

2013

PRINCIPLES OF MICROBIOLOGY

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words

as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10x1 = 10

- i) Which of the following is true ?
 - a) Eukaryotes have peptidoglycan cell walls
 - b) Cyanobacteria have prokaryotic cellular organisation
 - c) Paul Berg discovered prions
 - d) Robert Koch cultured polio virus.
- ii) Use of agar as a solidifying agent for microbiological media was suggested by
 - a) R. Koch
 - b) R. J. Petri
 - c) F. Hesse
 - d) D. H. Bergy.
- iii) Which of the following is most likely to be bactericidal ?
 - a) Autoclaving
 - b) Membrane filtration
 - c) Freeze - drying
 - d) Deep - freezing.

- iv) Pathogenic microorganisms are usually
- a) mesophilic
 - b) thermophilic
 - c) psychrophilic
 - d) halophilic.
- v) Microwave oven will only heat materials that contain
- a) proteins
 - b) water
 - c) metals
 - d) lipid.
- vi) Influenza virus typically causes
- a) acute infection
 - b) chronic infection
 - c) latent infection
 - d) no infection.
- vii) The order of reagents used in gram-staining are
- a) crystal violet, iodine, alcohol, safranin
 - b) crystal violet, iodine, safranin, alcohol
 - c) crystal violet, safranin, iodine, alcohol
 - d) crystal violet alcohol, iodine, safranin.
- viii) The methanogenic archaea are
- a) microaerophilic
 - b) aerobic
 - c) strictly anaerobic
 - d) none of these.
- ix) The oldest recognised disinfectant is
- a) formaldehyde
 - b) chlorine

- c) ethanol
- d) phenol.
- x) Technique required to grow bacteria on solid media were developed by
 - a) Pasteur
 - b) Koch
 - c) Leeuwenhoek
 - d) Ivanowsky.
- xi) Which of the following is true ?
 - a) Strep throat and scarlet fever are caused by the same organism
 - b) Whooping cough is also called pertussis
 - c) Botulism causes diplopia
 - d) All of these.
- xii) Gastric ulcers are caused by
 - a) spicy food
 - b) acidic food
 - c) *Helicobacter pylori*
 - d) stress.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3x5 = 15

2. What was the contribution of Robert Koch ? State the postulates of "Germ theory of Diseases".
3. Write a short note on numerical taxonomy.
4. Describe any three types of deep mycoses.
5. Describe the principle and working of an autoclave.
6. Define auxochrome. Classify the staining techniques.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. What is the contribution of Robert Koch in the field of microbiology ? Write down the features of Koch postulate. Does every disease causing microbes follow Koch postulate ? What are the contribution of Joseph Lister, Edward Jenner and Alexander Fleming in the field of microbiology ? What is Tyndallization ? $2 + 4 + 2 + 6 + 1$
8. Mention the adaptation of thermophilic bacteria which favours DNA stability. Name two methanogens and state how they synthesize methane. What are facultative and obligate anaerobes ? Give one example each. Classify bacteria according to the nutritional types. $3 + 5 + 3 + 4$
9. How does salting and sugaring prevent foods from microbial invasions ? What is oligodynamic action ? Discuss the differences in the action of ionizing and non-ionizing radiation as sterilant. Name one organism that may be linked with canned food poisoning. $5 + 4 + 5 + 1$
10. Discuss on taxonomy. What are the features of each kingdom in five kingdom classification ? Who proposed two kingdom and five kingdom classification ? $3 + 10 + 2$
11. a) Suppose that you carry out a serial dilution of a 0.1 ml sample. The 10^{-4} plate gives 90 colonies and the 10^{-5} plate yields 5 colonies. Calculate the concentration (bacteria/ml) of the original, undiluted sample.
- b) Describe the nutritional requirements of the four major nutritional groups and give some microbial examples of

each.

c) Name the bacteria classified according to oxygen requirement. 3 + 6 + 6

12. What is tincture of iodine ? Which amino acid units of proteins and enzymes are effected by iodine and how ? Why cationic detergents are more effective than anionic ? What are the effects of HOCl against microbes ? How could be enzymes inactivated by HgCl₂ ? 3 + 3 + 3 + 3 + 3

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