Total No. of Questions : 7]

SEAT No. : ____

P2512

[Total No. of Pages : 2

[6067]-211

M.Sc. - I

MICROBIOLOGY

MBCT - 121 : Instrumentation and Molecular Biophysics

(2019 Pattern) (Semester-II) (Credit System)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***
4) ***Figures to the right indicate full marks.***
5) ***Draw neat labelled diagrams wherever necessary.***
6) ***Use of scientific calculator is allowed.***
7) ***Assume suitable data, if necessary.***

Q1) Attempt any five: **[10]**

a) Define : Retention factor.

b) Write Van deemter equation.

c) What is quenching?

d) What are the radioactive isotopes.

e) Name any two mass analysers used in mass spectroscopy.

f) Enlist different methods of protein crystallisation.

Q2) Attempt the following.

a) Enlist detectors used in gas chromatography and explain any two in detail. **[7]**

b) In a chromatographic analysis of lemon oil a peak for limonene has a retention time of 8.42 min with a baseline width of 0.96 min. ν-Terpinene elutes at 9.57 min with a baseline width of 0.64 min. What is the resolution between the two peaks? **[5]**

P.T.O.

Q3) Attempt the following.

a) With the help of the suitable diagram explain flurescence spectroscopy. **[7]**

b) The absorbance A of 1.00×10^{-4} solution of amino acid tryptophan at wavelength 280 nm is 0.139. The path length of the cuvette is 1cm. What is the molar absorption coefficient (ε) at this wavelength? **[5]**

Q4) Attempt the following.

a) Explain spin-spin relaxation parameter in NMR. **[7]**

b) Explain direct lattice and reciprocal lattice. **[5]**

Q5) Attempt the following.

a) Explain autoradiography technique with respect to principle, process and applications. **[7]**

b) Write a note on confocal microscopy. **[5]**

Q6) Attempt the following.

a) Explain mass spectroscopy in detail. **[7]**

b) Explain bathochromic shift and hypochromic shift. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) Signal to noise ratio.

b) Isoelectric foccusing.

c) Eward sphere.

● ● ●

Total No. of Questions : 7]

SEAT No. :

P2524

[Total No. of Pages : 2

[6067]-411

M.Sc. - II

MICROBIOLOGY

MBCT 241 : Pharmaceutical Microbiology

(2019 Pattern) (Semester-IV) (Credit System)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Questions 2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***

Q1) Attempt any five of the following. **[10]**

a) What is the purpose of toxicity studies?

b) What is Ames pest?

c) Name any 2 drugs targeting bacterial cell wall.

d) What is the significance of phase III clinical trials?

e) What is the mole of CLSI in pharmaceutical Industry?

f) What is the principle of Rational drug design?

Q2) Attempt the following.

a) Explain the significance of ADME studies of preclinical development of drugs. **[7]**

b) Explain the classification of drugs based on therapeutic classes, explain one with suitable example. **[5]**

Q3) Attempt the following.

a) Explain the objectives, conduct and outcome of phase I and II clinical trials of drugs. **[7]**

b) How pharmacopeia help in maintaining uniformity and standards in pharmaceutical industry? **[5]**

P.T.O.

Q4) Attempt the following.

a) Explain the role of regulatory authorities in pharmaceutical industry. **[7]**

b) What is bioavailability of drugs and how it is determined? **[5]**

Q5) Attempt the following.

a) What is drug metabolism? Explain metabolism in liver. **[7]**

b) Write a note on biotransformation reaction. **[5]**

Q6) Attempt the following.

a) Define the terms lead compound, lead optimization and condidate drug and signify their roles in drug discovery. **[7]**

b) Explain the various methods of drug transport. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) First pass effect.

b) Ligand based drug design.

c) Preclinical development.

● ● ●

Total No. of Questions : 7]

SEAT No. :

P2506

[Total No. of Pages : 2

[6067]-111
M.Sc. - I
MICROBIOLOGY
MBCT - 111 : Microbial Systematics
(2019 Pattern) (CBCS) (Semester - I) (Credit System) (Revised) (MB - 501)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q1 is compulsory.***
2) ***Solve any five questions from Q2 to Q7.***
3) ***Q2 to Q7 carry equal marks.***
4) ***Figures to right indicate full marks.***
5) ***Draw neat labelled diagram wherever necessary.***
6) ***Use of scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Attempt the following (Any 5): **[10]**

a) Define Phenetic Approach.

b) Write any two application of Microarray in Microbial diversity.

c) Define Neo Darwinism.

d) Species concept in Prokaryotes.

e) Define Reciprocal Altrusim.

f) What are Unculturable Bacteria?

Q2) Attempt the following:

a) Define species divergence and write a note on estimates of total number of species. **[7]**

b) Enlist and explain any one method of extracting total bacterial DNA from habitat. **[5]**

Q3) Attempt the following:

a) Explain the importance of FAME profiling in Bacterial taxanomy. **[7]**

b) Justify : Shannon Index is better than Simpson's index for expressing Bacterial diversity in an ecological sample. **[5]**

P.T.O.

Q4) Attempt the following:

a) Explain the five kingdom and three domain classification system in bacterial systematics. **[7]**

b) From the given data, calculate shannon's diversity index for the river water sample. Total number of colonies is 184×10^7. **[5]**

Sr. No.	Type of Colonies	Number of Colonies
01	Pin Point	50
02	Pigmented	61
03	Colonies larger than 1 mm	73

Q5) Attempt the following:

a) Define Molecular Chronometer and Explain the significance of 16 S rRNA gene as molecular clock. **[7]**

b) Write a note on r and k selection. **[5]**

Q6) Attempt the following:

a) Explain the culture dependent strategies for cultivating the unculturable Bacteria. **[7]**

b) Explain host parasite coevolution. **[5]**

Q7) Write short notes on Any 2 of the following: **[12]**

a) RFLP.

b) Eusociality.

c) Selfish gene.

Total No. of Questions : 7]

SEAT No. :

P-2507

[Total No. of Pages : 3

[6067]-112

F.Y. M.Sc.

MICROBIOLOGY

MBCT - 112 : Quantitative Biology

(2019 Pattern) (Semester - I) (CBCS)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Question No 2 to 7 carry equal marks.***
4) ***Figures to the right indicate full marks.***
5) ***Draw neat labeled diagram wherever necessary.***
6) ***Use of scientific calculators log & statistic tables are allowed.***

Q1) **Attempt the following (Any five) :** **[10]**

a) Calculate the mean from the following data.

Sr.No.	Bonus	No. of Persons
1	3 - 5	14
2	5 - 7	16
3	7 - 9	25
4	9 - 11	12
5	11 - 13	22

b) Enlist different types of data and explain any two.

c) What is interval and ratio?

d) Draw bar diagram from following data

Class	1st	2nd	3rd	pass	failed
No. of Student	28	32	50	12	08

e) What is null hypothesis?

f) What is sample in statistics?

P.T.O.

Q2) Attempt the following : **[12]**

a) Write a note on : P value and significance level. **[7]**

b) Mean soil temperature and germination days of wheat of 10 places are recorded. Determine the regression coefficient. **[5]**

Mean Temp ºC	38	42	45	42	44	40	46	44	43	40
Germination days	21	29	27	27	19	18	19	31	29	33

Q3) **Attempt the following :** **[12]**

a) The following data represents, mean days require for flowering in two varieties of bean, G-65 and PS-16.

Determine whether the two varieties are significantly different or not. **[7]**

	G-65	PS-16
N	30	35
Mean	32	38
Variance	9.62	14.23

b) Explain one tailed and two tailed test. **[5]**

Q4) **Attempt the following :** **[12]**

a) In a mutation breeding experiments, gamma rays effect on 10 seeds weight in 9m per plant of bean variety were given analyse the data using t-Test.**[7]**

Control	2.9	3.1	3.5	3.4	3.0	4.0	3.7	3.0	4.0	4.0
Test	2.7	2.8	3.0	3.5	3.7	3.2	3.0	3.0	2.9	2.8

b) Cardiac output in ml/min was recorded in a sample of 15 post cardiac surgery patients. Results are as follows. We wish to know whether sample mean is different from 5.05. Apply Rank test. **[5]**

Cardiac output (ml/min) → 4.91, 4.10, 6.74, 7.27, 7.42, 7.50, 6.56, 4.64, 5.98, 3.14, 3.23, 5.80, 6.17, 5.39, 5.77

Q5) **Attempt the following :** **[12]**

a) In a cross between black male and grey female drosophila the offspring obtained were 25 black and 35 grey by chi square test find out whether it matches with expected ratio 1 : 1. **[7]**

b) What is the probability of getting either ace or spade from pack of 52 cards. **[5]**

Q6) **Attempt the following :** **[12]**

a) Nephropathy was observed in 100 patients of four classes of diabetes a per severity of the disease.

Class	I	II	III	IV
Number of patients	8	15	14	7

is this difference is due to chance? Test by chi square test. **[7]**

b) Five person with their profile are as follows.

Sex	Age
Male	40
Male	43
Female	38
Female	27
Male	65

if chairmen have to be selected from this. What is probability of that it would be female or person over 30 years. **[5]**

Q7) **Attempt any two of the following :** **[12]**

a) A book contains 100 misprints distributed randomly on it's 100 pages. What is the probability that the page observed randomly contain at least 2 miss prints. **[6]**

b) Assume the mean height of the sorghum variety to be 68.22 inch with a various of 10.8 inch. How many varieties in a field of 100 would you expect over 6 feet. **[6]**

c) Write a note on : Type - I and Type - II errors. **[6]**

Total No. of Questions : 7]

SEAT No. :

P2508

[Total No. of Pages : 2

[6067]-113
M.Sc. - I
MICROBIOLOGY
MBCT - 113 : BIOCHEMISTRY AND METABOLISM
(2019 Pattern) (Credit System) (Semester - I) (MB-503)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any five questions from Q. 2 to Q. 7.***
3) ***Q. 2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right side indicates full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***

Q1) Attempt any Five of the following. **[10]**

a) Name two hydrophilic amino acid.

b) Define Apical Meristem.

c) What treatment is given to the sample in SDS-PAGE?

d) How are proteins modified in Golgi apparatus?

e) What changes takes place in cell in G-1 phase of cell cycle?

f) How is peptide bond Formed?

Q2) Attempt the following.

a) Derive Henderson - Hassel balch equation and give its significance. **[7]**

b) A peptide containing equimolar amount of Met, phe, ser, asp, and thr was treated with cyanogen bromide, a peptide and single amino acid were released (identified as Homoserine). Treatment of original pentapeptide with chymotrypsin produced 2 fragments one of which was more acidic than other. The acidic fragment contains Met Treatment of original pentapeptide with carboxy peptidase A yielded serine followed by thr. Deduce amino acid sequence of penta peptide. **[5]**

P.T.O.

Q3) Attempt the following

a) Explain the prencipal of Real-Time PCR and give its application. **[7]**

b) A mixture of 4 proteins of PIs, 11,7, 5 and 3 and loaded upon DEAE anion exchange column equilibrated with lowionic strength buffer of pH-8. Which of the four proteins would be expected to be retained in the column. **[5]**

Q4) Attempt the following

a) Explain Gastrulation process in Xenopus. **[7]**

b) Describe ABC model of Flower development in Arabidopsis. **[5]**

Q5) Attempt the following

a) Describe structure and Functions of E.R. **[7]**

b) Explain cyclin dependant regulation of cell cycle. **[5]**

Q6) Attempt the following

a) Explain Ion-torrent method of DNA sequencing. **[7]**

b) Explain role of Morphogen gradient in Development. **[5]**

Q7) Attempt two of the following

a) Explain retrieval of E.R resident protein from cis Golgi. **[6]**

b) Describe super-secondary structure of proteins. **[6]**

c) Explain the structural features of amino acids. **[6]**

♦ ♦ ♦

Total No. of Questions : 5]

SEAT No. :

P2509

[Total No. of Pages : 2

[6067]-114

M.Sc.-I

MICROBIOLOGY

MBET-115 : Fungal Systematics and extremophiles

(2019 Pattern) (Semester-I) (Credit System) (MBTE-11)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) Solve any five of the following **[5]**

a) Enlist two important commercial aspects of halophiles.

b) Enlist two habitats from where methanogens can be isolated.

c) Note down six classes of fungi.

d) Enlist two examples of fungi belonging to zygomycetes.

e) Give two examples of psychrophiles.

f) What are anti-freeze proteins?

Q2) Attempt the following.

a) How do psychrophiles maintain membrane fluidity? **[6]**

b) Write a note on fungal cell wall. **[4]**

Q3) Attempt the following.

a) Write a note on sexual reproduction in Ascomycetes, with a suitable diagam. **[6]**

b) Write a note on applications of thermophiles. **[4]**

P.T.O.

Q4) Attempt the following.

a) If a group of scientist want to study the bacteria present in hot spring water sample, how should they carry out enrichment of sample and isolation of bacteria? **[6]**

b) Justify, Ascomycetes can be exploited in various fields. **[4]**

Q5) Attempt any two of the following. **[10]**

a) Write a note on cell membrane adaptation observed in halophiles.

b) Explain, different kinds of sexual spores found in different classes of fungi.

c) Draw life cycle of basidiomycetes.

❖ ❖ ❖

Total No. of Questions : 5]

SEAT No. : ____

P2510

[Total No. of Pages : 2

[6067]-115

M.Sc.-I

MICROBIOLOGY

(MBET-116) (MBTE-12) : Experimental design and quantitative Approach for biologist

(2019 Pattern) (Semester-I) (CBCS) (Revised)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat lablled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables & scientific calculators is a allowed.***
7) ***Assume suitable data if necessary.***

Q1) Attempt any five of the following. **[5]**

a) Draw schematic diagram to explain research methodology.

b) What is the role of placebo in clinical field trails.

c) What is cohort study' with respect to epidemiological survey.

d) Enlist any two sampling methods.

e) Explain presentation of experimental data in the form of equation.

f) Comment on -phase zero/pre clinical trial.

Q2) Attempt the following.

a) Write significance of 'Hypothesis formulation in research methodology. **[6]**

b) Describe fractional factorial design. **[4]**

P.T.O.

Q3) Attempt the following.

a) Give significance of survey Design' during designing of experiment. **[6]**

b) Explain simulation of bacterial growth and write its mathematical equation. **[4]**

Q4) Attempt the following.

a) Explain clinical field trails with respect to blinding and bias removal. **[6]**

b) Explain 'Non linear' models in data analysis. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Goodness of fit

b) Deterministic Vs stochastic models.

c) Non probabilistic sampling methods.

❖ ❖ ❖

Total No. of Questions : 5]

SEAT No. : ____

P2511

[Total No. of Pages : 2

[6067]-116

M.Sc.-I

MICROBIOLOGY

MBET-117 : Microbial Communication, Membrane Transport and Signal Transduction

(2019 Pattern) (Semester-I) (Credit System) (Revised)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat lablled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables & scientific calculators is a allowed.***
7) ***Assume suitable data if necessary.***

Q1) Attempt any five of the following. **[5]**

a) Categorize following molecules in to primary and secondary messengers
   i) CAM P,
   ii) Ca^{+2},
   iii) AHL
   iv) IP_3

b) Draw structure of acylated homoserine lactone.

c) Enlist various lipids of biological membrane.

d) Describe the disadvantages of biofilms.

e) Sunmarize the mechanism of action of filippases.

f) Differentiate between symport and antiport.

Q2) Attempt the following.

a) Illustrate with the help of diagram quorum sensing in gram positive bacteria. **[6]**

b) Explain the mechanism of biofilm formation with suitable example. **[4]**

P.T.O.

Q3) Attempt the following.

a) Describe the mechanism of signal transduction in bacterial two-component systems. **[6]**

b) A liposome containing ATpase is immersed in a buffer with acidic pH. the lumen of liposome was found to be acidified. Explain this observation. **[4]**

Q4) Attempt the following.

a) Justify that cell-cell signalling plays important role in Dictyostlium life cycle. **[6]**

b) Compare & contrast between voltage gated and ligand gated ion channels. **[4]**

Q5) Attempt any two of the following. **[10]**

a) Describe the mechanism of solute transport by facilitated diffusion.

b) Explain the various types of liposomes and comment on their applications.

c) Discuss the significance of S-motility in myxobacteria.

❖ ❖ ❖

Total No. of Questions : 7]

SEAT No. : ____

P2512

[Total No. of Pages : 2

[6067]-211

M.Sc. - I

MICROBIOLOGY

MBCT - 121 : Instrumentation and Molecular Biophysics

(2019 Pattern) (Semester-II) (Credit System)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***
4) ***Figures to the right indicate full marks.***
5) ***Draw neat labelled diagrams wherever necessary.***
6) ***Use of scientific calculator is allowed.***
7) ***Assume suitable data, if necessary.***

Q1) Attempt any five: **[10]**

a) Define : Retention factor.

b) Write Van deemter equation.

c) What is quenching?

d) What are the radioactive isotopes.

e) Name any two mass analysers used in mass spectroscopy.

f) Enlist different methods of protein crystallisation.

Q2) Attempt the following.

a) Enlist detectors used in gas chromatography and explain any two in detail. **[7]**

b) In a chromatographic analysis of lemon oil a peak for limonene has a retention time of 8.42 min with a baseline width of 0.96 min. ν-Terpinene elutes at 9.57 min with a baseline width of 0.64 min. What is the resolution between the two peaks? **[5]**

P.T.O.

Q3) Attempt the following.

a) With the help of the suitable diagram explain flurescence spectroscopy. **[7]**

b) The absorbance A of 1.00×10^{-4} solution of amino acid tryptophan at wavelength 280 nm is 0.139. The path length of the cuvette is 1cm. What is the molar absorption coefficient (ε) at this wavelength? **[5]**

Q4) Attempt the following.

a) Explain spin-spin relaxation parameter in NMR. **[7]**

b) Explain direct lattice and reciprocal lattice. **[5]**

Q5) Attempt the following.

a) Explain autoradiography technique with respect to principle, process and applications. **[7]**

b) Write a note on confocal microscopy. **[5]**

Q6) Attempt the following.

a) Explain mass spectroscopy in detail. **[7]**

b) Explain bathochromic shift and hypochromic shift. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) Signal to noise ratio.

b) Isoelectric foccusing.

c) Eward sphere.

● ● ●

Total No. of Questions : 7]

SEAT No. :

P2513

[Total No. of Pages : 2

[6067] - 212

M.Sc. - I

MICROBIOLOGY

MBCT - 122 : Molecular Biology

(2019 CBCS Pattern) (Semester - II) (MB 602)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7***
3) ***Q.2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Assume suitable data, if necessary.***
7) ***Use of scientific calculators is allowed.***

Q1) Answer any five. **[10]**

a) Give examples of role of mi RNA in cancel.

b) What is gene annotation, give points used in gene annotation.

c) What are expression vectors, give three examples.

d) What is klenow enzyme, Write the reaction catalysed by tuis enzyme.

e) Give four points of differences between siRNA and miRNA.

f) Give diagrammatic representation of rRNA processing.

Q2) Attempt the following.

a) Explain in detail at least seven characters used in designing a probe. **[7]**

b) With the help of a detailed diagram.Explain RNA processing by autosplicing. **[5]**

P.T.O.

Q3) Attempt the following.

a) Explain three options used in RDT,in case you have no suitable REs in your inserts or vectors. **[7]**

b) Write in short about the technique. That would be used to find out the presence of a DNA fragment directly in the colony. **[5]**

Q4) Attempt the following.

a) Describe whole genome shotgun. Sequencing method in detail. **[7]**

b) State the goals and applications of HGP in detail. **[5]**

Q5) Attempt the following.

a) Describe in detail the technique used for detection of polygenic diseases. **[7]**

b) What are RNA signatures of 'Autibiotic Resistance' in bacteria and how are they detected. **[5]**

Q6) Attempt the following.

a) Explain epitope tagging with a suitable example and give its applications. **[7]**

b) Write a short note on Random priming method. **[5]**

Q7) Attempt any two: **[12]**

a) Explain with examples the disorders caused due to change in protein conformation.

b) Explain FISH technique in detail.

c) Explain Expressed sequence Taq.

Total No. of Questions : 7]

SEAT No. :

P2514

[Total No. of Pages : 2

[6067]-213
M.Sc. - I
MICROBIOLOGY
MBCT- 123 : Enzymology, Bioenergetics & Metabolism
(2019 Pattern) (Credit System) (Semester - II)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Q.1 is compulsory.*
2) *Solve any Five questions from Q.2 to Q.7.*
3) *Q.2 to Q.7. carry equal marks.*
4) *Figures to the right side indicate full marks.*
5) *Draw neat labelled diagrams wherever necessary.*
6) *Use of logarithmic tables and scientific calculator is allowed.*
7) *Assume suitbale data necessary.*

Q1) Attempt any five. **[10]**

a) Give two examples of sugar acids.

b) Define entropy.

c) Write down two examples of unsaturated fatty acids.

d) Define Vmax.

e) State second law of thermodynamics.

f) Define allosteric enzymes.

Q2) a) Discuss the steps involved in king altmon approach to derive two substrate enzyme catalyzed reaction. **[7]**

b) Describe in detail with structure β oxidation process of saturated fatty acid. **[5]**

Q3) a) What are coupled reactions? Discuss the significance of high energy compound in such reaction. **[7]**

b) Explain with the help of suitable example the construction of purification chart of protein. **[5]**

Q4) a) Describe in detail the steps involved in gluconeogenesis. Add a note on its regulation. **[7]**

b) Draw secondary plots in case of uncompetitive inhibition to find out value of ki. **[5]**

Q5) a) Describe in detail role of TCA cycle in generating biosynthetic intermediates. **[7]**

b) The adenylate pool in a culture of lympho sarcoma cells was found to consist of 10^{-3}M ATP, 3×10^{-4}M ADP & 10^{-4}M AMP. Calculate energy charge of the cell. **[5]**

P.T.O.

Q6) a) What is glycogen? Explain in detail regulation of synthesis & break down of glycogen. **[7]**

b) Describe in detail glyoxylate cycle. **[5]**

Q7) Attempt any two of the following. **[12]**

a) Hill plot.

b) Lipids as signalling molecules.

c) Structure & function of sphingolipids.

✡ ✡ ✡

Total No. of Questions : 5]

SEAT No. :

P2515

[Total No. of Pages :1

[6067]- 214
M.Sc.- I
MICROBIOLOGY
MBCT-125 : Bioinformatics and Bionanotechnology
(2019 Pattern) (Credit System) (Semester - II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question No.2 to 5 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***

Q1) Solve any five of the following: **[5]**

a) What are the different methods for characterization of nanoparticles?
b) What is zeta potential?
c) What is a database?
d) What are the advantages of synthesis of nanoparticles using plants?
e) What is a phylogenetic tree?
f) What is the full form of NCBI?

Q2) Attempt the following.

a) Describe the different properties of nanoparticles. **[6]**
b) Explain the principle and applications of transmission electron microscope. **[4]**

Q3) Attempt the following.

a) Explain the characterization of nanoparticles using dynamic light scattering. **[6]**
b) Explain how to prepare the plant extract for synthesis of nanoparticles. **[4]**

Q4) Attempt the following.

a) Explain the principle and applications of scanning tunnelling microscope. **[6]**
b) Explain how the search engines work. **[4]**

Q5) Attempt any two of the following. **[10]**

a) Explain the pattern recognition in data mining tools.
b) Give the characteristics of magnetotactic bacteria.
c) Write short note on swiss-prot database.

Total No. of Questions : 5]

SEAT No. :

P2516

[Total No. of Pages :1

[6067]- 215
M.Sc. - I
MICROBIOLOGY
MBCT-126 : Molecular Biology Tools and Applications
(Revised 2019 Pattern) (CBCS) (Semester - II) (MBTE-22)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***

Q1) Attempt any five of the following. **[5]**

a) Define hybridoma technology.
b) What are polyhydroxyal kanoates?
c) What is FISH?
d) Write application of yeast two hybrid system.
e) What is EMSA?
f) What are oligo arrays?

Q2) a) Elaborate on: CRISPR- Cas system and its applications. **[6]**
b) Explain DOT blot and SLOT blot in detail. **[4]**

Q3) a) Elaborate on DNA micro array technique with neat labelled diagram. **[6]**
b) Explain DNase foot printing with example. **[4]**

Q4) a) What are biopolymens? Explain the synthesis of any one in detail with neat labelled diagram. **[6]**
b) Explain how monoclonal antibodies are used in cancer therapy. **[4]**

Q5) Attempt any two of the following. **[10]**

a) Explain how transcription rate is measured?

b) Write a short note on peptide antibodies.

c) Explain Methyl interference assay.

Total No. of Questions : 5]

SEAT No. :

P2517

[Total No. of Pages :1

[6067]- 216
M.Sc. - I
MICROBIOLOGY
MBCT-127 : Nitrogen metabolism, Respiration and photosynthesis
(2019 Pattern) (CBCS) (Semester - II) (MBTE-23)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q. 5 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right side indicate full marks.***

Q1) Attempt any five of the following. **[5]**

a) The enzyme that fixes the atmospheric CO_2 in C_4 plants is_____

b) What is the function of leghaemoglobin?

c) Write down the reaction carried out by glutamine synthetase.

d) What is sulfur respiration?

e) Which amino acids are synthesized from pyruvate?

f) What is IMP? Which products are formed from IMP?

Q2) Attempt the following.

a) Describe non-cyclic photophosphorylation. **[6]**

b) Explain transamination reaction & its significance. **[4]**

Q3) Attempt the following.

a) Describe becterial symbiotic Nitrogen fixation. **[6]**

b) Explain CAM pathway & its significance. **[4]**

Q4) Attempt the following.

a) Explain De novo purine biosynthesis pathway. **[6]**

b) Explain : Biochemistry of methanogenesis. **[4]**

Q5) Apptempt any two of the following. **[10]**

a) Explain photophosphorylation in cynobacteria.

b) Write a note on photorespiration.

c) Write a note on regulation of nitrogenase enzyme.

Total No. of Questions : 7]

SEAT No. :

P-2518

[Total No. of Pages : 2

[6067]-311

M.Sc. (Part - II)

MICROBIOLOGY

MBCT-231 : Immunology

(2019 Pattern) (Semester - III) (Revised)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic table/scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Solve any five of the following. **[10]**

a) What is the significance of PAMPs in immune response?

b) What is TCR-CD3 complex?

c) What is the role of TLR? Explain with example.

d) What are tumour associated antigen? Explain with example.

e) What is negative regulation in immune response?

f) What is Hodgkin's disease?

Q2) Attempt the following.

a) Explain the structure and role of G-Protein couple receptor with example. **[7]**

b) Explain TCR-CD3 activation pathway. **[5]**

P.T.O.

Q3) Attempt the following.

a) How biological response modifiers are used in the treatment of autoimmune disorders. **[7]**

b) Comment on use of transgenic animals in immunological research. **[5]**

Q4) Attempt the following.

a) Describe functional assays for phagocytes. **[7]**

b) What are characteristic features of lymphoma. **[5]**

Q5) Attempt the following.

a) How animal models are used in AIDS study? **[7]**

b) Comment on the role of Treg cells in immune response supression. **[5]**

Q6) Attempt the following.

a) Explain cellular transformation during neoplastic growth with examples. **[7]**

b) Explain cytotoxicity assays for measuring cytokines. **[5]**

Q7) Write short notes on any two. **[12]**

a) Toll like receptors.

b) Ras/MAP kinase pathway.

c) Regulation of classical pathway of complement activation.

Total No. of Questions : 7]

SEAT No. :

P-2519

[Total No. of Pages : 2

[6067]-312

S.Y. M.Sc.

MICROBIOLOGY

MBCT-232 : Molecular Biology

(2019 Pattern) (Semester - III) (Credit System)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Question 2 to 7 carry equal marks.***
4) ***Draw neat and labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithemic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Solve any five of the following : **[10]**

a) Define metabolomics. Give any two techniques used to study metabolomics.

b) Enlist any two prokaryotic transposons.

c) What is DNA imprinting? Mention any one imprinted gene in humans.

d) Mention any two gene sequencing techniques.

e) What are conserved genes. List any two examples of conserved genes.

f) Give two ethical issues concerning GMOs (genetically modified organisms).

Q2) Attempt the following :

a) Elaborate on gene sequencing techniques. **[7]**

b) Describe the transposons of Drosophila. **[5]**

Q3) Attempt the following :

a) Explain how MALDI is used as a tool in proteomic studies. **[7]**

b) Justify : Gene therapy plays a significant role to the treatment of diseases. **[5]**

P.T.O.

Q4) Attempt the following :

a) The left-hand-side terminal repeats of insertion sequences, Is1 and Is 50 are as follows :

i) Is 1 left terminal repeat (Is 1L)

5'-CTTACTGAT-3'

3'-GAATGACTA-5'

ii) Is 50 left terminal repeat (Is 50L)

5'-CTGACTCTT-3'

3'-GACTGAGAA-5'

Write down the right-hand-side terminal repeats of Is 1 and Is 50. Justify your answer. **[7]**

b) Comment on medical applications of GMOs (genetically modified organisms) **[5]**

Q5) Attempt the following :

a) Draw the structure of the TnA transposon comment on its controlling elements. **[7]**

b) Give the steps involved in the separation and purification of proteins. **[5]**

Q6) Attempt the following :

a) Explain with examples the differences between composite and non-composite transposons. **[7]**

b) What is the significance of genetic trade off mechanisms in aging?. **[5]**

Q7) Write short notes on any two of the following : **[12]**

a) 2D gel electrophoresis in proteomics

b) Alu elements

c) Applications of transgenic plants.

⌘⌘⌘

Total No. of Questions : 7]

SEAT No. :

P-2520

[Total No. of Pages : 2

[6067]-313

M.Sc. - II

MICROBIOLOGY

MBCT-233 : Clinical Microbiology

(2019 Pattern) (Semester - III) (Credit System)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Solve any 5 questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of logarithmic tables/scientific calculator is allowed.***
6) ***Assume suitable data if necessary.***

Q1) Attempt any five of the following : **[10]**

a) What are virulence genes?

b) What are exotoxins? Give two examples.

c) Give two methods to defect amoebiasis.

d) What are sulfur granules? State the infection in which they are observed.

e) Which proteins play an important role in viral persistence and liver pathogenesis of HBV?

f) Which are the morphological forms observed in the life cycle of Ascaris lumbricoides.

Q2) Attempt the following :

a) Explain the mechanism of bacterial invasion with diagram. **[7]**

b) Explain in detail any one epidemiological model for infections disease dynamics. **[5]**

P.T.O.

Q3) Attempt the following :

a) What are endotoxins? Explain in detail with respect to Gram negative bacteria. **[7]**

b) Explain pathophysiology of Ebola virus. **[5]**

Q4) Attempt the following :

a) Describe in vivo assay and in vitro assay for diphtheria toxoid. **[7]**

b) Describe virulence factors in Acinetobacter baumannii. **[5]**

Q5) Attempt the following :

a) Explain the pathogenesis of Aspergillus flavus. **[7]**

b) Explain therapeutic agents and prophylaxis of candidiasis. **[5]**

Q6) Attempt the following :

a) Give an account of methods for diagnosis of HINI. Add a note on therapeutic agents used in its treatment. **[7]**

b) Enlist general characters of Actinomycetes israelli. **[5]**

Q7) Write short notes on (any 2) : **[12]**

a) Structure of HBV

b) Granuloma formation in tuberculosis

c) Detection methods for dermatophytic fungi

□□□

Total No. of Questions : 5]

SEAT No. : ____

P2521

[Total No. of Pages : 2

[6067]-314

M.Sc.-II

MICROBIOLOGY

MBET 235 : Cell Culture Techniques

(2019 Pattern) (Semester-III) (Credit System)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables & scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Attempt any five of the following. **[5]**

a) What are suspension cell cultures?

b) What is cell passaging?

c) Give an example of adherent cell which can be grown by anchorage dependent cell culture.

d) What are secondary cultures?

e) Give two examples of plant derived immunomodulators.

f) What is the role of serum in the animal cell culture medium.

Q2) Attempt the following.

a) What are the characteristics features of transformed cells? **[6]**

b) What are immunomodulators? Explain its role? **[4]**

P.T.O.

Q3) Attempt the following.

a) Explain the use of hybrid lymphoid cell lines in immunological studies. **[6]**

b) What is the use of trypsinisation process in the cell culture technique. **[4]**

Q4) Attempt the following.

a) Write the difference between finite cell lines and continuous cell liner. **[6]**

b) Why pH is a key factor to be considered while designing animal cell culture media. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Cell lines

b) Monolayer culture.

c) Anchorage dependent cell culture.

Total No. of Questions : 5]

SEAT No. :

P2522

[Total No. of Pages : 2

[6067]-315

M.Sc.

MICROBIOLOGY

MBET-236 : Bioremediation & Bio mass utilization

(Rev-2019 Pattern) (Semester-III) (Credit System)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables & scientific calculators is a allowed.***
7) ***Assume suitable data if necessary.***

Q1) Attempt any five of the following. **[5]**

a) What do you mean by biotreatment of xenobiotic compound?

b) Write two ingredients added to improve process of bioremediation?

c) What is the fundamental difference in between in-situ? ex-situ bioremediation methods?

d) What are advantages of using biomass as fuel source?

e) Write products resulting from action of β-glucosidase.

f) Which enzyme is used for production of fructose from aldohexoses?

Q2) Attempt the following.

a) How yeast trans cription is engineered to improve ethanol production elaborate with suitable examples? **[6]**

b) How Lactobacillus spp. are engineered to improve silage production? **[4]**

P.T.O.

Q3) Attempt the following.

a) Draw flow chart showing different pathways for enzymatic conversion of aromatic compounds to catechol. **[6]**

b) Discuss n-octane degradation pathway. **[4]**

Q4) Attempt the following.

a) Discuss camphor degradation pathway. **[6]**

b) With suitable example explain the use of eukaryotic cellulase genes for gene clonning. **[4]**

Q5) Write short note on any two of the following. **[10]**

a) Factros affecting biodegradation of xenobiotics.

b) Gene manipulation for bioremediation.

c) Isolation of prokaryotic cellulase genes.

Total No. of Questions : 5]

SEAT No. :

P2523

[Total No. of Pages : 2

[6067]-316
M.Sc.-II
MICROBIOLOGY
MBET-237 : Microbial Virus Technology
(2019 Pattern) (Semester-III) (Cridit System)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat lablled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***

Q1) Solve any five of the following. **[5]**

a) Name two physical methods of concentration of phage.

b) What is burst size of bacteriophage?

c) Define lysogeny

d) What are algal viruses? Give examples.

e) Give example of therapeutic use of bacteriophage.

f) What are mycoviruses? Give example.

Q2) Attempt the following.

a) Explain different stages in intracellular development of bacteriophage. **[6]**

b) Comment on the use of bacteriophage on pathogen control in Aqua sytems. **[4]**

Q3) Attempt the following.

a) What is phage lysine therapy? Explain with example. **[6]**

b) Discuss use of phage in pathogen control in poultry. **[4]**

P.T.O.

Q4) Attempt the following.

a) Explain mycovirus-host interaction mechanisms. **[6]**

b) Comment on occurance of mycoviruses and their taxonomy. **[4]**

Q5) Write short notes on any two. **[10]**

a) Enumeration of bacteriophages.

b) Algal viruses.

c) Edipse period

❖ ❖ ❖

Total No. of Questions : 7]

SEAT No. :

P2524

[Total No. of Pages : 2

[6067]-411

M.Sc. - II

MICROBIOLOGY

MBCT 241 : Pharmaceutical Microbiology

(2019 Pattern) (Semester-IV) (Credit System)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Questions 2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***

Q1) Attempt any five of the following. **[10]**

a) What is the purpose of toxicity studies?

b) What is Ames pest?

c) Name any 2 drugs targeting bacterial cell wall.

d) What is the significance of phase III clinical trials?

e) What is the mole of CLSI in pharmaceutical Industry?

f) What is the principle of Rational drug design?

Q2) Attempt the following.

a) Explain the significance of ADME studies of preclinical development of drugs. **[7]**

b) Explain the classification of drugs based on therapeutic classes, explain one with suitable example. **[5]**

Q3) Attempt the following.

a) Explain the objectives, conduct and outcome of phase I and II clinical trials of drugs. **[7]**

b) How pharmacopeia help in maintaining uniformity and standards in pharmaceutical industry? **[5]**

P.T.O.

Q4) Attempt the following.

a) Explain the role of regulatory authorities in pharmaceutical industry. **[7]**

b) What is bioavailability of drugs and how it is determined? **[5]**

Q5) Attempt the following.

a) What is drug metabolism? Explain metabolism in liver. **[7]**

b) Write a note on biotransformation reaction. **[5]**

Q6) Attempt the following.

a) Define the terms lead compound, lead optimization and condidate drug and signify their roles in drug discovery. **[7]**

b) Explain the various methods of drug transport. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) First pass effect.

b) Ligand based drug design.

c) Preclinical development.

● ● ●

Total No. of Questions : 7]

SEAT No. :

P-2525

[Total No. of Pages : 2

[6067]-412

M.Sc. (Part - II) (Semester - IV)

MICROBIOLOGY

MBCT242 : Microbial Technology

(2019 Pattern) (Cridit System)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q1 is compulsory.***
2) ***Solve any five questions from Q2 to Q7.***
3) ***Q2 to Q7 carry equal marks.***
4) ***Draw neat and well labelled diagrams whenever needed.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic table/scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Solve any five of the following. **[10]**

a) Define fluidized bed reactor

b) What is aeration number?

c) Define biosensor.

d) What is tradesecret?

e) Define downstream processing.

f) What is ISO certification?

Q2) Attempt the following.

a) Explain in detail aeration of bioreactor; when the cell system used for biochemical reaction is sensitive to shear pressure. **[7]**

b) What is biconversion? Explain it with suitable example. **[5]**

P.T.O.

Q3) Attempt the following.

a) Discuss in detail commercial production of chitinase. **[7]**

b) Baffles are always equipped in mechanically agitated bioreactors. Justify the statement. **[5]**

Q4) Attempt the following.

a) What are OTR and OUR with reference to a bioreactor? **[7]**

b) Write a note on commercial applications of pullulan. **[5]**

Q5) Attempt the following.

a) What is process validation? Discuss its importance in an industry. **[7]**

b) Calculate the Reynolds number for a fluid having viscosity 0.6 Ns/m^3 with a relative density of 825 Kg/m^3 flowing through a pipe of 25 mm diameter with a velocity of 3 m/s and predict the flow state of the liquid. **[5]**

Q6) Attempt the following.

a) Discuss environmental significance of fungi. **[7]**

b) Write a note on environmental monitoring using biosensors. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) Bubble Column reactor

b) Commercial production of pollulan using a detailed flowchart.

c) IPR

Total No. of Questions : 5]

SEAT No. :

P2526

[Total No. of Pages : 1

[6067]-413
M.Sc. - II
MICROBIOLOGY
MBET- 244 : Quality Assurance and Validation in Pharmaceutical Industry and Development of Anti Infectives
(2019 Pattern) (Credit System) (Semester - IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) *Q.1 is compulsory.*
2) *Solve any Three questions from Q.2 to Q.5.*
3) *Q.2 to Q.5. carry equal marks.*
4) *Draw neat labelled diagrams wherever necessary.*
5) *Figures to the right side indicate full marks.*
6) *Use of logarithmic tables and scientific calculators is allowed.*
7) *Assume suitbale data if necessary.*

Q1) Attempt any five of the following. **[5]**

a) Give any two examples of antifungal agents.

b) State the importance of sterility testing of the drug.

c) Define Therapeutic ratio.

d) What is GLP.

e) Write down any two CLSI guidelines with respect to susceptibility testing?

f) Write two objectives of WHO certification related to quality assurance.

Q2) Attempt the following.

a) Explain the method kirby Bauer in susceptibility testing. Write its advantages. **[6]**

b) Explain the safety measures to be undertaken in microbiology laboratory. **[4]**

Q3) Attempt the following.

a) Explain how pyrogenicity test is performed for drugs. **[6]**

b) Explain the role of Quality management in pharmaceutical industry. **[4]**

Q4) Attempt the following.

a) Describe the susceptibility testing for Anti-mycobacterial agents. **[6]**

b) Describe the method for determining MIC using liquid media. **[4]**

Q5) Write short note on any two of the following. **[10]**

a) Good Manufacturing practices.

b) Ames test.

c) Stokes Method.

✡ ✡ ✡

Total No. of Questions : 5]

SEAT No. :

P2527

[Total No. of Pages :1

[6067]- 414
M.Sc. - II
MICROBIOLOGY
MBET-245 : Advances In Microbial Technology
(2019 Pattern) (Semester - IV) (Credit System)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question no.1 is compulsory.***
2) ***Solve any three questions from Que.2 to Que.5.***
3) ***Draw the neat diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables/scientific calculator is allowed.***
6) ***Assume suitable data if necessary.***
7) ***Q.No. 2 to Q.No. 5 carry equal marks.***

Q1) Attempt any five of the following. **[5]**

a) Give two examples of secondary growth metabolities.
b) Write the role of growth associated metabolities.
c) Define microbial growth rate.
d) Write mathematical expression for yield coefficient?
e) Which cells produce erythropoietin?
f) What is animal cell culture?

Q2) Attempt the following.

a) Explain the factors effecting on mass transfer of nutrients. **[6]**
b) Describe production of erythropoietin. **[4]**

Q3) Attempt the following.

a) Describe production of HBV vaccine with diagram. **[6]**
b) What are the effects of exopolysaccharides on yield of the product? **[4]**

Q4) Attempt the following.

a) Explain the method for production of recombinant enzymes. **[6]**
b) Describe production of insulin by recombinant technology. **[4]**

Q5) Write a short note on any two of the following. **[10]**

a) Limitations of animal cell culture technology.
b) Recombinant DNA vaccine.
c) Hybridoma technology.

Total No. of Questions : 5]

SEAT No. :

P-2528

[Total No. of Pages : 2

[6067]-415
M.Sc.-II
MICROBIOLOGY
MBET-246 : INDUSTRIAL WASTE WATER TREATMENT AND INDUSTRIAL PRODUCTION OF VACCINE
(2019 Pattern) (Semester - IV) (CBCS) (Revised)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question no. 2 to 5 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right side indicate full marks.***

Q1) **Solve any 5 of the following:** **[5]**

a) Define : Hydraulic retention time.

b) Give examples of preservatives used in vaccine production.

c) Give the name of reactor used in anerobic Biological treatment.

d) Which are the viruses used in production of live attenuated vaccines.

e) Write down the formula to calculate BOD & COD of waste water.

f) Write applications of next generation vaccines.

Q2) **Attempt the following:**

a) Describe the Pilot and large scale production of BCG vaccine. **[6]**

b) Explain in detail the Physicochemical properties of diary effluent. **[4]**

Q3) **Attempt the following:**

a) Describe the various effluent treatment strategies used in paper and pulp industry. **[6]**

b) Enlist various anerobic processes of waste water treatment. Describe one in brief. **[4]**

P.T.O.

Q4) **Attempt the following:**

a) Explain in detail activated sludge treatment and its analysis. **[6]**

b) Justify : Use of excipients and adjuvants in vaccine production increases the effect of vaccines. **[4]**

Q5) **Write Note on any two:** **[10]**

a) Recombinant vaccines.

b) Biological waste water treatment.

c) Hapten conjugate vaccines

Total No. of Questions : 5]

SEAT No. :

P2529

[Total No. of Pages : 2

[6067]-416

M.Sc. - II

MICROBIOLOGY

MBET-247 : Bioethics, Biosafety, Quality Control and Quality Assurance

(2019 Pattern) (Semester-IV) (Credit System)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to Q.5 carry equal marks.***
4) ***Draw neat and labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Solve any five of the following: **[5]**

a) Define quality control.

b) Name the regulatory body that plays an advisory role with respect to research on genetically modified organisms (GMOs.)

c) Enlist the universal ethical principles.

d) Which Indian regulatory body is in volved in the approval of drugs.

e) List two examples of pathogens from biohazard group2.

f) Which quality department approves or rejects starting materials and finished products in pharmaceutical industry.

Q2) Attempt the following.

a) Describe the roles and responsibilities of the following regulatory bodies. (i) CPCB (Central Pollution Control Board) (ii) FSSAI (Food Safety Standards Association of India). **[6]**

P.T.O.

b) A 26-year-old woman of low socio-economic status and staying alone suffers from major depression. She is hospitalised because she is suicidal. Three days after her admission and treatment, hear psychiatrist notes that, although still depressed, she is not suicidal any more. The medical insurance reviewer asks the psychiatrist to discharge The patient. The sypchiatrist feels that discahrge would be risky. Also, as the woman has no one to take care of her and she needs insurance for the extended hospital stay, the psychiartist states in the medical record that the patient is again suicidal. How can the psychiatrist's action be justified? Discuss the case study with respect to ethical principles. **[4]**

Q3) Attempt the following.

a) Differentiate between validation and calibration used in quality management. **[6]**

b) Justify : Infections agents and biological material must be chemically disinfected or autoclaved before disposal in the medical waste bin. **[4]**

Q4) Attempt the following.

a) How are human pathogens classified on the basis of the biological risk assessment criteria. **[6]**

b) Justify: quality control finds and corrects defects in products, where as quality assurance prevents defects. **[4]**

Q5) Write short notes on any two of the following: **[10]**

a) Principles of good manufacturing practice (GMP)

b) Salient provisions of the biological Diversity act.

c) Importance of standard operating procedures (SOPs) in quality assurance.

● ● ●