# 1 Mark Questions

1. An electron microscope has higher resolution as compared to the light microscope. This is because
   (a) the wavelength of an electron is longer than the wavelength of light
   (b) the wavelength of an electron is shorter than the wavelength of light
   (c) the electrons can penetrate the sample better
   (d) they use different stains

2. Bacterial cell lysis by lysozyme is due the
   (a) hydrolysis of α-1, 4-glycosidic bonds between the N-acetylglucosamine and N-acetylmuramic acid
   (b) inhibition of cell wall synthesis
   (c) hydrolysis of pentapeptide bridges
   (d) hydrolysis of β-1, 4-glycosidic bonds between the N-acetylglucosamine and N-acetylmuramic acid

3. The recombination frequencies between three genes *x*, *y* and *z* are as follows—N-*x*-*y*-2.6%, *y*-*z*-1.4% and *x*-*y*-1.2%. Then the gene order is
   (a) *x*-*z*-*y* (b) *x*-*y*-*z*
   (c) *y*-*x*-*z* (d) *z*-*x*-*y*

4. A mutant phenotype due to a non-sense mutation can be rescued by a mutation in *t*RNA gene. This rescue is an example of
   (a) induced mutation
   (b) suppressor mutation
   (c) spontaneous mutation
   (d) deletion mutation

5. Ames test is performed to detect
   (a) mutagen (b) pH
   (c) nutrient stress (d) salinity

6. Wild type *E. coli* forms purple coloured colonies on EMB-lactose plate. This is due to
   (a) increase in pH of the medium
   (b) decrease in pH of the medium
   (c) secretion of purple coloured pigment
   (d) secretion of β-galactosidase

7. The resistance of a lambda (λ) lysogenic *E. coli* to re-infection by lambda is mediated by
   (a) blocking entry of the incoming lambda DNA
   (b) degrading the incoming lambda DNA
   (c) blocking transcription of the incoming lambda DNA
   (d) triggering mutation of the lambda receptor of the host

8. Pasteurization of milk is carried out by
   (a) boiling for 5 min
   (b) heating at 72°C for 30 min
   (c) heating at 63°C for 15 min
   (d) heating at 63°C for 30 min

9. A growing bacterial culture with a doubling time of 20 min reaches cell density of $2 \times 10^8$ cells mL in 3 h. How much time would it take to reach the cell density of $1 \times 10^8$ cells/mL?
   (a) 200 min (b) 180 min
   (c) 160 min (d) 90 min

10. The quickest way to determine bacterial growth in terms of viable cells is through
    (a) most probable number (MPN) technique
    (b) spread plate method
    (c) pour plate method
    (d) slide culture technique

# 2 Marks Questions

11. Match the scientist from group I with the corresponding contribution listed in group II.

| Group I | Group II |
|---|---|
| A. Robert Koch | 1. Discovery of endospores |
| B. Walter Hesse | 2. Disproved spontaneous generation |
| C. Louis Pasteur | 3. Discovery of caustive agent of tuberculosis |
| D. Ferdinand Cohn | 4. Use of agar as solid media |
| | 5. Invention of microscope |

**Codes**

| | A | B | C | D |
|---|---|---|---|---|
| (a) | 5 | 3 | 4 | 2 |
| (c) | 3 | 4 | 1 | 5 |

| | A | B | C | D |
|---|---|---|---|---|
| (b) | 3 | 4 | 1 | 5 |
| (d) | 3 | 4 | 2 | 1 |

**12.** Superantigens elicit a very strong T-cell response because they

(a) bind to the specific antigen binding site on the T-Cell Receptors (TCR)

(b) bind to the site on T-cell receptor that is outside the antigen-specific binding site

(c) directly activate the T-cell without the help of antigen presenting cells

(d) directly induce cytokine secretion by macrophages

**13.** MHC-I groove can be loaded with peptides of only 8-10 amino acids because

(a) MHC-I groove is closed on both ends

(b) fragments of only 8-10 amino acids are generated in MHC-I bearing cells

(c) $\beta_2$-microglobulin of MHC-I prevents the binding of large peptides to MHC-I

(d) β-polypeptides of MHC-I prevents binding of 8-10 amino acid long peptides to MHC-I

**14.** In a *lac* $O^c$ *lac* $Z^-$ / *lac* $O^+$ *lac* $Z^+$ partial diploid, of the two *lac* Z enzymes, only the mutant enzyme (*lac* $Z^-$) is synthesized constitutively. This observation shows that *lac* $O^c$ mutation is

(a) *trans*-dominant (b) *trans*-recessive

(c) *cis*-dominant (d) *cis*-recessive

**15.** Which one of the following events occurs in prokaryotes but not in eukaryotes?

(a) Protein phosphorylation

(b) RNA polymerase and promoter interaction

(c) Control of transcription by attenuation

(d) Formation of Okazaki fragments

**16.** Match the pathogen in group I with the corresponding disease in group II.

| Group I | Group II |
|---|---|
| A. Bacteria | 1. Measles |
| B. Virus | 2. Candidiasis |
| C. Fungi | 3. Malaria |
| D. Protozoa | 4. Bovine spongiform encephalitis |
| | 5. Tuberculosis |

**Codes**

| | A | B | C | D |
|---|---|---|---|---|
| (a) | 1 | 2 | 4 | 5 |
| (c) | 5 | 1 | 4 | 2 |

| | A | B | C | D |
|---|---|---|---|---|
| (b) | 1 | 4 | 2 | 3 |
| (d) | 5 | 1 | 2 | 3 |

**17.** A bacterial culture was diluted 1000 fold and 0.1 mL of this diluted sample was spread per plate on nutrient agar. In a triplicate run, the number of colonies formed is 121, 93 and 86. The number of colonies forming units/mL in the original bacterial culture is

(a) $10^6$ (b) $10^5$ (c) $10^3$ (d) $10^2$

**18.** Match the microorganism in group I with the application in group II.

| Group I | Group II |
|---|---|
| A. *Aspergillus oryzae* | 1. Metal ore leaching |
| B. *Brevibacterium flavum* | 2. Glucoamylase producer |
| C. *Thiobacillus* | 3. Bread making ferroxidans |
| D. *Saccharomyces* | 4. Glutamic acid producer cerevisiae |
| E. *Rhizobium meliloti* | 5. Penicillin producer |
| | 6. Symbiotic nitrogen fixer |

**Codes**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| (a) | 1 | 6 | 4 | 5 | 2 |
| (b) | 2 | 4 | 1 | 3 | 6 |
| (c) | 4 | 1 | 6 | 3 | 5 |
| (d) | 6 | 2 | 3 | 5 | 1 |

**19.** A mutant of *E. coli* grows normally on glucose or on glycerol but not on acetate. The most likely metabolic pathway that is defective in this mutant is

(a) Glyoxalate cycle

(b) Hexose monophosphate shunt

(c) Krebs' cycle

(d) Entner-Duodoroff pathway

**20.** Match the resistance mechanism in group I with the antibiotic in group II.

| Group I | Group II |
|---|---|
| A. β-Lactamases | 1. Aminoglycosides |
| B. Enhanced folate | 2. Penicillin metabolism |
| C. Drug efflux | 3. Sulfa drugs |
| D. Phosphorylation of the | 4. Tetracyclins drug |
| E. Mutant RNA polymerase | 5. Naladixic acid |
| | 6. Rifamicin |

**Codes**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| (a) | 2 | 3 | 4 | 5 | 6 |
| (b) | 3 | 4 | 1 | 6 | 5 |
| (c) | 2 | 3 | 4 | 1 | 6 |
| (d) | 1 | 2 | 3 | 4 | 6 |