

2019

AEA

Answer all questions and each question carry equal mark.

Total marks 120 (4X30)

1. a, b and c are three numbers such that $b = (a+c)/2$. Then b is
 - a) the mean as well as the median of the numbers a, b and c .
 - b) the mean but not the median of the numbers a, b and c .
 - c) the median but not the mean of the numbers a, b and c .
 - d) neither the mean nor the median of the numbers a, b and c .

2. In order to test whether the mean cholesterol levels in four groups are same or not, one would use:
 - a) t-test
 - b) F-test
 - c) Z-test
 - d) Chi square test

3. If a fair coin is tossed three times, the probability of obtaining at most one head is
 - a) $1/8$
 - b) $3/8$
 - c) $1/3$
 - d) $1/2$

4. In a random samples of n_1 males, the proportion of obese people is p_1 . In an independent sample of n_2 females, the proportion of obese people is p_2 . If the two samples are combined, the proportion of obese people is
- a) p_1+p_2
 - b) $(p_1+p_2)/2$
 - c) $(n_1p_1+n_2p_2)/(n_1+n_2)$
 - d) $p_1/n_1+ p_2/n_2$
5. Among the following which activity is absent in bacterial DNA polymerase?
- a) 3'-5' exonuclease activity
 - b) 5'-3' exonuclease activity
 - c) 3'-5' polymerase activity
 - d) 5'-3' polymerase activity
6. Which of the following is not associated with insulin action?
- a) increased glucose transport
 - b) increased glycogen formation
 - c) enhanced lipolysis in adipose tissue
 - d) decreased rate of gluconeogenesis

7. *Mycobacterium tuberculosis* is an intra-cellular bacterium. It prefers to infect

- a) macrophages
- b) β -cells
- c) T-cells
- d) neutrophils

8. Based on per molecule which of the following gas has the most powerful green-house effect?

- a) CO_2
- b) CH_4
- c) N_2O
- d) CFCs

9. Among the following events in the history of life--

a- prokaryotic cells; b- eukaryotic cells; c- natural selection; d- organic molecules; e- self-replicating molecules.

Which is the correct chronological order?

- a) d, e, c, a, b
- b) d, e, a, b, c
- c) e, d, a, c, b
- d) d, e, a, c, b

10. The rate of migration of a protein in SDS-Polyacrylamide gel is not influenced by
- a) size of the protein
 - b) charge in the protein
 - c) pore size of the gel
 - d) strength of the electric field
11. Temperature dependent sex determination is observed in
- a) Drosophila
 - b) amphibians
 - c) reptiles
 - d) sea urchins
12. Meeting point of all metabolic pathway is
- a) lactic acid
 - b) citric acid
 - c) α -ketogluteric acid
 - d) acetyl-CoA
13. A major advantage of monoclonal antibodies compared to polyclonal antibodies is that monoclonal antibodies
- a) have identical binding sites that recognize a specific epitope
 - b) cross-linked molecules that share antigenic sites
 - c) are more easily coupled with probes such as fluorescent dyes
 - d) have higher affinity binding to antigens

14. Which of the following is non-mutagenic?
- a) acridine
 - b) IR
 - c) UV
 - d) X-ray
15. In cellular respiration, which of the following processes occur only inside mitochondria and not in the cytoplasm?
- a) Glycolysis and the pentose-phosphate pathway
 - b) Glycolysis and the citric acid cycle
 - c) The citric acid cycle and oxidative phosphorylation
 - d) Glycolysis and oxidative phosphorylation
16. In two-dimensional electrophoresis, proteins are separated
- a) First by their charge and then by their mass
 - b) First by their mass and then by their charge
 - c) Only on the basis of their charge
 - d) Only on the basis of their mass
17. All of the following vitamins act as antioxidant except
- a) Vitamin D
 - b) Vitamin A
 - c) Vitamin E
 - d) Vitamin C

18. Which of the following is NOT essential fatty acid?
- a) Linolenic acid
 - b) Linoleic acid
 - c) Arachidonic acid
 - d) Linodonic acid
19. Dark reaction of photosynthesis is traced by
- a) O^{18}
 - b) P^{32}
 - c) X-rays
 - d) $^{14}CO_2$
20. Amino acid that form yellow colour after staining with ninhydrin
- a) Aspartic acid
 - b) Glutamic acid
 - c) Glycine
 - d) Proline
21. In the endodermis of higher plants, the role of Casperian strip is to control the water movement so that it flows
- a) between the cells
 - b) through the plasma membrane
 - c) through the cell wall
 - d) through the transfusion tissue

22. It is found that people with the genetic disease called sickle cell anaemia are resistant to malaria. Which of the following best describes the underlying mechanism?
- a) Frequency-dependent selection
 - b) Superiority of heterozygotes
 - c) Transient polymorphism
 - d) Balanced polymorphism
23. Which of the following proteins acts as an energy transducer?
- a) G-protein
 - b) Bacteriorhodopsin
 - c) Hemoglobin
 - d) Heat shock protein
24. Which of the following characteristic differentiate Eubacteria from archaeobacteria
- a) Circular nature of chromosome.
 - b) Absence of nuclear membrane.
 - c) Presence of 70S ribosomes.
 - d) Presence of murein in cell wall.

25. Which of the following GM crops is the most widely cultivated globally?
- a) Herbicide resistant soybean.
 - b) Insect resistant cotton.
 - c) Insect resistant brinjal.
 - d) Delayed ripening tomato.
26. Which of the following enzyme production is enhanced by ethylene?
- a) Amylase and Protease
 - b) Protease only
 - c) Cellulase and chlorophyllase
 - d) Cellulase and Protease.
27. Which of the following monochromatic lights are more suitable for growth and development of plants
- a) Red, far red
 - b) Red, blue, far red
 - c) Red, green
 - d) Blue, far red
28. Cybrids are produced by
- a) Fusion of two different nuclei from two different species
 - b) Fusion of two same nuclei from two same species
 - c) Nucleus from one species but cytoplasm from both the parent species.
 - d) None of above.

29. Fats consists of

- a) Alcohol linked by ester bonds to three fatty acids.
- b) Glycerol molecule linked by ester bonds to three fatty acids
- c) Glycerol molecule linked by ester bonds to a fatty acid.
- d) Glycerol molecule linked by ester bonds to four fatty acids

30. IR Analysis is for -

- a) Detecting the magnetic power of the compound
- b) Detecting the number of electron present in the compound
- c) Detecting the number of proton in the compound
- d) Detecting the functional groups in the compound