

4. The movement of a single cell that was marked with a reporter gene was required to be continually observed during development. This can be monitored by
- A) phase contrast microscopy B) bright field microscopy
C) atomic force microscopy D) fluorescence microscopy
5. Which one of the following methods is used to measure the quantitative levels of a given gene-specific RNA?
- A) RNase protection assay B) DNase foot printing
C) Northern blotting D) Southern blotting
6. The cell density in a 100 mm culture dish was 2.7×10^6 cells/ml. The culture was diluted to 1:27 ratio and 100 μ l seeded per well into a 96 well plate. The final cell density per well is
- A) 1×10^5 B) 1×10^4
C) 2.7×10^4 D) 2.7×10^5
7. Which one of the following methods finds the location of genes on a chromosome?
- A) Gene tracking B) Genome walking
C) Genome mapping D) Chromosome walking
8. Which one of the following radiolabeled nucleotide is used while labeling DNA following Nick translation procedures?
- A) Alpha- ^{32}P ATP B) Gamma- ^{32}P ATP
C) Beta- ^{32}P ATP D) Beta- ^{35}S ATP
9. Molar absorption coefficient of tyrosine is $200\text{M}^{-1} \text{cm}^{-1}$ at 257 nm. At what concentration (g/L) this amino acid will exhibit an O.D. of 1.0 in a cuvette of 0.5 cm path length at 257 nm?
- A) 3.30 B) 1.65
C) 0.33 D) 0.17
10. Which one of the following methods is used to measure the rate of transcription of gene/s?
- A) Global Run ON sequencing (GRO-seq) B) Northern Hybridization
C) RNA-seq D) DNase-seq
11. In rocket immunodiffusion, the length of the rocket is
- A) directly proportional to the amount of antibody B) inversely proportional to the amount of antigen
C) directly proportional to the amount of antigen D) inversely proportional to the amount of antibody

19. Which region of the gene should be preferred for selection of unique target sequence to design a microarray Chip for whole genome expression analysis of a eukaryotic system?
- A) Any region of the coding DNA sequences
B) 5' region of the coding DNA sequences
C) 3' region of the coding DNA sequences and 3' untranslated region
D) Any region of intron only
20. R-loop mapping is associated with mapping of
- A) exons in a gene
B) translation start site
C) transcription start site
D) small RNA binding sites
21. A mixture of Arginine (R), Phenylalanine (F) and Histidine (H) was fractionated using cation exchange chromatography at neutral pH. The amino acids were eluted with an increasing salt gradient. Identify the correct order of elution.
- A) R, H, F
B) F, H, R
C) H, F, R
D) R, F, H
22. In Lysine, the pKa of the side chain is about 10.5. Assuming that the pKa of carboxyl and amino groups are 2.0 and 9.0 respectively, the pI of lysine is closest to
- A) 5.5
B) 6.2
C) 7.4
D) 9.8
23. In MacConkey's agar broth, _____ inhibits the growth of Gram-positive bacteria.
- A) Tryptone
B) peptone
C) Tryptophan
D) bile salts
24. Rabbit IgG was treated with the Papain enzyme. The Fab and Fc fragments obtained after proteolytic digestion were immunized in goat separately. The sera samples were collected after 48 days following immunization. The anti-sera were used for probing the H and L chains. Which one of the following statements is correct?
- A) The antibody to the Fab fragment reacts only to the L chain
B) The antibody to the Fc fragment reacts only to the H chain
C) The antibody to the Fab fragment reacts only to the H chain
D) The antibody to the Fab fragment could react to both the H and L chain
25. A researcher would like to estimate the level of a cytokine in a cell culture supernatant. Which one of the following techniques would be MOST suited for this purpose?
- A) Fluorescence *in situ* hybridization
B) Enzyme linked immunosorbent assay
C) Fluorescence activated cell sorting
D) Immuno-fluorescence microscopy

26. During counter-immunoelectrophoresis,

- A) antigen and antibody migrate opposite to each other
 B) antibody will migrate towards anode
 C) antibody will migrate towards cathode
 D) antibody and antigen migrate parallel to each other

27. Glucokinase catalyzes the first reaction of glycolysis in liver and converts glucose into glucose-6-phosphate. The K_{cat} of Glucokinase is 600 per second. When the total enzyme (Et) concentration is 20 nanomoles and substrate concentration is 40 nanomoles, the reaction velocity (V_0) is 9.6 micromole / sec. The K_m for the substrate in this reaction is

- A) 20 micromoles
 B) 15 micromoles
 C) 10 micromoles
 D) 5 micromoles

28. Light of a specific wavelength in a spectrophotometer is generated by

- A) UV lamp
 B) monochromator
 C) white light lamp
 D) beam divider

29. Biomaterials placed in the body are expected to mimic the functions of

- A) transmembrane proteins
 B) Cytoplasm
 C) cell organelles
 D) extracellular matrix

30. In an oxygen-hydrogen cell, _____ is bubbled at cathode.

- A) Oxygen
 B) Hydrogen
 C) Nitrogen
 D) Chlorine

31. In Gram's staining, the correct order of addition of reagents is:

- A) Crystal violet, alcohol, iodine, safranin
 B) Crystal violet, iodine, alcohol, safranin
 C) Crystal violet, safranin, alcohol, iodine
 D) Iodine, crystal violet, alcohol, safranin

32. Indole (I), methylene (M), Voges-Proskauer (V), and citrate (C) are tested to detect enteric bacteria. Which one of the following test result is positive for *E. coli*?

- A) I,M,V,C (+,+,-,-)
 B) I,M,V,C (+,-,+,+)
 C) I,M,V,C (-,-,+,-)
 D) I,M,V,C (+,-,+,+)

33. During flow cytometry analysis what has to be adjusted to ensure that fluorescence from one channel would not spill over into the other channel/s?

- A) Threshold
 B) compensation
 C) Gate
 D) Voltage

41. Embryonic stem cells are _____, whereas adult stem cells are _____.
- A) multipotent; totipotent B) unipotent; totipotent
C) pluripotent; unipotent D) pluripotent; multipotent
42. During sea urchin development, if blastomeres are separated at 4 cell embryo and allowed to develop, they will
- A) not develop, as they separated from other blastomeres B) develop aberrantly, as nuclear determinants are distributed among blastomeres
C) develop in a mosaic pattern D) develop normally, since each blastomere can regulate its own development
43. A collar of tissue that usually surrounds the infundibular stalk or infundibulum is
- A) Pars nervosa B) Pars tuberalis
C) Pars distalis D) Pars intermedia
44. A plant of the genotype AaBb is self-crossed. The two genes are linked and are 50 map units apart. What proportion of the progeny will have the genotype aabb?
- A) 1/2 B) 1/4
C) 1/8 D) 1/16
45. Bacterial toxins and their effects are provided in column A and column B, respectively.

Column A (Toxin)

1. Botulism toxin
2. Diphtheria toxin
3. Perfringens toxin
4. Tetanus toxin

Column B (Effect)

- (a) Rigid paralysis
- (b) Membrane lysis
- (c) Flaccid paralysis
- (d) Inhibits protein synthesis

Identify the correct set of column A versus column B match.

- A) 1 (c), 2 (d), 3 (b), 4 (a) B) 1 (d), 2 (b), 3 (a), 4 (c)
C) 1 (b), 2 (a), 3 (c), 4 (d) D) 1 (d), 2 (c), 3 (b), 4 (a)
46. Inactivated whole virus is used as a source of vaccine in all except
- A) Polio B) Rabies
C) Hepatitis A D) Hepatitis B

47. In human liver, the initial step in the utilization of fructose is its phosphorylation to fructose 1-phosphate. This is followed by

- A) phosphorylation to fructose 1,6-biphosphate B) cleavage of fructose 1-phosphate to form glyceraldehyde and dihydroxyacetone phosphate
C) conversion to fructose 6-phosphate D) isomerization to glucose 1-phosphate

48. Which one of the following is a non-organ-specific autoimmune disease?

- A) Hashimoto's thyroiditis B) Insulin-dependent Diabetes mellitus
C) Systemic lupus erythematosus D) Di George syndrome

49. The 'mid-blastula transition' is a stage in animal development when,

- A) translation of maternal mRNA is initiated B) transcription of zygotic genes begins
C) blastocoel formation occurs D) cell determination is completed

50. Which one of the following tissue / glands has high levels of the potent androgen, dihydrotestosterone than testosterone in primates?

- A) Testis B) Vas deferens
C) Prostate D) Seminal Vesicle

51. A normal adult is placed on a diet deficient only in phenylalanine. Which one of the following statements is correct?

- A) Protein synthesis continues normally B) Phenylalanine is a non-essential amino acid
C) Phenylalanine is formed from alanine and benzoic acid and no metabolic changes are observed D) Tyrosine becomes an essential amino acid

52. Which of the following are most effective in destroying intracellular pathogens?

- A) T helper cells B) B cells
C) Mast cells D) T cytolytic cells

53. Cold sores are caused by

- A) Human herpes virus 8 B) Human herpes virus 6
C) Herpes simplex virus 1 D) Herpes simplex virus 2

54. Which of the following mRNA contains attenuator sequence at the 5' UTR?

- A) trp operon
 B) ara operon
 C) nif operon
 D) lac operon

55. The lipid moieties and peripheral membrane proteins are given in column A and column B, respectively.

Column A	Column B
1. Isoprenoid tails	(i) Thy 1
2. Myristoyl tails	(ii) β -catenin
3. Transmembrane cadherin	(iii) Ras
4. GPI tails	(iv) Src peptide

Identify the correct set of column A versus column B match.

- A) 1-(iv), 2- (iii), 3-(i), 4 (ii)
 B) 1-(iii), 2-(iv), 3-(ii), 4 (i)
 C) 1-(ii), 2- (i), 3-(iv), 4 (iii)
 D) 1-(iv), 2- (i), 3-(iii), 4 (ii)

56. Which one of the following anterior morphogens is critical for establishing antero-posterior polarity during *Drosophila* embryonic development is

- A) Nanos
 B) Torso
 C) Bicoid
 D) Torpedo

57. Which of the following statement/s holds true for "Poised genes" in embryonic stem cells?

- I. Transcriptionally active
 II. RNA Pol II binding to promoters
 III. Contain H3K4me3 and H3K27me3 modifications
 IV. Highly condensed chromatin

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

58. Which one of the following does not utilize phosphatidyl inositol lipid for signaling in a physiological response?

- A) Vasopressin
 B) Acetyl choline
 C) Follicle stimulating hormone
 D) Adrenaline

59. Migration of cancerous cells from the site of origin to other parts of the body forming secondary tumors is referred to as

- A) epithelial mesenchymal transition
 B) metastasis
 C) Proliferation
 D) invasion

67. In the left hemisphere, Broca's area is related to

- A) speech
 B) smell sensation
 C) impulses received from eyes
 D) reasoning and learning

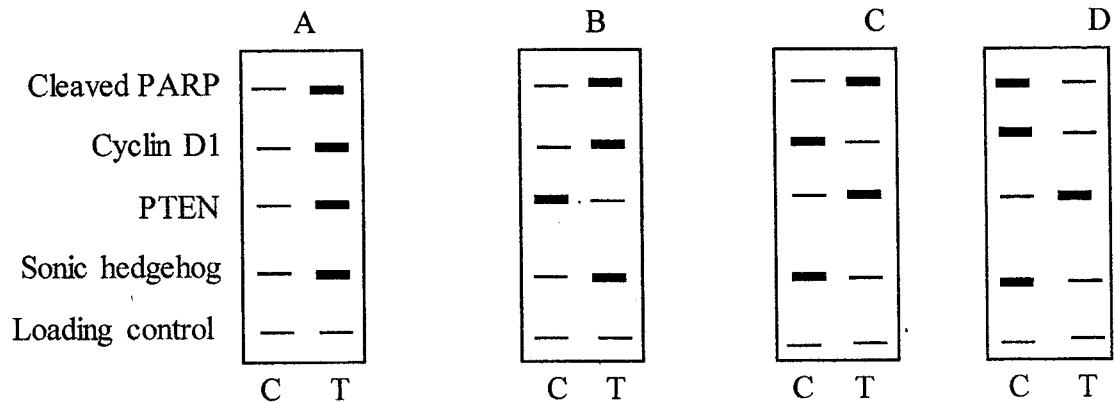
68. Which one of the following trace minerals is essentially required for thyroid hormone production in addition to iodine?

- A) Copper
 B) Selenium
 C) Manganese
 D) Fluoride

69. Quantal transmission is

- A) the release of neurotransmitter in discrete packets
 B) the transmission from non-spiking neurons only
 C) an incremental effect of pre-synaptic inhibition
 D) the transmission at neuromuscular junction only

70. A researcher treated cancer cells with an anticancer drug and performed Western blot analysis. Which one of the following blots is the best representation of untreated control (C) and treated samples (T) in the respective order?



For rough work

University of Hyderabad
Entrance Examinations - 2021

School/Department/Centre : Department of Animal Biology
Course/Subject : PhD in Animal Biology

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
1	A	26	A	51	D	76	
2	B	27	C	52	D	77	
3	A	28	B	53	C	78	
4	D	29	D	54	A	79	
5	A	30	A	55	B	80	
6	B	31	B	56	C	81	
7	C	32	A	57	D	82	
8	A	33	B	58	D	83	
9	B	34	C	59	B	84	
10	A	35	A	60	A	85	
11	C	36	C	61	C	86	
12	B	37	A	62	D	87	
13	A/B/C/D	38	A	63	C	88	
14	C	39	A	64	D	89	
15	C	40	B	65	D	90	
16	D	41	D	66	C	91	
17	B	42	D	67	A	92	
18	C	43	B	68	B	93	
19	C	44	D	69	A	94	
20	A	45	A	70	C	95	
21	B	46	D	71		96	
22	D	47	B	72		97	
23	D	48	C	73		98	
24	D	49	B	74		99	
25	B	50	C	75		100	

Note/Remarks : Q.No.13 - Options A, B, C, D will be considered as right answers.

Signature of the Head/Dean
School/Department/Centre