



Previous Year Question Paper  
of

**G.A.T.E. (XL) 2016**

**LIFE SCIENCES**

**XL-K: Microbiology**

**Examination**

*(Original Question Paper with Answer Key)*

**GRADUATE APTITUDE TEST IN ENGINEERING**



For more question papers, please visit: [www.easybiologyclass.com](http://www.easybiologyclass.com)

## XL-K: MICROBIOLOGY

Q. 1 – Q. 10 carry one mark each.

Q.1 Which one of the following is the most appropriate technique to determine the relatedness of two bacterial species?

- (A) DNA hybridization (B) Doubling time measurement  
(C) Biochemical characterization (D) Plasmid profiling

Ans. A

Q.2 Which one of the following phages undergoes non-integrative lysogenic phase?

- (A)  $\lambda$  (B) P1 (C) T7 (D) M13

Ans. B

Q.3 Which one of the following is **NOT** a part of human microbiome?

- (A) *Propionibacterium acnes* (B) *Lactobacillus casei*  
(C) *Streptococcus suis* (D) *Bacteroides fragilis*

Ans. C

Q.4 Resident macrophages of \_\_\_\_\_ are called Kupffer cells.

- (A) brain (B) liver (C) lung (D) kidney

Ans. B

Q.5 The enzyme responsible for generation of hypochlorous ions during phagocytosis is

- (A) NADPH oxidase (B) catalase  
(C) myeloperoxidase (D) superoxide dismutase

Ans. C

Q.6 Teichoic acid is composed of repetitive units of

- (A) keto-deoxy octanoic acid (B) glucose  
(C) *N*-acetyl glucosamine (D) glycerol

Ans. D

Q.7 Biofilm produced by bacteria is detected by

- (A) Saffranin (B) Malachite green (C) Basic fuchsin (D) Congo red

Ans. D

- Q.8 The precursor for the synthesis of aromatic amino acids is
- (A) phosphoenolpyruvate (B) pyruvate  
(C) oxaloacetate (D)  $\alpha$ -ketoglutarate

Ans. A

- Q.9 The net yield of NADH in the Embden-Meyerhof pathway in *E. coli* is\_\_\_\_\_.

Ans. 2.0 : 2.0

- Q.10 *E. coli* ribonuclease contains 124 amino acids. The number of nucleotides present in the gene encoding the protein is \_\_\_\_\_.

Ans. 375 : 375

**Q. 11 – Q. 20 carry two marks each.**

- Q.11 Which of the following infectious agents cross the blood-brain barrier?

(P) *Streptococcus pneumoniae* (Q) Coxsackie virus  
(R) Rotavirus (S) *Streptococcus pyogenes*

(A) P & S (B) R & S (C) P & Q (D) Q & R

Ans. C

- Q.12 At  $OD_{540nm} = 0.5$ , which one of the following bacterial mono-dispersed cell suspensions will have (i) maximum and (ii) minimum number of cells?

(P) *Mycoplasma pneumoniae* (Q) *Micrococcus luteus*  
(R) *Bacillus subtilis* (S) *Escherichia coli*

(A) P & Q (B) P & R (C) Q & R (D) R & S

Ans. B

Q.13 Which one of the following enzyme combinations allows some bacteria to utilize acetate through glyoxylate pathway?

- (P) Isocitrate lyase (Q) Isocitrate dehydrogenase  
(R) Succinyl CoA synthetase (S) Malate synthase

- (A) P & S (B) P & R (C) Q & S (D) Q & R

Ans. A

Q.14 The decimal reduction time ( $D_{121}$ ) for *Clostridium botulinum* spores is 0.2 min. The time required to reduce the spore count from  $10^{12}$  to one spore at  $121^{\circ}\text{C}$  is \_\_\_\_\_ minutes.

Ans. 2.4 : 2.4

Q.15 *E. coli* requires three genes, *galK* (kinase), *galT* (transacetylase) and *galE* (epimerase) to utilize galactose. If there is a mutation in any one of these genes, the mutant cannot utilize galactose. Which one of the following combinations of merodiploids will support the growth of mutants on galactose?

- (P)  $galK^{+} galT^{+} galE^{-} / galK^{-} galT^{+} galE^{-}$   
(Q)  $galK^{-} galT^{+} galE^{-} / galK^{+} galT^{-} galE^{+}$   
(R)  $galK^{+} galT^{-} galE^{-} / galK^{-} galT^{-} galE^{+}$   
(S)  $galK^{+} galT^{+} galE^{-} / galK^{+} galT^{-} galE^{+}$

- (A) P & Q (B) P & R (C) R & S (D) Q & S

Ans. D

Q.16 Nitrogenase reduces  $\text{N}_2$  to  $\text{NH}_3$ . Metal co-factors required for this activity are \_\_\_\_\_.

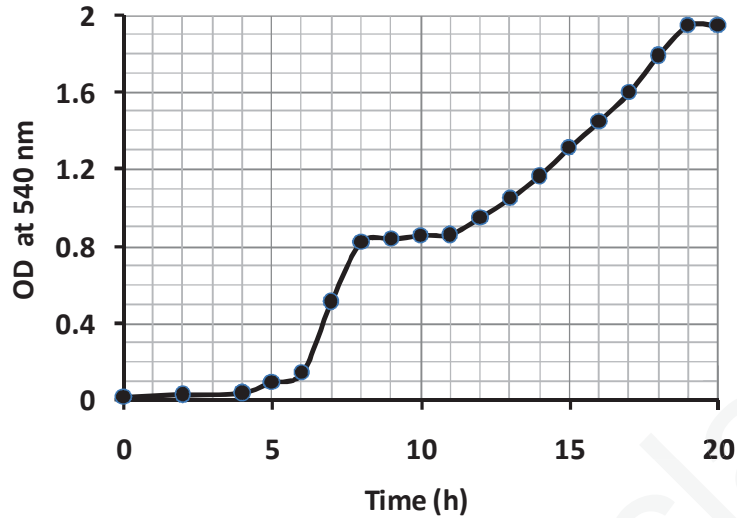
- (A) Fe & Cu (B) Mo & Fe  
(C) Mo & Mn (D) Cu & Mn

Ans. B

Q.17 If a bacterial cell contains 5,000 genes and if the average mutation frequency per gene is  $2 \times 10^{-4}$  per generation, the average number of new mutations per generation is \_\_\_\_\_.

Ans. 1.0 : 1.0

Q.18 The growth profile of *E. coli* on glucose plus lactose is shown below. The specific growth rate of the second exponential phase is \_\_\_\_ h<sup>-1</sup>.



Ans. 0.10 : 0.11

Q.19 Match the cell structure components given in **Group I** with appropriate functions from **Group II**.

**Group I**

- (P) Cell membrane
- (Q) Purple membrane
- (R) Cisternae
- (S) Outer membrane

**Group II**

- (I) Nutrient transport
- (II) Photosynthesis
- (III) Active transport
- (IV) Protein glycosylation
- (V) Light-driven proton transport

- (A) P-I, Q-V, R-II, S-III
- (C) P-III, Q-II, R-V, S-I

- (B) P-I, Q-II, R-IV, S-III
- (D) P-III, Q-V, R-IV, S-I

Ans. D

Q.20 Match the antibiotics given in **Group I** with appropriate targets from **Group II**.

**Group I**

- (P) Nalidixic acid
- (Q) Tetracycline
- (R) Erythromycin
- (S) Rifampin

**Group II**

- (I) RNA polymerase
- (II) DNA gyrase
- (III) DNA polymerase
- (IV) 50S ribosomal subunit
- (V) Aminoacyl tRNA

- (A) P-III, Q-IV, R-V, S-I
- (C) P-II, Q-V, R-IV, S-I

- (B) P-V, Q-I, R-IV, S-II
- (D) P-II, Q-V, R-I, S-IV

Ans. C

**END OF THE QUESTION PAPER**

Please visit: [www.easybiologyclass.com](http://www.easybiologyclass.com) for:

- Lecture Notes
- Biology PPTs
- Biology MCQs
- Online Mock Tests (MCQ)
- Video Tutorials
- Practical Aids
- Model Question Papers of NET, GATE, DBT, ICMR Exams
- CSIR NET Life Sciences Previous Year Question Papers
- GATE Previous Year Question Papers
- DBT BET JRF Previous Year Question Papers
- ICMR JRF Entrance Exam Resources
- Jobs Notifications
- Higher Studies in Biology / Life Sciences
- Seminar / Workshop/ Conference Notifications
- *And many more....*



Please subscribe our **youtube** channel: **easybiologyclass**  
<https://www.youtube.com/user/easybiologyclass/videos>



You can access more PDFs & PPTs from our **Slideshare** account  
<http://www.slideshare.net/EasyBiologyClassEBC/>



Our sister concern: [www.angiospermtaxonomy.com](http://www.angiospermtaxonomy.com)