

單選題 (每題二分, 答錯不倒扣)

- Which of the following statements are accurate statements regarding the structure of a typical Gram-positive cell envelope?
 - The outer membrane is a defining structure of a Gram-positive cell.
 - The Gram-positive cell is less dependent on peptidoglycan than the Gram-negative cell.
 - The periplasm of a Gram-positive cell lies between the inner and outer.
 - All of the above are correct statements.
 - None of the above are correct statements.
- Which of the following agents inhibit the initiation of RNA synthesis in prokaryotes by binding to the β -subunit of RNA polymerase?
 - α -Amanitin
 - Actinomycin D
 - Rifampin
 - Puromycin
 - Steptolydigin
- An organism uses reduced, pre-formed organic molecules as its principal carbon source. Accordingly, the organism is a/an?
 - Autotroph
 - Heterotroph
 - Homotroph
 - Carbotroph
 - More than one of the above
- You have isolated a microbe from meat that has spoiled in your refrigerator. After some growth studies, you find that the microbe grows best at about 10°C and will not grow above about 18°C . From this information you might correctly conclude that you have isolate a
 - Psychrophile
 - Mesophile
 - Frigidophile
 - Microthermophile
 - None of these terms accurately describe this microbe
- Processes by which all living cells, viable spores, viruses and viroids are either destroyed or removed from an object or habitat are called?
 - Apoptosis
 - Disinfection
 - Sanitation
 - Antisepsis
 - Sterilization
- All of the following situations occur in *E. coli* cells that are starved for amino acids EXCEPT
 - An accumulation of ppGpp
 - An increase in overall mRNA synthesis
 - A increase in protein degradation
 - A significant reduction in tRNA synthesis
 - A significant reduction in rRNA synthesis

(背面仍有題目, 請繼續作答)

7. Which of the following serves as the primer for the reverse transcriptase of a retrovirus such as HIV?
- (A) A specific host tRNA
 - (B) A specific host protein
 - (C) U6 snRNA
 - (D) U2 snRNA
 - (E) A virally synthesized piece of DNA
8. Which of the following best describes fermentative metabolism?
- (A) Growth in a toxin environment
 - (B) Growth in an anoxic environment
 - (C) Growth in the absence of oxygen
 - (D) Growth in the absence of an external electron receptor
 - (E) More than one of the above is an accurate description of fermentation
9. You have isolated a bacterium that is a Gram-positive, spore-forming rod. Into which of the following genera is it likely that this bacterium will fall?
- (A) *Salmonella*
 - (B) *Bacillus*
 - (C) *Escherichia*
 - (D) *Treponema*
 - (E) The information provided in the micrograph is insufficient to distinguish among the four choices (A-D)
10. A/An ___ is a heat-labile protein that is produced by both Gram-positive and Gram-negative cells that attack mammalian gut cells.
- (A) endotoxin
 - (B) exotoxin
 - (C) enterotoxin
 - (D) gastrolysin
 - (E) fever
11. Which of the following would be a small bacterium that is an obligate intracellular parasite?
- (A) *Treponema pallidum*
 - (B) *Bacillus subtilis*
 - (C) *Rickettsia*
 - (D) *Bdellovibrio*
 - (E) None of the above
12. A patient who has had mumps and recovered develops a life-long immunity to the disease. This is an example of
- (A) Naturally acquired passive immunity
 - (B) Artificially acquired passive immunity
 - (C) Naturally acquired active immunity
 - (D) Artificially acquired active immunity
 - (E) Innate immunity
13. Viruses store their genetic information as
- (A) Single-stranded DNA

- (B) Single-stranded RNA
(C) Double-stranded DNA
(D) Double-stranded RNA
(E) Example of virus using each of the above occur
14. In which of the following would one expect to find the greatest concentration of microbes in a healthy human?
- (A) large intestine
(B) Urine
(C) Blood
(D) Kidney
(E) Liver
15. You have a nutrient broth tube that contains about 0.3% agar. You inoculate an unknown microbe into the medium and incubate it at 37°C overnight. In the morning you see growth throughout the tube (from the surface to the bottom). From this experiment you conclude that your micribe is
- (A) A microaerophile
(B) An obligate anaerobe
(C) A facultative anaerobe
(D) An aerotolerant anaerobe
(E) The information provided is not sufficient to distinguish between the above choices

複選題 (每題二分, 全對才計分, 答錯不倒扣)

1. Which of the following is a phage-coded protein that is likely to be produced in the early or middle stages of viral infection?
- (A) Capsomere
(B) Sigma factor
(C) Lysozyme
(D) DNA polymerase
(E) Heat-shock protein
2. Which of the following groups make use of a monooxygenase?
- (A) Cyanobacteria
(B) Ammonia oxidizers
(C) Denitrifiers
(D) Methane oxidizers
(E) Iron oxidizers
3. Which of the following groups use reversed electron transport to generate high-energy electrons for biosynthesis?
- (A) Cyanobacteria
(B) Ammonia oxidizers
(C) Denitrifiers
(D) Methane oxidizers
(E) Iron oxidizers
4. Which of the following metabolic activities are carried out by bacteria that can grow aerobically?

- (A) Methanogenesis
(B) Denitrification
(C) Nitrification
(D) Sulfate reduction
(E) Iron reduction
5. Which of the following metabolic activities generally occur only under anoxic conditions?
(A) Methanogenesis
(B) Denitrification
(C) Nitrification
(D) Sulfate reduction
(E) Iron reduction
6. Which of the following groups contains organisms that when in pure culture can degrade lactate?
(A) Methanogens
(B) Sulfate-reducing bacteria
(C) Iron-reducing bacteria
(D) Aerobic heterotrophs
(E) None of the above
7. Which of the following would be found in the Archaea but **NOT** in other procaryotic cells?
(A) Covalently closed circular DNA in a supercoil
(B) Gas vesicles
(C) 30S and 50S ribosomal subunits
(D) Ether-linked phospholipids
(E) Poly- β -hydroxybutyrate storage vacuoles
8. Which of the following description of translocation is true?
(A) This form of cellular transport is found only in procaryotes.
(B) Energy is required.
(C) Specific transport proteins are required.
(D) The molecule being transported is covalently modified during the process.
(E) Molecules transported into the cell move down a concentration gradient.
9. Which of the following statements about microbial growth is **NOT** true?
(A) Viable counts generally provide overestimates of the number of bacteria in a culture.
(B) Turbidimetric measurement of bacterial growth is especially effective when working with dilute samples.
(C) Growing bacterial in a test tube is an example of a continuous culture.
(D) Measurement of bacterial growth by the dry weight method is based on the assumption that the cells all have the same mass.
(E) Use of microscopic counting chambers is an example of an indirect, total count.
10. Which of the following terms dealing with viruses is correctly paired with its description?
(A) Envelope - made from the host cell membrane.
(B) Protomers - form the protein coil that makes up the helical capsid.
(C) Plaques - represent where there originally was one bacterial virus (phage).
(D) Lysogeny - can only be done by temperate viruses.
(E) Nucleocapsid - composed of nucleic acid, protein capsid and phospholipid envelope.

簡答題 (每題五分)

1. Which nucleic acid base is unique to DNA and to RNA?
2. If the doubling time of a bacterial culture is 20 minutes, and how folds does increase the cell numbers in 2 hours?
3. How does 5-bromouracil induce mutation?
4. Is there any relation between plasmid size and copy number?
5. Please explain what is the multiplicity of infection?
6. Please draw and explain the pattern of microbial cell growth in the batch fermentation.
7. Please explain what are the ID_{50} and LD_{50} ?
8. What is the candidate of pathogen for SARS?
9. What three types of vaccines are classified broadly?
10. Please explain what is the passive immunization?