
4	14.a.	What are the enzymes involved in fatty acid synthesis?	K4	CO4
	(OR)			
	14.b.	What are essential and non essential amino acids?		
5	15.a.	Eloborate the lactic acid fermentation?	K4	CO5
	(OR)			
	15.b.	Explain about the propionic acid fermentation?		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe in details about the micro and macronutrients growth factors for the growth of microbes ?	K4	CO1
2	17	Explain the about the Sporogenesis process?	K4	CO2
3	18	Elaborate the steps involved in glycolysis?	K4	CO3
4	19	Give an account on synthesis of purine and pyridimines ?	K4	CO4
5	20	Write an essay on mixed acid fermentation?	K4	CO5

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Third Semester)

Branch - **MICROBIOLOGY**

MOLECULAR BIOLOGY

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Z-DNA is a a) left handed b) right handed c) RL helix d) super coiled helix	K1	CO1
	2	Who proposed the semi-conservative method of DNA replication? a) Cavelier and Rosenberg b)Holley c) Jacob and Monod d)Watson and Crick	K2	CO1
2	3	The formation of RNA complementary to a DNA strand is called a) Translation b) Trasnformation c) Transcription d) Transfection	K1	CO1
	4	Which type of RNA polymerase can bind C-terminal binding protein? a) I b) II c) III d) IV	K2	CO1
3	5	What is the process of synthesis of a polypeptide chain from mRNA known as a) Conversion b) Replication c) Transformation d) Translation	K1	CO1
	6	Which of the following codons is the mRNA start codon that initiates translation? a) UAG b) UAA c) UGA d) AUG	K2	CO1
4	7	Which one of the following enzyme beings about hydrolysis of lactose to glucose and galactose? a) Transacetylase b) β-galactosidase c) Alkaline phosphatase d) Permease	K1	CO1
	8	The trp operon in bacteria is responsible for the synthesis of a) Tryptophan b) Glucose c) Lactose d) Galactose	K2	CO1
5	9	The 3' end of an intron is marked by _____ a) Donor site b) Acceptor site c) AT rich site d) Branch point site	K1	CO1
	10	Coding sequences are called as a) Exons b) Introns c) Anticodons d) Genetic code	K2	CO1

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Select the structure and functions of tRNA.	K3	CO2
	(OR)			
	11.b.	Choose the various enzymes involved in DNA replication.		
2	12.a.	Organize the initiation of transcription process.	K3	CO2
	(OR)			
	12.b.	Develop the post transcriptional modifications of rRNA.		
3	13.a.	Analyse the structure and function of ribosomes.	K4	CO3
	(OR)			
	13.b.	Examine the post translational modifications of proteins.		
4	14.a.	Simplify the negative control of regulation in lac operon.	K4	CO3
	(OR)			
	14.b.	Inference the mechanism of attenuator control.		
5	15.a.	Explain the function of eukaryotic RNA polymerase.	K5	CO4
	(OR)			
	15.b.	Evaluate the mechanism of enhancers.		

SECTION -C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Survey the Meselson and Stahl's experiment.	K4	CO4
2	17	Examine the transcription process in prokaryotes.	K4	CO4
3	18	Assess the translation in prokaryotes.	K5	CO5
4	19	Criticize the structure and function of Trp operon.	K5	CO5
5	20	Discuss the mRNA splicing mechanism.	K6	CO6

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Third Semester)

Branch - **MICROBIOLOGY**

CHEMISTRY FOR MICROBIOLOGY

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which concentration term expresses the number of moles of solute per kilogram of solvent? a) Molarity b) Molality c) Normality d) Mole fraction	K1	CO1
	2	Which method is used to separate a mixture of liquids with very similar boiling points? a) Distillation b) Fractional distillation c) Steam distillation d) Counter-current distribution	K2	CO1
2	3	Which of the following is a tranquilizer? a) Paracetamol b) Diazepam c) Ibuprofen d) Ampicillin	K1	CO2
	4	Which of the following is not a conformation of n-butane? a) Anti b) Synclinal c) Chair d) Gauche	K2	CO2
3	5	Which fertilizer is widely used as a nitrogen source? a) Urea b) Potassium chloride c) Triple super phosphate d) Bone meal	K1	CO3
	6	Which of the following is an inorganic insecticide? a) Nicotine b) Lead arsenate c) Rotenone d) Allethrin	K2	CO3
4	7	Which of the following is a natural essential oil? a) Acetone b) Eucalyptus oil c) Phenol d) Ethylene glycol	K1	CO4
	8	Teflon is chemically known as: a) Polyethylene b) Polytetrafluoroethylene c) Polyvinyl chloride d) Polyurethane	K2	CO4
5	9	Which enzyme is used during the bating process in leather manufacturing? a) Protease b) Amylase c) Cellulase d) Lipase	K1	CO5
	10	Starch adhesives are commonly used in: a) Leather tanning b) Paper bonding c) Shoe manufacturing d) Furniture coating	K2	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Describe the principle of fractional distillation and its application in the purification of organic liquids.	K2	CO1
	(OR)			
	11.b.	What role does green chemistry play in reducing environmental impact?		

Cont...

Cont...

2	12.a.	Write a note on the uses and limitations of sulpha drugs.	K1	CO2
	(OR)			
	12.b.	Describe the functions, sources, and deficiency diseases of vitamin A, D, E, and K.		
3	13.a.	Differentiate between natural and artificial fertilizers with examples.	K2	CO3
	(OR)			
	13.b.	What are natural plant insecticides? Mention two examples.		
4	14.a.	Discuss the process of perfume formulation with key ingredients.	K3	CO4
	(OR)			
	14.b.	Differentiate between addition and condensation polymerization.		
5	15.a.	Explain the role of enzymes in the leather industry.	K4	CO5
	(OR)			
	15.b.	Discuss the preparation, properties, and applications of rubber-based adhesives.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain the key principles of green chemistry.	K4	CO1
2	17	Draw and explain the conformations of n-butane.	K4	CO2
3	18	Explain the manufacture of ammonium nitrate and urea with the relevant chemical reactions.	K4	CO3
4	19	Explain the classification of detergents with examples.	K4	CO4
5	20	Describe the processes of tanning and finishing in detail.	K4	CO5

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Fourth Semester)

Branch – MICROBIOLOGY

BIOINSTRUMENTATION

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 What is the wavelength of UV
(i) 100-500 nm (ii) 200-400 nm
(iii) 500-600 nm (iv) none
- 2 Isopycnic centrifugation is also known as
(i) Preparative centrifugation (ii) ultra centrifugation
(iii) Density gradient centrifugation (iv) Analytical centrifugation
- 3 Solvents used in thin layer chromatography
(i) BAW (ii) CAW
(iii) CAVE (iv) none
- 4 Ammonium per sulphate is an ----- agent
(i) reducing (ii) oxidising
(iii) chelating (iv) none
- 5 Scintillation detector is
(i) Sodium iodide with thallium (ii) Sodium iodide with mercury
(iii) Potassium iodide with silver (iv) none

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a What is Beer- Lamberts Law? Explain about it.
OR
b Explain about calomel electrodes in pH meter.
- 7 a Outline the basic principle of centrifugation.
OR
b Describe the instrumentation of Analytical centrifuge.
- 8 a Outline the principle of thin layer chromatography.
OR
b Outline the applications of gas chromatography.

Cont...

- 9 a Describe the significance of iso electric point in electrophoresis.
OR
b Outline the applications of Agarose gel electrophoresis.
- 10 a What happens during radioactive Decay? Explain about it.
OR
b Explain about nuclear transformation.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 6 = 30)

- 11 a Discuss about the significance of electrochemical biosensors.
OR
b Elucidate the working principle of pH meter with a neat diagram.
- 12 a Outline the principle and instrumentation of density gradient centrifugation.
OR
b Sketch the principle and instrumentation of preparative centrifugation.
- 13 a Outline about Gas chromatography. Add its applications.
OR
b State how biomolecules are separated in HPLC.
- 14 a Summarize about various factors affect the movement of molecules in electrophoresis.
OR
b State the principle and applications of immune electrophoresis.
- 15 a Summarize the applications of radioisotopes in Biology.
OR
b Explain about scintillation counter.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024

(Fourth Semester)

BRANCH - MICROBIOLOGY

SOIL AND AGRICULTURAL MICROBIOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1 What are all of the microorganisms that live in a particular environment called?

- (a) Autochthonous (b) Allochthonous (c) Microbiome (d) Autogenous

2 The degradation of complex molecules in soil by fungi for utilization by bacteria is an example of which type of association?

- (a) Neutralism (b) Mutualism (c) Commensalism (d) Antagonism

3 What is the process of release of inorganic substances both minerals and non-minerals from organic matter called?

- (a) Mineralization (b) Fragmentation (c) Leaching (d) Humification

4 The transformation of nitrates to gaseous nitrogen is accomplished by microorganisms in a series of biochemical reactions. The process is known as

- (a) Nitrification (b) Denitrification (c) Ammonification (d) Nitrogen fixation

5 *Trichoderma harzianum* is used for

- (a) wasteland reclamation (b) bioremediation of contaminated soil
-
- (c) gene transfer (d) Biocontrol agent against plant pathogens

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

11 a Extend the significant role of micro flora in soil.

OR

b Summarize the distribution and abundance of Fungi in soil.

12 a Comment on Neutralism and Competition with suitable examples.

OR

b Discuss the importance of positive and negative microbial interactions.

13 a Short note on Sulphur cycle with neat diagram.

OR

b How microorganisms associate with organic matter in decomposition process.

14 a Narrate the mechanism involved in non-symbiotic nitrogen fixation with examples.

OR

b How blue green algae act as a biofertilizer? Explain in detail.

Cont....

- 15 a Give a short note on Bacterial insecticide with its application.

OR

- b What is Biopesticide? Relate how the microbes take part in the symbiotic association with insects.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (5 x 6 = 30)

- 16 a. Justify the environmental factors influence the microbial community in soil.

(OR)

- b. Elaborate the impact of microbial distribution and abundance in soil.

- 17 a. Comment on mutualistic relationship between microorganisms with suitable examples.

(OR)

- b. Discuss the microbial interactions with examples - (i) Ammensalism (ii) Commensalism

- 18 a. Encounter Nitrogen cycle and explain the role of microorganism in nitrogen fixation.

(OR)

- b. Clarify the beneficial association of microbes in biogeochemical cycles.

- 19 a. Classify Mycorrhiza and elaborate the benefits of VAM fungi with suitable examples.

(OR)

- b. Define nodulation. Elaborate the importance of nif and nod gene in nodulation process.

- 20 a. Describe in detail about virus and nematode insecticide draw the protocol of mass production.

(OR)

- b. Justify the microbial association with insect. Explain its role of microbial insecticide with suitable example.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Fourth Semester)

Branch – MICROBIOLOGY

MATHEMATICS FOR LIFE SCIENCES

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 The order of the differential equation $y''' + 3(y'')^2 + y' = 0$ is _____.
(i) 1 (ii) 3 (iii) 2 (iv) 4
- 2 The condition for differential equation $M(x,y)dx + N(x,y)dy = 0$ to be an exact equation is _____.
(i) $\frac{\partial M}{\partial y} = 2 \frac{\partial N}{\partial x}$ (ii) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$
(iii) $\frac{\partial M}{\partial y} + \frac{\partial N}{\partial x} = 0$ (iv) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$
- 3 The error in the trapezoidal rule is of the order
(i) h^3 (ii) h^4 (iii) h^2 (iv) h^0
- 4 In third order Runge-Kutta method $\Delta y =$ _____.
(i) $\frac{1}{6}(k_1 + 2k_2 + 2k_3)$ (ii) $\frac{1}{6}(k_1 + k_2 + k_3)$
(iii) $\frac{1}{6}(k_1 + 4k_2 + k_3)$ (iv) $\frac{1}{6}(k_1 + k_2 + 2k_3)$
- 5 _____ of an enzymatic reaction can be defined as the rate of the reaction at which the enzyme shows the highest turnover.
(i) accelerator (ii) maximum velocity
(iii) variable parameter (iv) minimum velocity

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Verify whether $e^y dx + (xe^y + 2y) dy = 0$ is exact, if so solve.
OR
b Solve $y' - y \cot x = 2x \sin x$.
- 7 a If the population of a country doubles in 50 years in how many years will it treble under the assumption that the rate of increase is proportional to the number of inhabitants?
OR
b Solve the equation of the simple harmonic motion.
- 8 a Find the first two derivatives of $(x)^{1/3}$ at $x=50$ and $x=56$.
x : 50 51 52 53 54 55 56
 $y=(x)^{1/3}$: 3.6840 3.7084 3.7325 3.7563 3.7798 3.8030 3.8259

OR

Cont....

- b Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Trapezoidal rule with $h=0.2$. Hence obtain an approximate value of π .
- 9 a Using Euler's method, solve numerically the equation, $y' = -y$, $y(0)=1$, for $x = (0.01)(0.01)(0.04)$.
OR
- b Obtain the values of y at $x=0.1, 0.2$ using Runge Kutta method of second order for the differential equation $y' = -y$, given $y(0)=1$.
- 10 a What fraction of $V_{\max}$ observed at $[S]=4K_m, [S]=5K_m, [S]=6K_m, [S]=9K_m$, and $[S]=10K_m$? Calculate the ratios of $[S]_{0.9}/[S]_{0.5}$ and $[S]_{0.75}/[S]_{0.5}$.
OR
- B Explain the Woolf-Augustinsson-Hofstee plot.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Solve $\frac{dy}{dx} = \left(\frac{y^3 + 3x^2y}{x^3 + 2xy^2} \right)$.
OR
- b Solve $(1+y^2)dx + (x - \tan^{-1} y)dy = 0$.
- 12 a Explain the Brachistochrone problem.
OR
- b A special rain drop starting from rest falls under the influence of gravity. If it gathers in water vapour (assumed at rest) at a rate proportional to its surface and if its initial radius is 0. Show that it falls with constant acceleration $g/4$.
- 13 a Find the first and second derivative of the function tabulated below at $x=0.6$:
- | | | | | | |
|----|--------|--------|--------|--------|--------|
| x: | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 |
| y: | 1.5836 | 1.7974 | 2.0442 | 2.3275 | 2.6511 |
- OR
- b Evaluate $\int_0^{\pi} \sin x dx$ by dividing the range into ten equal parts, using (i) Trapezoidal rule (ii) Simpson's rule.
- 14 a Using Modified Euler method, find $y(0.25)$, given $\frac{dy}{dx} = 2xy$, $y(0)=1$.
OR
- b Using Runge-Kutta method of fourth order, find $y(0.3)$ correct to 4 decimal places if $\frac{dy}{dx} + y + xy^2 = 0$, $y(0)=1$ by taking $h=0.1$.
- 15 a The equilibrium constant for the reaction $S \leftrightarrow P$ is 5. Suppose we have a mixture of $[S]=2 \times 10^{-4}$ M and $[P]=3 \times 10^{-4}$ M. $K_{mp} = 3 \times 10^{-5}$ M, $V_{\max s} = 2 \mu \text{ moles} \times \text{litre}^{-1} \times \text{min}^{-1}$, $V_{\max r} = 4 \mu \text{ moles} \times \text{litre}^{-1} \times \text{min}^{-1}$.
- (a) In which direction will the reaction proceed on addition of an appropriate enzyme?
(b) At what initial velocity will the reaction start towards equilibrium?
OR
- b An enzyme was assayed at an initial substrate concentration of 2×10^{-5} M. In 6 min, half of the substrate has been used. The K_m for the substrate is 5×10^{-3} M. Calculate (a) K_m (b) $V_{\max}$ (c) the concentration of product by 15 min.

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Fifth Semester)

Branch – MICROBIOLOGY

**PRINCIPLES OF GENETIC ENGINEERING & RECOMBINANT DNA
TECHNOLOGY**

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 Who created the first rDNA molecule?
(i) Watson and Crick (ii) Boyer and Cohen
(iii) Paul Berg (iv) Arber and Smith
- 2 Which one of the following are vectors for animals?
(i) SV40 (ii) CMV
(iii) M13 Phage (iv) Gemini
- 3 cDNA library construction strategies are given by _____.
(i) Sanger (ii) Maxam and Gilbert
(iii) Maniatis (iv) Cohen
- 4 The PCR techniques was developed by
(i) Kary Mullis (ii) Kohler
(iii) Milstein (iv) Altman
- 5 Which nucleotide used as a terminator in Sanger's sequence
(i) dGTP (ii) dATP
(iii) ssATP (iv) ddGTP

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Explain the mode of action of ligases.
OR
b What is Linkers? Write in brief.
- 7 a Write a detail account on lambda vectors.
OR
b Describe the properties of good vectors.
- 8 a How are Genomic library constructed give their advantages?
OR
b Explain the marker inactivation selection of recombinant.

Cont...

- 9 a Explain the applications of blotting technique.
OR
b Give a brief account on RFLP
- 10 a Compare contrast Sanger's sequence and Next generation sequence.
OR
b Describe the role of sequencing in forensic science.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Explain the characteristic features and applications of type II restriction enzymes with examples.
OR
b Elucidate the characteristic features and applications DNA polymerases.
- 12 a Compare and contrast the features of Phagemid, Cosmid vectors.
OR
b Draw and label pBR322 and add note on cloning of DNA in it.
- 13 a Bring out the Maniatis strategies of construction of cDNA library.
OR
b Explain the various techniques for screening of recombinants.
- 14 a Elaborate the steps of Southern blotting Process.
OR
b 'A reliable diagnosis is possible by employing PCR as a modern diagnostic tool' – Discuss.
- 15 a Discuss in detail the DNA sequencing by Sanger's sequence.
OR
b Examine the major challenges involved in DNA sequencing and data analyses.

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Fifth Semester)

Branch – MICROBIOLOGY

IMMUNOLOGY AND IMMUNOTECHNOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 White blood cells that destroyed infected and diseased cells known as
(i) Antibody (ii) Phagocytosis (iii) NK cells (iv) Hapten
- 2 The antibodies present in mucosal surfaces are -----
(i) IgE (ii) IgA (iii) IgM (iv) IgG
- 3 Immunity by receiving antibodies from an external source is known as -----
immunization
(i) passive (ii) active (iii) inactive (iv) impassive
- 4 A reaction between ----- antigens with their antibodies forms insoluble
complexes.
(i) unsolvable (ii) dissolvable (iii) insoluble (iv) soluble
- 5 Rheumatoid arthritis is an / a ----- immune disease
(i) auto (ii) allo (iii) immuno (iv) haemolytic

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a. Bring out the contributions of Edward Jenner to the field of immunology.
(or)
b. Briefly explain about any one secondary lymphoid organs.
- 7 a. List out the features of an antigen.
(or)
b. Illustrate the structural and functional properties of IgM antibodies.
- 8 a. Present the role of interleukins.
(or)
b. State the current immunization schedule in India.
- 9 a. How is Ouchterlony's double immunodiffusion important?
(or)
b. Describe complement fixation test in brief.

Cont...

- 10 a. Write a short note on autoimmunity.
(or)
b. Which is referred as the delayed- type of hypersensitivity reaction? Write briefly.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a. Give an account on primary lymphoid organs.
(or)
b. What are APCs and MHCs? How are they significant? Elaborate.
- 12 a Explain the structure, function and biological properties of IgA and IgG immunoglobulins.
(or)
b Write a summary on clonal selection theory.
- 13 a Distinguish between humoral and cell mediated immunity.
(or)
b Tabulate the differences between attenuated and inactivated vaccines.
- 14 a Describe immunoelectrophoretic.
(or)
b How is direct ELISA different from sandwich ELISA? Explain with suitable diagrams.
- 15 a Give a detailed note on anaphylactic hypersensitivity.
(or)
b What is tissue typing? How is it important?

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2024
(Fifth Semester)

Branch -- MICROBIOLOGY

MEDICAL MICROBIOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 *Shigella dysenteriae* shows
 - (i) Tumbling motility
 - (ii) Gliding motility
 - (iii) Darting motility
 - (iv) No motility
- 2 Tuberculosis is a
 - (i) Water borne disease
 - (ii) Air borne disease
 - (iii) Food borne disease
 - (iv) Arthropod borne disease
- 3 Hepatitis B virus is also called
 - (i) Infectious Hepatitis
 - (ii) Serum Hepatitis
 - (iii) Serum sickness
 - (iv) Pathogenic Hepatitis
- 4 Which one of the following is an example for round worm?
 - (i) *Entamoeba histolytica*
 - (ii) *Plasmodium vivax*
 - (iii) *Ascaris lumbricoides*
 - (iv) *Wuchereria bancrofti*
- 5 What is the preferred method for collecting the blood specimens for blood culture to detect bacterial infections?
 - (i) Finger stick
 - (ii) Saliva collection
 - (iii) Swabbing the skin surface
 - (iv) Vein puncture

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Analyse the morphology and clinical features of *Klebsiella* sp.
OR
b Describe the pathogenesis of *Vibrio cholerae*.
- 7 a Outline the procedure for hair baiting technique.
OR
b Summarize the life cycle of *Coccidioides immitis*.
- 8 a Organize the symptoms and pathogenesis of Influenza A virus.
OR
b Develop the pathogenesis of covid-19 clinical manifestations.
- 9 a State the life cycle of *Entamoeba histolytica*.
OR
b Bringout the pathogenesis of *Ascaris lumbricoides*.
- 10 a Narrate the blood smear examination.
OR
b Explain the collection method of throat swabs.

Cont...

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Elucidate account on pathogenicity, laboratory diagnosis and treatment of *Staphylococcus* sp.

OR

- b Pointout the general characters, laboratory diagnosis and prophylaxis of *Neisseria gonorrhoeae*.

- 12 a Categorize the life cycle and treatment of *Pityriasis versicolor*.

OR

- b Examine the pathogenesis and prophylaxis of Candidiasis.

- 13 a Assume the general characters, symptoms, pathogenesis and laboratory diagnosis of Rabies virus.

OR

- b Analyze the pathogenesis, laboratory diagnosis and treatment of HIV-1 virus.

- 14 a Infer the clinical manifestations, life cycle and prophylaxis of *Plasmodium vivax*.

OR

- b Discuss the pathogenesis, laboratory diagnosis and treatment of *Wuchereria bancrofti*.

- 15 a Survey the collection method of urine sample.

OR

- b Summarize the various method of collection in pus sample.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
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BSc DEGREE EXAMINATION DECEMBER 2024
(Fifth Semester)

Branch – **MICROBIOLOGY**

PRINCIPLES OF FOOD MICROBIOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(5 x 1 = 5)

- 1 Which of the following techniques uses the method of reduction in water activity?

(i) Curing	(ii) Emulsification
(iii) Blanching	(iv) Radicidation
- 2 NaCl destroys microorganisms by the mechanism of _____.

(i) Plasmolysis	(ii) Chelation
(iii) Heat shock	(iv) Osmotic shock
- 3 Cottage is an example of _____ Cheese.

(i) Hard	(ii) Semi hard
(iii) Soft	(iv) Semi soft
- 4 Ochratoxin is basically a secondary metabolite of _____.

(i) Fungi	(ii) Bacteria
(iii) Yeast	(iv) Actinomycetes
- 5 Which of the following item is designated as AGMARK standard?

(i) Sea food	(ii) Milk products
(iii) Cereals	(iv) Spices

SECTION - B (15 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks

(5 x 3 = 15)

- 6 a Illustrate the mechanism water activity in food
OR
b Illustrate the concept of O-R Potential of food.
- 7 a State the principles of food preservation.
OR
b Write a note on chemical preservatives with examples
- 8 a Comment on the spoilage of Canned food products.
OR
b Outline the production of Cheese.
- 9 a Explain how Salmonella sp. brings about food poisoning.
OR
b Brief on Infant and wound Botulism.
- 10 a Brief on the concept of food standards.
OR
b Prioritize steps of good manufacturing practices.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

- 11 a Elaborate on the intrinsic factors effecting growth of microorganisms.
OR
b Elaborate on the extrinsic factors effecting growth of microorganisms.
- 12 a Describe low temperature as a means of preservation technique.
OR
b Discuss the steps involved in canning process.
- 13 a Outline the use of probiotics and their characters.
OR
b Explain the steps of Sauerkraut production.
- 14 a Give a detailed account on food poisoning associated Mycotoxins.
OR
b What is food-borne outbreak? Give a detail account on bacterial of food poisoning.
- 15 a Account on HACCP principles and state how is it important in quality measure.
OR
b Explain the biological treatment of waste water disposed from the industry.

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
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BSc DEGREE EXAMINATION DECEMBER 2024
(Fifth Semester)

Branch – MICROBIOLOGY

MAJOR ELECTIVE COURSE -I: PHARMACEUTICAL MICROBIOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 The suitable method to cultivate animal viruses is / are _____.
(i) Animals (ii) Bacterial cells
(iii) Embryonated egg (iv) Both (i) and (iii)
- 2 Infection that results in pus formation is called _____.
(i) Focal infection (ii) Chronic infection
(iii) Pyogenic infection (iv) Acute infection
- 3 An antibiotic that possess antagonistic property against folate synthesis is _____.
(i) Nalidixic acid (ii) Polymyxin
(iii) Sulfonamide (iv) Tetracycline
- 4 *Klebsiella pneumoniae* is a _____.
(i) facultative anaerobe (ii) obligate anaerobe
(iii) Gram-positive bacilli (iv) motile organism
- 5 Propyl paraben is used as a _____.
(i) Preservative (ii) colouring agent
(iii) coating agent (iv) None of these

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Differentiate between viroids and prion.
(or)
b Write the merits and demerits of microorganisms in pharmaceuticals.
- 7 a Give an account on phagocytosis.
(or)
b Present the different ways to modulate inflammatory responses.
- 8 a Outline the drugs available against Gram positive coccal infection.
(or)
b Describe the uses of trimethoprim.
- 9 a Give short notes on pathogenicity of *Klebsiella* infections.
(or)
b Discuss briefly transmission and symptoms of diseases caused by *Acinetobacter* spp.
- 10 a Illustrate the assessment of microbial contamination.
(or)
b Enumerate the effects of preservative concentration.

Cont...

SECTION -C (30 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 x 6 = 30)

- 11 a Discuss in detail cultivation of viruses to produce vaccines.
(or)
b Give a detailed account on the major categories of microbes with their pharmaceutical importance.
- 12 a Compare and contrast between partially invasive and non-invasive pathogens with suitable examples.
(or)
b Describe the normal microbial flora of human body.
- 13 a Explain about antiviral drugs.
(or)
b Elaborate the properties and uses of β -lactum and tetracycline antibiotics.
- 14 a Summarize the features vancomycin resistant enterococci.
(or)
b Give a note on healthcare associated infection caused by *Eschericia coli*.
- 15 a How to preserve pharmaceutical products using antimicrobial agents?
(or)
b State and explain the various sources of contamination of an aseptic area.

Z-Z-Z END