A-47

Hall Ticket Number:

ENTRANCE EXAMINATION 2021

INTEGRATED M.Sc. & Ph.D. ANIMAL BIOLOGY & BIOTECHNOLOGY

Time: 2 hours Maximum Marks: 70

INSTRUCTIONS: PLEASE READ BEFORE ANSWERING!

- ***There are total of 10 pages in this question paper. Answer sheet (OMR) will be provided separately. Check this before you start answering***
- ***Write your Hall Ticket Number in the OMR sheet given to you. Also write the Hall Ticket Number in the space provided above***
- ***Answers are to be marked on the OMR answer sheet following the instructions provided there upon.***
- ***Hand over OMR answer sheet at the end of the examination to the invigilator.***
- ***The question paper consists of Part A and Part B. All questions carry one mark each. The marks obtained in Part A will be taken into consideration in case of a tie i.e., when more than one student gets equal marks, to prepare the merit list.***
- ***No additional sheets will be provided. Rough work can be done in the question paper itself/space provided at the end of the booklet.***

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PART "A"

1. In a DNA double helix, guanine and cytosine bases are paired together by
   A) covalent bonds B) hydrogen bonds
   C) peptide bonds D) hyperconjugation

2. Which of the following may be used as antifoaming agent in fermentation?
   A) Disaccharides B) Polysaccharides
   C) Polyglycols D) Polypeptides

3. The tuberculin skin test is an example of
   A) allergic reaction B) serum sickness
   C) precipitation reaction D) type IV hypersensitivity

4. Which of the following protein is involved in cross-linking actin filaments?
A) Actinin
B) Cofilin
C) Nebulin
D) Profilin

5. Considering 0.1 M aqueous solution of each of the following, which solution has the lowest pH?
A) Na_2CO_3
B) Na_3PO_4
C) Na_2S
D) NaCl

6. When single-stranded DNA from a human is mixed with single-stranded DNA from a chimpanzee, it was found that about 99% of the DNA is homologous. This can be taken as evidence that:
A) humans and chimpanzees originated in similar environments
B) humans and chimpanzees are closely related
C) humans and chimpanzees evolved simultaneously from distinct ancestor
D) All organisms have similar DNA

7. The arrangement of nucleotides in DNA can be seen by
A) spectrofluorimetry
B) phase contrast microscopy
C) X-ray crystallography
D) electron microscopy

8. What is the concentration of H+ ion in a solution of 0.1M NaOH?
A) 10^{-12} M
B) 9^{-12} M
C) 10^{-13} M
D) 9^{-13} M

9. Photomultiplier tubes convert
A) photons to electrical signals
B) photons to chemical signals
C) low energy photons to high energy photons
D) high energy photons to low energy photons

10. In Meselson and Stahl experiment on DNA replication, *E. coli* was grown initially in medium containing ^{15}N and further allowed to grow in ^{14}N media. The DNA obtained in the second generation found to have
A) 25% ^{15}N, 75%^{14}N
B) 50% ^{15}N, 50% ^{14}N
C) 75% ^{15}N, 25% ^{14}N
D) 100% ^{14}N

11. If a peptide GARAGE subjected to proteolytic cleavage yields two tripeptides, which protease was used in the reaction?
A) Trypsin
B) Chymotrypsin
C) Cyanogen bromide
D) Acetylcholine esterase

12. _____ is used as precursor for the industrial production of penicillin.
A) Alpha amino butyric acid
B) Benzoic acid
C) Phenyl acetic acid
D) Phenoxy acetic acid

13. Effluent treatment of water by "Ozonation" is an example of
A) pretreatment
B) primary treatment
C) secondary treatment
D) tertiary treatment

14. Which light exposure conditions would be most harmful to live cells?
A) 300 nm (Violet) light
B) 450 nm (blue) light
C) 550 nm (Green) light
D) 700 nm (red) light

15. In genetic screening to study recessive mutation phenotypes which one of the following ploidy can be used?
A) Hexaploid
B) Diploid
C) Haploid
D) Tetraploid

16. Green fluorescent protein (GFP) was originally isolated from which of the following organisms?
A) *Anabena doliolum*
B) *Aequorea victoria*
C) *Drosophila melanogaster*
D) *Candida albicans*

17. A plant biologist is planning on to generate plants that withstand abiotic stress by tweaking the amino acid metabolism. Which amino acid metabolism is more suitable to manipulate?
A) Histidine
B) Methionine
C) Proline
D) Tryptophan

18. A method by which one can determine the rate of transcription of a given gene is
A) global run-on sequencing
B) nuclear RNA sequencing
C) cytoplasmic RNA sequencing
D) total RNA sequencing

19. The ability of the immune system to recognize self-antigens versus non-self antigen is defined as:
A) specific immunity
B) humoral immunity
C) tolerance
D) cell-mediated immunity

20. A plasma membrane of poikilothermic organism living in the Arctic zone compared to an organism living in the temperate climate zone is richer in
A) cholesterol
B) long-chain fatty acid
C) protein
D) unsaturated fatty acid

21. Central nervous system is derived from which one of the following germ layers?
A) Ectoderm
B) Endoderm
C) Mesoderm
D) Endomesoderm

22. During a "fight or flight" situation, the release of epinephrine promotes glycogen breakdown to pyruvate in
A) liver tissue
B) brain
C) skeletal muscle
D) cardiac muscle

23. Which of the following does not kill endospores?
A) Autoclaving
B) Pasteurization
C) Hot air sterilization
D) Incineration

24. A loss-of-function mutation in repressor (such that it prevents the binding of repressor with lactose) will have what kind of effect on lac genes in the presence of lactose?
A) The expression of lac genes will be increased by two fold
B) The expression of lac genes will be decreased
C) There will be no effect on gene expression
D) The expression of lac genes will be increased by ten fold

25. Heavier proteins with higher 'S' (coefficient) value will sediment more rapidly than lighter proteins. However, Tropomyosin from muscle fibers, with 93 kDa molecular weight, has a coefficient of 2.6S and the Hemoglobin, at 65 kDa molecular weight, has a coefficient of 4.3S. Which of the following explanation is correct?
A) Tropomyosin has many more subunits than Hemoglobin
B) Tropomyosin is rod-shaped and Hemoglobin is spherical.
C) Tropomyosin is strongly charged and Hemoglobin is neutral
D) Tropomyosin is more spherical than hemoglobin

26. A mechanism that can cause a gene to move from one linkage group to another is
A) duplication
B) crossing over
C) inversion
D) translocation

27. The anhydride of $Ba(OH)_2$ is:
A) BaH_2
B) BaOH
C) BaO_2
D) BaO

28. Blood agar is an example of _____ media.
A) selective
B) basal
C) differential
D) enriched

29. Which one of the following statements holds true for G0/G1 phase organization of chromosomal DNA in a mature eukaryotic cell nucleus?
A) Organized randomly and interact with another chromosomal DNA randomly
B) Organized randomly and interact with another chromosomal DNA non-randomly
C) Organized in constrained locations and interact with another chromosomal DNA non-randomly
D) Organized in constrained locations and interact with another chromosomal DNA randomly

30. What is the primary function of CD4+ T cells?
A) Promote phagocytosis
B) Respond to MHC class I and II presentation
C) Respond to MHC class I presentation
D) Respond to MHC class II presentation

31. Subcellular components are separated by
A) electrophoresis
B) chromatography
C) autoradiography
D) differential centrifugation

32. Which of the following statements hold true for embryonic stem cells.
(I) Derived from trophectodermal cells of early blastocyst stage
(II) They have longer S phase of cell cycle
(III) Has higher levels of telomerase enzyme
(IV) They are totipotent in nature
A) I, II, III and IV
B) I and IV only
C) II and III only
D) I and III only

33. Ecological study of an organism is called as
A) Synecology
B) Autecology
C) Paleology
D) Ornithology

34. The molarities of 0.1 N solution of HCl and 0.1 N solution of H_2SO_4 are respectively
A) 0.1 M and 0.1 M
B) 0.05 M and 0.1 M
C) 0.1 M and 0.05 M
D) 0.1 M and 0.2 M

35. Which of the following has maximum calorific value?
A) Fat
B) Carbohydrate
C) Protein
D) Amino acid

PART "B"

36. An example of a substance where 50% of the filtered load is reabsorbed by kidneys is
A) potassium
B) chloride
C) urea
D) bicarbonates

37. Global Tiger Initiative broadened to snow-leopards to promote conservation to prevent extinction was first launched by
A) World Conservation Society
B) United Nations Environment Program
C) World Economic Forum
D) World Bank

38. Which nervous system controls skeletal muscle?
A) Sympathetic
B) Parasympathetic
C) Somatic
D) Autonomic

39. In the resting state of a neuron, the axonal membrane is
A) more permeable to K+ and nearly impermeable to Na+
B) equally permeable to both Na+ and K+
C) more permeable to Na+ and nearly impermeable to K+
D) impermeable to both Na+ and K+

40. The source of somatostatin is same as that of

A) insulin
B) ACTH
C) adrenaline
D) vasopressin and oxytocin

41. Microevolution can be thought of as:

A) changes in the frequencies of alleles in a gene pool
B) genes mutating in response to environmental change
C) creating new species where none existed before
D) reacting to changes in the environment

42. Most common site of human fertilization in reproductive system is

A) infundibulum leading to tubal ostium
B) Ampullary-Isthmus junction
C) uterotubal junction
D) the isthmic portion

43. Which one of the following dangerous greenhouse gases is generated by wastewater?

A) Nitrogen
B) Sulphur dioxide
C) Carbon dioxide
D) Methane

44. Which of the following virus has RNA as genetic material?

A) Hepatitis B virus
B) Hepatitis C virus
C) Herpes Simplex virus
D) Epstein Barr virus

45. A respiratory pigment protein that does not accept Fe as oxygen binding site either in 1:1 or 2:1 ratio is

A) hemerythrin
B) hemoglobin
C) hemocyanin
D) chlorocruorin

46. Which one of the following statements is true for "imprinted genes" in mammals?

A) Copy of a gene inherited through a sperm which is transcriptionally active in all the cells of an organism
B) Copy of a gene inherited through an Oocyte which is transcriptionally inactive in all the cells of an organism
C) Copy of a gene inherited either through sperm or Oocyte which are transcriptionally active in a parent of origin specific manner
D) Copy of a gene inherited either through sperm or Oocyte which are transcriptionally active in a random fashion

47. Which one of the following amino acids is the most soluble in water at pH 7.0?

A) Tryptophan
B) Phenylalanine
C) Leucine
D) Glutamate

48. The two nitrogen atoms in urea are contributed by

A) ammonia and glutamate
B) glutamine and glutamate
C) ammonia and aspartate
D) ammonia and alanine

49. Which one of the following animals has two respiratory pigment proteins (red-green) in the blood?

A) *Serpula vermicularis*
B) *Pheretima posthuma*
C) *Lumbricus terrestris*
D) *Hirudo medicinalis*

50. Sequestering toxins is well known in invertebrates as a chemical defence, but such phenomenon is seen in vertebrates after predating toxin-producing prey and those are

A) Garter snake and Tiger keelback snake
B) Tiger shark and Great white shark
C) Lion fish and Puffer fish
D) the Japanese toad and Stubfoot toad

51. Because of difference in peak breeding time, five different species of frogs rarely produce interspecific hybrids. The isolating mechanism is

A) behavioral
B) geographical
C) mechanical
D) temporal

52. Which of the following statement is incorrect regarding ecological pyramids?

A) The pyramid of biomass is upright in grass land ecosystem
B) The pyramid of numbers is upright in grass land ecosystem
C) The pyramid of energy is inverted in ocean ecosystem
D) The pyramid of biomass is inverted in aquatic ecosystem

53. Which of the following pigment is most abundant in green plants?

A) Carotene
B) Chlorophyll a
C) Chlorophyll b
D) Xanthophyll

54. In a protein, the predominant amino acid present in β-sheets is

A) aspartic Acid
B) tryptophan
C) tyrosine
D) glycine

55. An example of an antagonist that inhibits the action of aldosterone on its receptors in nephron tubule is

A) spironolactone
B) acetazolamide
C) chlorthalidone
D) furosemide

56. Detoxification of lipid drugs and other harmful compounds in ER is carried out by:

A) cytochrome P450
B) cytochrome B
C) cytochrome D
D) cytochrome F

57. Respiratory alkalosis is caused by

A) increased H_2CO_3
B) decreased H_2CO_3
C) increased Bicarbonate ions
D) decreased Bicarbonate ions

58. Which of the following RNA molecules antagonize translation of mRNA molecules?

A) tRNA
B) SnRNA
C) SnoRNA
D) miRNA

59. *Mycobacterium Tuberculosis* is an intra-cellular bacterium. It predominantly resides in
A) macrophages
B) B-cells
C) T-cells
D) neutrophils

60. In the reaction, NADH + H^+ + E-FMN → NAD^+ + E-$FMNH_2$, the electron acceptor is
A) E-$FMNH_2$
B) E-FMN
C) NADH
D) NAD^+

61. During photorespiration glycine is synthesized in:
A) mitochondria
B) cytoplasm
C) peroxisomes
D) chloroplasts

62. The substrate Km in an enzyme-catalyzed reaction
A) is usually less than Kd
B) cannot be equal to Kd
C) is never less than Kd
D) is estimated from the Y-intercept of a Lineweaver-Burk plot

63. Holliday junction intermediate is a feature of
A) amino acid metabolic pathway
B) lipid glycosylation pathway
C) protein transport pathway
D) homologous DNA recombination pathway

64. Cooperative ligand binding can be described quantitatively by
A) Ramachandran plot
B) Henderson Hasselbalch equation
C) Hill equation
D) Lineweaver Burk plot

65. Light yellowish colour of cow milk is due to the presence of
A) beta-Carotene
B) turmeric
C) riboflavin
D) cyanophycin

66. Which of the following bacterial product is primarily responsible for septicemia?
A) Enterobactin
B) Peptidoglycan
C) Lipoteichoic acid
D) Lipopolysaccharide

67. Gramicidin is an example of
A) peptide antibiotic
B) beta-Lactam antibiotic
C) sulfonamide antibiotic
D) fluoroquinolone antibiotic

68 The term that refers to a disease which is present always in low number in a particular region
A) pandemic
B) epidemic
C) endemic
D) hypodermic

69. Which of the following is not a gaseous cycle?
A) Oxygen
B) Nitrogen
C) Carbon
D) Phosphorous

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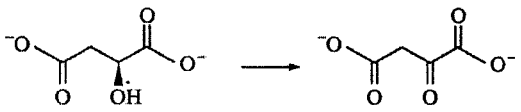
70. The following enzyme-catalyzed transformation that occurs in TCA cycle can be described as:



A) Hydrolysis
B) Oxidation
C) Reduction
D) Aldol condensation

For rough work

University of Hyderabad
Entrance Examinations - 2021

School/Department/Centre : Department of Animal Biology
Course/Subject : Integrated M.Sc. Ph.D. Animal Biology & Biotechnology

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

Note/Remarks :

Signature
School/Department/Centre