



Previous Year Solved Question Paper
of

G.A.T.E. (XL) 2019

Life Sciences

Microbiology

Examination

(Original Question Paper with Answer Key)

GRADUATE APTITUDE TEST IN ENGINEERING



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XL-S: Q. 1 – Q. 10 carry one mark each & Q. 11 – Q. 20 carry two marks each.

Q.1 Chloramphenicol and tetracycline are broad spectrum antibiotics which inhibit bacterial growth by targeting _____.

- (A) cell wall synthesis (B) protein synthesis
(C) RNA synthesis (D) DNA synthesis

Ans. B

Q.2 Which of the following radiation methods is used in preserving food from spoilage by microorganisms?

- (A) Radio waves (B) Microwaves (C) Non-ionizing (D) Ionizing

Ans. D

Q.3 Which part of the lipopolysaccharides has toxic properties that make some bacterial infections a potentially serious medical problem?

- (A) Polysaccharide side-chains (B) Lipid A portion
(C) Repeat carbohydrate units (D) Core region of polysaccharides

Ans. B

Q.4 Microbes make up about _____ of earth's living material by weight.

- (A) 1/4th (B) 2/3rd (C) 3/4th (D) 4/5th

Ans. B

Q.5 The highly contagious viral disease measles is caused by a

- (A) double-stranded DNA virus
(B) single-stranded DNA virus
(C) single-stranded RNA virus
(D) double-stranded RNA virus

Ans. C

Q.6 Secondary metabolites such as penicillin from mold are produced during the _____.

- (A) lag phase (B) idiophase (C) log phase (D) decline phase

Ans. B

Q.7 Dick test is used to assess the susceptibility to _____.

- (A) diphtheria (B) scarlet fever (C) typhoid fever (D) tuberculosis

Ans. B

Q.8 Which of the following is a symbiotic bacterial genus that converts nitrogen into nitrogen containing compounds that are utilized by legume plants to synthesize amino acids?

- (A) *Spirillum* (B) *Azotobacter*
(C) *Rhizobium* (D) *Clostridium*

Ans. C

Q.9 What is the enzyme involved in the following reaction?



- (A) Glycerol phosphate dehydrogenase (B) Glycerol kinase
(C) Lipase (D) Zymase

Ans. C

Q.10 A bacterial culture contains 500 organisms / mL in the exponential growth phase at 8 am in the morning. If you consider a generation time of 20 minutes, the total number of organisms / mL (round off to the nearest integer) after three hours (i.e. at 11 am in the morning) will be _____.

Ans. 255999 TO 256001

Q.11 Folic acid synthesis in bacteria is competitively inhibited by sulfonamides. Which of the following essential components is replaced by sulfonamides during the process of folic acid synthesis?

- (A) Pteridine (B) Glutamic acid
(C) Para-amino benzoic acid (D) Sulfamethaxazole

Ans. C

Q.12 Which of the following cellular structures are absent in eukaryotes and are present at least in some prokaryotic organisms?

- (i) Respiratory enzymes
(ii) Ribosomes
(iii) Nucleoid
(iv) Internal membranes
(v) Pili

- (A) (iii) and (v) (B) (i) and (iv)
(C) (i), (iii) and (v) (D) (iii), (iv)

Ans. A

Q.13 Granules are inclusion bodies found in bacteria. Which of the following statements are true about granules?

- (i) Granules can be storage vessels for carbohydrates/lipids
(ii) Some granules supply substances for a variety of metabolic processes
(iii) Granules are dissolved in cytoplasm
(iv) Granules are membrane-enclosed structures

- (A) (ii) and (iii) (B) (iii) and (iv) (C) (i) and (ii) (D) (i) and (iii)

Ans. C

Q.14 Match the culture media to their uses

| Culture Media | Uses |
|--------------------------|---|
| (i) Complex media | (p) identifying certain bacteria from mixed culture |
| (ii) Selective media | (q) chemically undefined media for growing bacteria |
| (iii) Differential media | (r) cultivating fastidious bacteria |
| (iv) Enriched media | (s) distinguishing one bacteria from another |

- (A) (i)-(s), (ii)-(r), (iii)-(q), (iv)-(p) (B) (i)-(q), (ii)-(p), (iii)-(s), (iv)-(r)
 (C) (i)-(q), (ii)-(r), (iii)-(p), (iv)-(s) (D) (i)-(p), (ii)-(s), (iii)-(q), (iv)-(r)

Ans. B

Q.15 Among the following characteristics listed below, select those that are the most appropriate for archaebacteria.

- (i) Peptidoglycan containing muramic acid and D-amino acids are present in cell wall
 (ii) Long chain branched alcohols (phytanols) bound to glycerol by ether linkages are found in the lipids of cytoplasmic membrane
 (iii) First amino acid to initiate new polypeptide chain is N-Formylmethionine
 (iv) Translation process is sensitive to the action of diphtheria toxin

- (A) (i), (iii) (B) (ii), (iii), (iv) (C) (ii), (iv) (D) (i), (ii), (iv)

C

Q.16 Which of the following processes are involved in horizontal gene transfer (HGT)?

- (i) Conjugation
 (ii) Transduction
 (iii) Binary fission
 (iv) Transformation
 (v) Translesion synthesis
 (vi) Transversion

- (A) (i), (iii), (iv) (B) (i), (iv), (vi)
 (C) (ii), (iv), (v) (D) (i), (ii), (iv)

Ans. D

Q.17 Match the class of antibodies to appropriate description or function

| Antibodies | Description / function |
|------------|---|
| (i) IgA | (p) Mucosal immunity |
| (ii) IgG | (q) Immunity to parasitic infections |
| (iii) IgD | (r) Most abundant antibody in the blood |
| (iv) IgE | (s) Found on the B cell membranes |

- (A) (i)-(s), (ii)-(r), (iii)-(q), (iv)-(p) (B) (i)-(p), (ii)-(q), (iii)-(s), (iv)-(r)
 (C) (i)-(p), (ii)-(r), (iii)-(s), (iv)-(q) (D) (i)-(p), (ii)-(s), (iii)-(q), (iv)-(r)

Ans. C

Q.18 Match the diseases with the appropriate causative agents

| Disease | Causative agent |
|-----------------------------|----------------------------------|
| (i) Rheumatic heart disease | (p) <i>Candida albicans</i> |
| (ii) Syphilis | (q) Group A <i>Streptococcus</i> |
| (iii) Genital warts | (r) Human papilloma virus |
| (iv) Oral thrush | (s) <i>Treponema pallidum</i> |

(A) (i)-(p), (ii)-(q), (iii)-(s), (iv)-(r)

(B) (i)-(q), (ii)-(s), (iii)-(r), (iv)-(p)

(C) (i)-(r), (ii)-(s), (iii)-(p), (iv)-(q)

(D) (i)-(s), (ii)-(q), (iii)-(p), (iv)-(r)

Ans. B

Q.19 Consider a spherical bacterial cell with diameter 2 μm and a eukaryotic cell of spherical shape with a diameter of 20 μm . The surface area to volume (in μm^{-1}) ratio of the bacterial cell (round off to 1 decimal place) is _____ times more than that of the eukaryotic cell.

Ans. 9.9 TO 10.1

Q.20 When grouping bacteria using numerical taxonomy approach, many characteristics are determined for each strain. If all characteristics are same, then the % similarity is 100. When comparing two bacterial strains, if 72 characteristics are the same and 44 characteristics are different, the % similarity (round off to 2 decimal places) between the two strains is _____.

END OF THE QUESTION PAPER

61.50 TO 62.50

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