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D.P. code 553687 Set I.

## OPTIONAL

[Time : Three hours]		[Marks: 100]
Please check whether you have received the right question paper		
N.B:	1. All questions carry equal marks 2. Attempt all questions	

Q.I	A.	Define the following:	(05)
		i) <b>Ribosomes</b> -particle consisting of RNA and associated proteins found in large numbers in the cytoplasm of living cells, responsible for protein synthesis	
		ii) <b>Type cultures</b> - reference cultures maintained in international reference laboratories. They contain representatives of all established species	
		iii) <b>Swimmers ear</b> : otitis externa- a painful infection of the external ear canal leading to the eardrum frequently caused by <i>Pseudomonas</i>	
		iv) <b>Epidemiology</b> : Science that evaluates the occurrences, determinants, distribution, and control of health and disease in a defined human population.	
		v) <b>Sterilization hold time</b> - It is the time required for the entire load to be exposed to pure, dry, saturated steam at the effective temperature in order to ensure sterilization.	
<b>Q.I</b>	<b>B.</b>	<b>State whether the following statements are true or false:</b>	<b>(05)</b>
		i) Sabourauds agar is an enrichment medium. <b>False</b>	
		ii) Separation of motile from nonmotile can be carried out using Craigie's tube. <b>True</b>	
		iii) Small pox has been controlled by quarantine. <b>False</b>	
		iv) Bioterrorism organisms are agents belonging to biosafety level 3- <b>False</b>	
		v) Pasteurization is the disinfection by moist heat below 100°C- <b>True</b>	
<b>Q.I</b>	<b>C.</b>	<b>Give one example for each of the following:</b>	<b>(05)</b>
		i) <b>Spore forming bacteria</b> -- Bacillus, Clostridium	
		ii) <b>Selective media</b> - MacConkeys, Sabourauds, SS	
		iii) <b>Pandemic</b> : H1N1	
		iv) <b>Organism causing amebiasis</b> : <i>Entamoeba histolytica</i>	
		v) <b>Phenolic disinfectants</b> - Clearosol, Hycolin, Stericol, Lysol	
<b>Q.I</b>	<b>D.</b>	<b>Select the most appropriate alternative:</b>	<b>(05)</b>

(2)

		i)	_____ are branching filamentous bacteria ( <b>Actinomycetes, Mycoplasma, Spirochetes</b> )	
		ii)	The outermost layer of the skin is called _____. ( <b>sebum, epidermis, dermis</b> )	
		iii)	Common cold is caused by _____. ( <b>Rotavirus, HAV, Rhinovirus</b> )	
		iv)	Type C fire extinguishers are used for _____ fires. ( <b>thrash, electrical, chemical</b> )	
		v)	_____ is used for sterilization of surgical instruments. ( <b>Pasteurization, Boiling at 100°C, Radiation</b> )	
<b>Q.2</b>	<b>A</b>		<b>Answer any two of the following:</b>	<b>(20)</b>
		i)	Discuss the methods used to cultivate anaerobic bacteria <b>Ananthnarayan 8<sup>th</sup> edn pg no- 45,47</b>	
		ii)	Write a short note on microbial diseases of the skin. <b>Tortora 11<sup>th</sup> edition page 591 -594</b>	
		iii)	Discuss Chemical hygiene plan. What are the standard precautions to be maintained in the laboratory? ( <b>Bailey 12<sup>th</sup> edition Pg No.48, 52-54</b> )	
<b>Q.3</b>	<b>A.</b>		<b>Answer any three of the following:</b>	<b>(18)</b>
		i)	Discuss the phases of bacterial growth curve <b>Ananthnarayan 8<sup>th</sup> edn pg no-22,24</b>	
		ii)	Write a note on Dark field microscopy <b>Ananthnarayan 8<sup>th</sup> edn pg no-13</b>	
		iii)	Differentiate between a prokaryotic and eukaryotic cell <b>Ananthnarayan 8<sup>th</sup> edn pg no-13</b>	
		iv)	Justify Mac Conkey's agar is a selective and differential medium <b>Ananthnarayan 8<sup>th</sup> edn pg no-40</b>	
		v)	Give the principle underlying Gram staining technique. <b>Ananthnarayan 8<sup>th</sup> edn pg no-15</b>	
		vi)	Discuss the structure of bacterial flagella <b>Ananthnarayan 8<sup>th</sup> edn pg no-19,20</b>	
<b>Q.3</b>	<b>B.</b>		<b>Do as directed:</b>	<b>(02)</b>
		i)	Give significance of Mesosomes.- <b>principle sites of respiratory enzymes in bacteria, coordinate nuclear and cytoplasmic division during binary fission</b>	
		ii)	Name one method used to carry out intraspecies classification of bacteria. <b>biochemical methods, serotyping, phage typing, colicin type</b>	

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		iii)	What is the significance of streak culture method –isolation of bacteria in pure culture	
		iv)	Name one capsule producing bacteria- <i>Klebsiella</i> , <i>Bacillus</i> , <i>Streptococcus</i>	
<b>Q.4</b>	<b>A.</b>		<b>Answer any three of the following:</b>	<b>(18)</b>
		i)	Justify “Skin is inhospitable to most microorganisms.” Tortora 11 <sup>th</sup> edition page 590- 591	
		ii)	List and describe pathovars of <i>Escherichia coli</i> causing gastroenteritis. Tortora 11 <sup>th</sup> edition page 723-724	
		iii)	Describe the important features and functions of nervous system. Tortora 11 <sup>th</sup> edition page 616	
		iv)	Explain how controls directed against reservoirs prevent diseases. Prescott 8 <sup>th</sup> edition page 947	
		v)	How do vectors transmit diseases? Tortora 9 <sup>th</sup> edition page 413	
		vi)	Discuss the pathology of typhoid fever. Tortora 11 <sup>th</sup> edition page 720 -722	
<b>Q.4</b>	<b>B.</b>		<b>Do as directed:</b>	<b>(02)</b>
		i)	Give the full form of CDC. Centres for Disease Control and Prevention	
		ii)	Name a reportable viral disease. AIDS, Hantavirus pulmonary syndrome, Hepatitis A,B,C, Measles, Mumps, Poliomyelitis, Rabies, Rubella, SARS, Smallpox, Varicella, Yellow fever	
		iii)	What are defensins? Defensins are antimicrobial peptides found in skin	
		iv)	Define zoonosis. Diseases that occur primarily in wild and domestic animals and can be transmitted to humans.	
<b>Q.5</b>	<b>A.</b>		<b>Answer any three of the following:</b>	<b>(18)</b>
		i)	Discuss the disinfection of safety cabinets and discard jars. (Mackie & McCartney 14 <sup>th</sup> ed. Pg. 828)	
		ii)	Write a short note on: Multipurpose autoclaves. (Mackie & McCartney 14 <sup>th</sup> ed. Pg. 820-822)	
		iii)	Justify: ‘Gas sterilization can be achieved by different methods’. (Mackie & McCartney 14 <sup>th</sup> ed. Pg. 823-824)	

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		iv)	What are Biosafety Cabinets? Discuss the different types of Biosafety cabinets. (Bailey 12 <sup>th</sup> edition Pg No.55-56)	
		v)	Discuss how fire and electrical safety is maintained in the laboratory. (Bailey 12 <sup>th</sup> edition Pg No.48-49)	
		vi)	Justify: 'Steaming at 100°C is used for sterilization of heat labile material'. (Mackie & McCartney 14 <sup>th</sup> ed. Pg 815)	
<b>Q.5</b>	<b>B.</b>		<b>Do as directed:</b>	<b>(02)</b>
		i)	What are HEPA filters? (Mackie & McCartney 14 <sup>th</sup> ed. Pg 825)	
		ii)	Explain: Syringe filters (Mackie & McCartney 14 <sup>th</sup> ed. Pg 825)	
		iii)	What is the wavelength used in UV light? (260 nm)	
		iv)	Give any two examples of protective equipment used in the laboratory. (Gloves, goggles, HEPA respirators, masks, coats)	

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## Option B.

[Time : Three hours]  
100]

Set I

[Max. Marks:

Please check whether you have received the right question paper

N.B:

1. All questions carry equal marks
2. Attempt all questions

Q.1 A.

**Define the following:**

(05)

- i) Sterilization: Any cleansing action that removes all microorganisms
- ii) Mesophiles: A microorganism with a growth optimum around 20 to 45 °C, minimum of 15 to 20 °C and maximum 45 °C
- iii) Growth: A vital process which brings about irreversible increase in any organism with respect to its size, form, weight and volume.
- iv) Transcriptome The **transcriptome** is the set of all messenger RNA molecules in one cell or a population of cells.
- v) Metabolomics; Metabolomics is the scientific study of chemical processes involving metabolites, the small molecule intermediates and products of metabolism

Q.1 B.

**State whether the following statements are true or false:**

(05)

- i) Degermation involves scrubbing of skin to remove microbes. (True)
- ii) Blood agar is a selective medium. (False)
- iii) Generation time for *Saccharomyces cerevisiae* is two hours. (True)
- iv) Yeast Artificial Chromosome can carry largest DNA inserts. (True)
- v) Phenetic, Cladistic and evolutionary systematic approaches are used in study of phylogenetics. (True)

Q.1 C.

**Give one example for each of the following:**

(05)

- i) Non ionizing radiation used as microbial control agent: UV light
- ii) Obligate anaerobes: *Clostridium*, *Bacteroides*, *Methanobacterium*
- iii) Marine hyperthermophile: *Pyrococcus abyssi*, *Pyrodictium occultum*
- iv) Nucleic acid sequence data base: Gene bank, DDBJ, EMBL
- v) Protein sequence data base: PIR, SWISS PROT

Q.1 D.

**Select the most appropriate alternative and fill in the blank.**

(05)

- i) Low temperature \_\_\_\_\_ microbial growth. (retards)



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- ii) Fungal sexual spores are \_\_\_\_\_ resistant to physical and chemical conditions. ( moderately)
- iii) Prions are infectious agent composed of \_\_\_\_\_ (Protein)
- iv) Stain used for negative staining is \_\_\_\_\_ (Nigrosin)
- v) PCR was invented by Karry Mullis.

P-T-O

Q.2 A

**Answer any two of the following:**

(20)

- i) Explain any three methods of measuring microbial growth. (prescott 8 th edn page no-168,169,170,171)
- ii) Discuss the effect of antimicrobial agents on cell membrane, cell wall and protein as well as DNA synthesis. ( Talaro 6<sup>th</sup> edn 321)
- iii) Justify 'plasmids are excellent cloning vectors' and schematically represent construction of recombinant plasmid and cloning. (366-367 and fig 14.13 Prescott 7<sup>th</sup> edn)

Q.3 A.

**Answer any three of the following:**

(18)

- i) Write brief notes on microbial ecology and agricultural microbiology. prescott 8 th ed page no-21
- ii) Give a comparative account of archaea and true bacteria.. prescott 8 th ed page no-04
- iii) Write a note on numerical aperture and working distance of a microscope. prescott 8 th ed page no-28
- iv) Explain dark field microscopy with a suitable diagram. prescott 8 th ed page no-29
- v) Write a note on differential staining. . -- prescott 8 th ed page no-37
- vi) Explain selective media using suitable examples. prescott 8 th ed page no-148

Q.3 B.

**Do as directed:**

(02)

- i) Significance of catalase: catalyzes the destruction of super oxide radical and hydrogen peroxide





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- ii) What does MPN stand for?. **Most Probable Number**
  - iii) Define mean growth rate. **the number of generation per unit time**
  - iv) What is alpha haemolysis? - **greenish halo around the colony on blood agar due to partial haemolysis**

**Q.4 A.**

**Answer any three of the following:**

**(18)**

- i) Explain the factors which influence action of antimicrobial agents. .  
( Talaro 6<sup>th</sup> edn 320)
- ii) Write a note on use of steam under pressure in controlling microbial growth.  
( Talaro 6<sup>th</sup> edn 324-325)
- iii) Discuss the role of ionizing radiation as antimicrobial agent.  
( Talaro 6<sup>th</sup> edn 326-327)
- iv) Write a note on chlorine and its compounds as disinfectants.  
( Talaro 6<sup>th</sup> edn 333)
- v) Explain mode of action of aldehydes as germicide and state their application.  
( Talaro 6<sup>th</sup> edn 337-338)
- vi) Discuss the use of dry heat as a sterilant.  
( Talaro 6<sup>th</sup> edn 325-326)

**Q.4 B.**

**Do as directed:**

**(02)**

- i) Plasmolysis: Shrinking and lysis of cells due to loss of water in hypertonic environment
- ii) Name a method used for sterilization of serum.: Filtration
- iii) State any one adverse effect of alcohol on microbial cells.  
Dehydration/ protein coagulation/ Cell membrane disruption etc.-any one)
- iv) Microbial death: permanent loss of ability to grow and reproduce

**Q.5 A.**

**Answer any three of the following:**

**(18)**

- i) Write short note on PCR (Prescott pg 362-366)
- ii) What is electrophoresis? How is it used in southern blotting?  
Prescott pg366 and fig 14.06
- iii) Write a note on construction of genomic library (Prescott pg 370-371 fig 14.15)



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iv) Explain the use of Ti plasmid in agricultural genetic engineering.

Prescott pg 378-380

v) Describe four major areas of concern about the application of genetic engineering. (Prescott pg 380)

vi) What are the applications of bioinformatics?  
(Ignasimutthu pg no. 1.11 to 1.13)

**Q.5 B.**

**Do as directed: (any 2)**

**(02)**

i) Enlist any 2 goals of proteomics. (Ignasimuttu pg no. 4.3 & 4.4)

ii) Give long form of BLAST (Ignasimutthu. Pg. no. 6.16)

iii) Give an example of plasmid vector.  
pBR 322, pUC 19

iv) What is a shuttle vector? (Prescott pg no. 367)

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