

3. Antibodies used in immunotherapy are subjected to partial proteolysis by the enzyme pepsin.

Consider the following statements

- I. F(ab)₂ fragment having the antigen binding activity is generated
- II. Fab fragment having antigen binding activity and the crystallizable Fc fragment are generated
- III. The F(ab)₂ fragment generated forms a visible precipitate on incubation with a proper antigen
- IV. The F(ab)₂ fragment generated is incapable of forming a visible precipitate on incubation with a proper antigen

Which of the above statement(s) regarding the partial digestion of antibodies by pepsin are true.

- A) I and II
 - B) I and III
 - C) I and IV
 - D) II and III
4. In a bioreactor, if the mass fed to the separation process was 460 kg and the mass recovered was 422 kg, what is the percentage yield?
- A) 93.77%
 - B) 8.20%
 - C) 91.73%
 - D) 9%
5. One of the following exotoxins is responsible for capillary disruption.
- A) Botulism toxin
 - B) Erythrogenic toxin
 - C) Perfringens toxin
 - D) Pyrogen toxin
6. The partial amino acid sequence of the human adrenocorticotrophin is ser-tyr-ser-met-glu-his-phe-ser. The number of peptides released when it is treated with cyanogen bromide are
- A) 5
 - B) 2
 - C) 3
 - D) 4
7. Base call accuracy for Phred quality score of 20 is
- A) 70%
 - B) 80%
 - C) 99.90%
 - D) 99%
8. Match the following:
- A) Confocal microscopy
 - B) SEM
 - C) TEM
 - D) FRET
- 1. Surface composition and topography
 - 2. Ultrastructure analysis
 - 3. Energy transfer
 - 4. Pinhole
- A) A-3, B-2, C-1, D-4
 - B) A-4, B-1, C-2, D-3
 - C) A-4, B-1, C-3, D-2
 - D) A-2, B-1, C-3, D-2

9. The accumulation of lactic acid from a cancer cell line maintained in the culture media is due to
- A) Excess production of ethyl alcohol B) Lack of enough oxygen
C) Excess of oxygen D) Inhibition of glycolysis
10. Which one of the following methods is used to detect protein-protein interactions?
- A) Western blotting B) Northern blotting
C) *In situ* hybridization D) Far-Western blotting
11. Glucose-1-phosphate (uniformly labeled, specific activity of 16,000 cpm per micromole) was incubated with glycogen in the presence of a cell free extract containing glycogen phosphorylase. Radioactivity was incorporated into the glycogen at an initial velocity of 2,550 cpm per minute. What is the rate of the enzyme reaction in terms of micromoles glucose incorporated per minute?
- A) 0.159 B) 0.00265
C) 6.2745 D) 376.470
12. If a membrane bound vesicle has to transit a distance of 2 meters along an axon with an average velocity of 1 $\mu\text{m}/\text{sec}$, the time taken for the transit will be?
- A) 0.23 days B) 2.3 days
C) 23 days D) 230 days
13. Which one of the following dye exclusion assays is used to assess cell viability?
- A) Diacetylfluorescein B) MTT
C) Trypan blue D) H^3 thymidine
14. Which one of the following approaches can be used to isolate a specific cell population from a heterogeneous mixture of cell types?
- A) Column Chromatography B) High-throughput microscopy
C) Flow Cytometry D) Histochemistry
15. DNA protein interactions are assessed at genome-wide level by using which one or more of the following techniques?
- I. EMSA; II. ChIP on Chip; III. RNA Seq; IV. South-Western blotting
- A) I, II and IV B) I, III and IV
C) I only D) II only

16. The wavelength range of visible light is
- A) 0.39 to 0.77 mm B) 0.39 to 0.77 μm
C) 0.39 to 0.77 nm D) 0.39 to 0.77 cm
17. Which one of the following techniques allows the quantitative determination of the number of antigen specific cells in a given population?
- A) Indirect ELISA B) Sandwich ELISA
C) Competitive ELISA D) ELISPOT
18. Splicing of a gene can be monitored by
- A) Southern hybridization B) Northern hybridization
C) Western blotting D) South-western blotting
19. Which one of the following methods is used to identify the N-terminus of a polypeptide?
- A) Edwards degradation B) Ninhydrin test
C) Edmans degradation D) Anthrone test
20. Chi-square is zero, when
- A) Expected frequency is half of the observed frequency B) Expected frequency is double that of the observed frequency
C) Expected frequency is triple that of the observed frequency D) Expected frequency is equal to observed frequency
21. The cell density in a culture medium is 6.8×10^6 cells/ml. If each well of a 6-well plate has to receive 2×10^5 cells in 1ml, what should be the dilution strategy?
- A) 1:6.8 followed by 1:10 B) 1:3.4 followed by 1:10
C) 1:10 followed by 1:2 D) 1:3.4 followed by 1:2
22. Starting from cathode side, the correct order to be followed in placing the components for protein transfer by Western blotting technique is
- A) Filter paper, SDS gel, nitrocellulose membrane, filter paper B) Filter paper, nitrocellulose membrane, SDS gel, Filter paper
C) Nitrocellulose membrane, filter paper, SDS gel-filter paper D) Filter paper, filter paper, nitrocellulose membrane, SDS gel
23. Which of the following is not a protein detection method?
- A) Fluorescence *in situ* hybridization B) Immunofluorescence microscopy
C) Immunoelectron microscopy D) Immunoblotting

PART "B"

36. The amount of DNA present in a mature spermatozoan and in a skin cell that is in G2 phase of cell cycle respectively are.

- A) 1X & 1X
 B) 1X & 2X
 C) 0.5X & 1X
 D) 1X & 4X

37. Naive T cells after receiving proper signals from antigen presenting cells differentiate to effector cells. Consider the following statements:

- I. IL-12 promotes naive T cells differentiation to Th1 cells.
 II. IL-10 promotes naive T cells differentiation to Th2 cells.
 III. Th17 cells plays important role in autoimmunity
 IV. IL-4 cytokine is not produced by Th2 cells

Which of the above statements is/are correct?

- A) I, II, IV
 B) I, III, IV
 C) I, II, III, IV
 D) I, II, III

38. With reference to intracellular pathogens, one of the following statements is false.

- A) They are degraded in the cytoplasm
 B) Their antigenic determinants are presented to CD8 T cells
 C) Their elimination is mediated by superoxide radicals formed by myeloperoxidase
 D) Their proteins bind to MHC1

39. Core enzyme of RNA polymerase is guided by _____ factor to recognize the transcription start site.

- A) Gamma
 B) Delta
 C) Alpha
 D) Sigma

40. An enzyme protein kinase hydrolyzed a substrate (0.03 mmol/L) with an initial velocity of 1.5×10^{-3} mmol/L/min and a maximum velocity of 4.5×10^{-3} mmol/L/min. The K_m of this enzyme is

- A) 0.06
 B) 0.02
 C) 0.08
 D) 0.12

41. Which one of the following statements is false?
- A) Interkinetic movement of the nuclei is a characteristic feature of developing ventricular zone. B) Subventricular zone displays interkinetic nuclei during the development.
- C) Developing ventricular zone contains pseudostratified epithelium. D) Rhombic lip produces cells of the external granule cell layer of the epithelium.
42. Which one of the following cytokines is important for activation of naive T cell proliferation and differentiation?
- A) IL-2 B) IL-6
C) IL-17 D) IL-12
43. The small hillock of granulosa cells formed during folliculogenesis is referred to as
- A) Liquor folliculi B) Cumulus oophorus
C) Antrum D) Corona radiata
44. One of the following statements is true for bivalent genes in stem cells.
- A) H3K4me3 & H3K9me3 on one of the parental alleles B) H3K4me3 & H3K9me3 on both the parental alleles
C) H3K4me3 in maternal allele and H3K9me3 in paternal allele D) H3K4me3 in paternal allele and H3K9me3 in maternal allele
45. Which one of the following is not a common method used in human genetic analysis?
- A) RFLP B) Pedigree analysis
C) Karyotyping D) Test cross
46. An organism is able to live on a culture medium containing nutrient A by the enzyme catalyzed reactions as shown: $A \rightarrow B \rightarrow C$. A mutant organism, which is a nutrient auxotroph, failed to survive on nutrient A, but lived when nutrient B was supplied to the medium. This is best explained as
- A) The central dogma of life B) One gene –one enzyme hypothesis
C) One gene – many enzyme hypothesis D) Amino acid activation
47. The refractive period of DNA replication in *E.coli* is caused by
- A) methylated origin B) hemimethylated origin
C) unmethylated origin D) acetylated origin

48. Which one of the following best describes death upon detachment?
- A) Anoikis
B) Necroptosis
C) Extravasation
D) Metastasis
49. Development of regionally distinct cutaneous features in birds is mediated by
- A) epithelial cells
B) mesenchymal cells
C) germ layer cells
D) stem cells
50. One of the following is not a representative of Archea.
- A) *Methanococcus jannaschii*
B) *Thermotoga maritima*
C) *Archaeoglobus fulgidus*
D) *Acetopyrum pernix*
51. Bacterial flagellar proteins are recognized by
- A) TLR3
B) TLR5
C) TLR4
D) TLR9
52. Which one of the following represents neuroectodermal thickenings that form outside of the boundaries of the CNS and contribute to the paired specialized sense organs?
- A) Neural crest
B) Placodes
C) Rhombomeres
D) Spongioblasts
53. Chromosomes with a single kinetochore attached simultaneously to both spindle poles during cell division is known as
- A) monotelic
B) syntelic
C) amphitelic
D) merotelic
54. An example of a substance where 50% of the filtered load is reabsorbed by the kidneys is
- A) Potassium
B) Chloride
C) Urea
D) Bicarbonate
55. Class B GPCRs are receptors for hormones that include
- A) insulin, T3 and aldosterone
B) glucagon, TSH and calcitonin
C) glucagon, PTH and calcitonin
D) insulin, FSH and cortisol

56. The complement protein C3b mediates

- A) opsonization
- B) formation of membrane attack complex
- C) inflammation
- D) lysis of pathogen

57. Which one of the *Sox* genes mostly interacts with *Sry* gene in terms of male sex development in mice?

- A) *Sox2*
- B) *Sox19*
- C) *Sox30*
- D) *Sox9*

58. In a given experiment there are four experimental groups and in each group there are 4 mice. Each mouse of the groups is immunized with the keyhole limpet hemocyanin or azobenzene arsonite or lipopolysaccharide or dextran. Four weeks later, the sera were collected from these mice and antigen-specific IgG1 and IgG2A ELISA was performed. Which one of the mice groups would show the antibody response?

- A) keyhole limpet hemocyanin-primed mice
- B) Azobenzene-primed mice
- C) Lipopolysaccharide-primed mice
- D) Dextran-primed mice

59. Na-K-ATPase is predominant on _____ side of plasma membrane

- A) basolateral
- B) Apical
- C) Luminal
- D) paracellular

60. One of the following is not a synthetic steroid.

- A) Cortisone
- B) Methylprednisone
- C) Dexamethasone
- D) Dehydroepiandrosterone

61. During the course of evolution, some hormones remain structurally stable, but can be recruited to regulate new functions. Such a transformation is referred to

- A) speciation
- B) transmutation
- C) exaptation
- D) adaptation

62. The chemical signals for catecholamine secretion from the adrenal medulla is activated by

- A) GABA
- B) Acetyl choline
- C) Taurine
- D) Dopamine

For Rough Work

University of Hyderabad
Ph.D. Entrance Examinations - 2022

School/Department/Centre
Course: Ph.D.

: Department of Animal Biology, School of Life Sciences
Subject : Animal Biology

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
1	D	26	B	51	A
2	C	27	B	52	B
3	B	28	A	53	D
4	C	29	C	54	C
5	B	30	A	55	C
6	B	31	D	56	A
7	D	32	B	57	D
8	B	33	A	58	A
9	B	34	A	59	A
10	D	35	C	60	D
11	A	36	D	61	C
12	C	37	D	62	B
13	C	38	C	63	B
14	C	39	D	64	D
15	D	40	A	65	C
16	B	41	B	66	C
17	D	42	A	67	B
18	B	43	B	68	A
19	C	44	B	69	A
20	D	45	D	70	C
21	B	46	B		
22	A	47	B		
23	A	48	A		
24	A	49	B		
25	B	50	B		

Note/Remarks :

K. Sumanth
21/11/2022

Signature
School/Department/Centre