62

QUESTION PAPER SERIES CODE
A

Registration No. : | | | | | |

Centre of Exam. : _____

Name of Candidate : _____

Signature of Invigilator

ENTRANCE EXAMINATION, 2015

M.Phil./Ph.D. LIFE SCIENCES

[Field of Study Code : SLSP (159)

Time Allowed : 3 hours

Maximum Marks : 70

INSTRUCTIONS FOR CANDIDATES

Candidates must read carefully the following instructions before attempting the Question Paper :

(i) Write your Name and Registration Number in the space provided for the purpose on the top of this Question Paper and in the Answer Sheet.

(ii) **Please darken the appropriate Circle of Question Paper Series Code on the Answer Sheet.**

(iii) The Question Paper is divided into two parts : Part—A and Part—B. Choose the most appropriate answer.

(iv) Answer *all* 30 questions of Part—A.

(v) Answer *any* 40 questions from Part—B. If you answer more than 40 questions, only first 40 will be checked. **Questions covering both Biological Sciences and Physical Sciences are included. Therefore, it is advised that you read the entire Question Paper.**

(vi) Each correct answer carries **one** mark. **For every wrong answer, half mark will be deducted.**

(vii) Both parts have multiple choice questions. All answers are to be entered in the Answer Sheet provided with the question paper for the purpose by darkening the correct choice, i.e., (a) or (b) or (c) or (d) with **BALLPOINT PEN** only against each question in the corresponding circle.

(viii) Calculators and Log Tables may be used.

(ix) Answer written by the candidates inside the Question Paper will not be evaluated.

(x) Three Pages at the end have been provided for Rough Work.

(xi) Return the Question Paper and Answer Sheet to the Invigilator at the end of the Entrance Examination.

(xii) **DO NOT FOLD THE ANSWER SHEET.**

INSTRUCTIONS FOR MARKING ANSWERS

1. Use only Blue/Black Ballpoint Pen (do not use pencil) to darken the appropriate Circle.
2. Please darken the whole Circle.
3. Darken ONLY ONE CIRCLE for each question as shown in example below :

	Wrong	Wrong	Wrong	Wrong	Correct
–	○ ⓑ ⓒ ○	⊘ ⓑ ⓒ ⓓ	⊘ ⓑ ⓒ ⊘	◎ ⓑ ⓒ ○	ⓐ ⓑ ⓒ ○

4. Once marked, no change in the answer is allowed.
5. Please do not make any stray marks on the Answer Sheet.
6. Please don't do any rough work on the Answer Sheet.
7. Mark your answer only in the appropriate space against the number corresponding to the question.
8. **Ensure that you have darkened the appropriate Circle of Question Paper Series Code on the Answer Sheet.**

PART—A

Answer **all** questions

1. The Nobel Prize for 2014 in Physiology or Medicine was awarded for which of the following works?

   (a) The human genome sequence

   (b) Inducible pluripotent stem cells (IPSCs)

   (c) Cells working like inner 'GPS' in the brain

   (d) Targeted therapy against cancer cells

2. Which of the following numbers cannot be a probability?

   (a) 0

   (b) 0·2

   (c) 0·9

   (d) 1·1

3. In order to apply a linear regression model, which of the following assumptions has to be true?

   (a) Response (Y) variable has to be normally distributed

   (b) Predictor (X) variable has to be normally distributed

   (c) Both X and Y have to be normally distributed

   (d) Residuals have to be normally distributed

4. In an experiment to examine rodent predation of seeds dispersed by birds, a researcher set up seeds in plots under two treatments (control seeds not consumed by any animals and bird-dispersed seeds). Each plot contained 10 seeds on the forest floor, and these were checked after 24 hours to examine the number of remaining seeds. The most appropriate distribution to apply to this dataset to compare differences in seed predation between the treatments is

   (a) normal distribution

   (b) binomial distribution

   (c) Poisson distribution

   (d) negative binomial distribution

5. When an F^+ donor conjugates with an F^- recipient, then

   (a) both become F^+

   (b) both become F^-

   (c) the recipient becomes F^-

   (d) the donor becomes F^-

6. While setting up a conjugation experiment between an F^+ donor and F^- recipient, your culture gets contaminated with DNAse. What will be the outcome of this experiment?

(a) Both strains will become F^-

(b) F^+ will remain as F^+

(c) F^- will become F^+

(d) F^+ will become F^-

7. Which of the following types of genetic transfer lead to incorporation of new DNA into the bacterial chromosome?

A. Conjugation mediated by F factor

B. Hfr-mediated conjugation

C. Transduction

D. Transformation

(a) A and B only

(b) C and D only

(c) A, B, C and D

(d) B, C and D

8. Which one of the following methods cannot be used to measure levels of expressed RNA quantitatively?

(a) Northern blot

(b) 30 cycles of RT-PCR

(c) RNAse protection assay

(d) Microarray

9. In general, suppressors of nonsense mutations map to genes encoding

(a) RecA

(b) rRNA

(c) mRNA

(d) tRNA

10. Which of the following molecule(s) is/are pulled down after immunoprecipitation of chromatin using an antibody against beta subunit of RNA polymerase II?

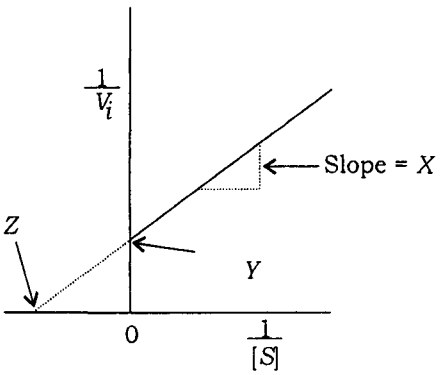
(a) RNA polymerase subunits, DNA and transcription factors

(b) Beta subunit of RNA polymerase

(c) Beta subunit of RNA polymerase and DNA

(d) Beta subunit of RNA polymerase, DNA and spiceosomal factors

11. The definitions of X, Y and Z with respect to the following figure regarding enzyme kinetics are



(a) $V_{max} / K_M, 1/V$ and $-1/K_M$

(b) $K_M / V_{max}, 1/V_{max}$ and $-1/K_M$

(c) $V_{max} / K_M, V_{max}$ and K_M

(d) $K_M / V_{max}, V_{max}$ and K_M

12. Maize is a diploid plant with 10 pairs of chromosomes. Chromatids that are present in the metaphase of mitosis and metaphase I of meiosis of cell division are

(a) 10 and 20

(b) 20 and 20

(c) 40 and 40

(d) 10 and 10

13. Suspension by vigorous shaking of soybean lecithin (a mixture of phospholipids) in phosphate buffered saline leads to formation of

(a) bilayer lipid membrane

(b) multilamellar liposomes

(c) unilamellar liposomes

(d) lipid micelles

14. Which of the following forms of chromatin will be present if histone H1 and all non-histone proteins are removed?

(a) 30 nm fibre

(b) 700 nm chromatin

(c) Naked DNA

(d) 10 nm bead-on-a-string

15. Which one of the following conditions will change the equilibrium constant of a reaction?

(a) Temperature of the reaction

(b) Volume of the reaction

(c) Pressure in the reaction chamber

(d) Presence of a catalyst

16. Which one of the following statements is NOT true?

(a) Molecules of a gas are not stationary

(b) Molecules of a gas remain in one cluster

(c) Molecules of a gas move with different speeds

(d) Molecules of a gas move with constant speed

17. The total cell mass was determined at different time points as follows :

1·5 (t = 0), 3·0 (t = 1d), 6 (t = 2d), 12(t = 3d)

where d = days and t = time

Which of the following shapes of the curve best describes the data point?

(a) Linear

(b) Parabolic

(c) Exponential

(d) Power law

18. Bond angles for a trigonal bipyramid molecule are

(a) 180° and 120°

(b) 120° and 109°

(c) 90° and 120°

(d) 120° and 90°

19. Which of the following is believed to be a key cause of immortalization of cancer cells in many tumours?

(a) Complete loss of telomeres

(b) Inactivation of the telomerase enzyme

(c) Reactivation of the telomerase enzyme

(d) Shortening of telomere

20. Radiation-induced injury to biological organisms always begins with

(a) cell transformation

(b) chemical changes at atomic and molecular level

(c) polarization of electromagnetic energy

(d) immunomodulation

21. Which of the following chromosome anomalies is associated with cri du chat syndrome?

(a) Deletion of long arm of chromosome 22

(b) Partial deletion of short arm of chromosome 5

(c) Translocation of chromosome 9

(d) Trisomy of chromosome 13

22. Which of the following techniques is the most appropriate one to detect a specific protein in a crude protein extract?

(a) Gel electrophoresis

(b) Western blotting

(c) 2D gel electrophoresis

(d) Affinity chromatography

23. The direction of the induced e.m.f. during electromagnetic induction can be determined by making use of

(a) Faraday's law

(b) Ampere's law

(c) Lenz's law

(d) Laplace's law

24. The critical temperature for hydrogen is

(a) -80° C

(b) -253° C

(c) -240° C

(d) -259° C

25. Stokes' formula holds good, when

(a) velocity of the body is greater than the critical velocity

(b) there is slipping between the body and the fluid

(c) the moving body is perfectly smooth and rigid

(d) the size of moving body is greater than the distance between the molecules of the medium

26. Which of the following is a typical feature of a monocotyledonous plant in contrast to dicotyledonous plants?

(a) Veins are branching and netlike

(b) Showing alternation of generation

(c) Vascular bundles are arranged in a ring around the ground tissue

(d) Pollen grains have single pore of furrow

27. We call a meristem indeterminate, when

(a) the cells undergo a fixed number of cell division cycle and stop dividing after that

(b) cells divide continuously and do not stop

(c) all the meristematic cells differentiate into permanent cells

(d) some meristematic cells remain as undifferentiated

28. The first carboxylation product of a C3 plant is

(a) phosphoglyceraldehyde

(b) phosphoglyceric acid

(c) oxaloacetic acid

(d) malic acid

29. Production of gastric juice is due to stimulation of

(a) vagus nerve

(b) trigeminal nerve

(c) abducens nerve

(d) hypoglossal nerve

30. You are provided with plasmid DNA and insert DNA samples digested with two restriction enzymes. Which of the following pairs of restriction enzymes can readily provide compatible ends for ligation?

(a) Xho I (5′–C↓ TCGAG) and Sal I (5′–G↓ TCGAC)

(b) Cla I (5′–AT↓ CGAT) and Sal I (5′–GT↓ CGAC)

(c) BamH I (5′–G↓ GATCC) and Bgl II (5′–A↓ GATCT)

(d) Sal I (5′–G↓ TCGAC) and Xho I (5′–C↓ TCGAG)

PART—B

Answer **forty** questions

31. You, as a microbial geneticist would like to map the location of galE and trpA genes in a new species of bacterium that appears to be closely related to *E.coli*. You decide to use cotransduction, for which you generate appropriate donor and recipient strains. Unfortunately, your experiment fails and you do not observe cotransduction in your experiment. Which of the following is the most reasonable explanation for this situation?

(a) The new bacterial species does not have the galE and trpA genes

(b) These two genes are far apart to be mapped

(c) The new bacterial species cannot survive galE mutation or trpA mutation

(d) These genes are too close to be mapped

32. Magnification of compound microscope is not connected with

(a) numerical aperture

(b) focal length of objective

(c) focal length of eyepiece

(d) tube length

33. Urea is a water-soluble excretion product of nitrogen metabolism. How many hydrogen bonds can it donate to the oxygen of water?

(a) 2

(b) 3

(c) 4

(d) 5

34. When the linear form of glucose cyclizes, the product is a/an

(a) anhydride

(b) glycoside

(c) hemiacetal

(d) lactone

35. The enzyme 'fumarase' catalyzes the reversible hydration of fumaric acid to l-malate, but it will not catalyze the hydration of maleic acid, the *cis* isomer of fumaric acid. This is an example of

(a) chiral activity

(b) racemization

(c) stereoisomerization

(d) stereospecificity

36. In the binding of oxygen to myoglobin, the relationship between the concentration of oxygen and the fraction of binding sites occupied can best be described as

(a) hyperbolic

(b) linear with a negative slope

(c) linear with a positive slope

(d) sigmoidal

37. Meristem size is regulated by a number of genes that either positively or negatively regulate the size of a meristem. Mutation of a gene X increases the size of the meristem, whereas mutation in the gene Y reduces it. The double mutant xy has a phenotype that resembles the single mutant y phenotype. From this observation which of the following will be a logical conclusion?

(a) Gene X negatively regulates meristem size and functions downstream of gene Y

(b) Gene X positively regulates meristem size and functions upstream of gene Y

(c) Gene X negatively regulates meristem size and functions upstream of gene Y

(d) Gene X and Y are negative and positive regulators of meristem size respectively and they work in two independent pathways

38. Phytochromes are present in two interconvertible forms—Pr and Pfr. Which of the following is true about phytochromes?

(a) Pr is the active form that absorbs red light and converts into inactive Pfr form

(b) Pr is the inactive form that absorbs red light and converts into active Pfr form

(c) Pfr is the active form that absorbs red light and converts into inactive Pr form

(d) Pfr is the inactive form that absorbs far-red light and converts into active Pr form

39. All cells of quiescent centre (QC) of growing root tip was killed by laser beam and allowed to grow. A few days later the space generated by killing is filled by the division of neighbouring columella and vascular initial cells. Which of the following fates will the newly formed cells acquire?

(a) The lower cells will get columella fate and the upper cells will get vascular initial fate

(b) All the cells will get mixed identity of columella and vascular initial

(c) All the cells will get QC identity

(d) All the cells will get combination of columella, vascular initial and QC identity

40. Cork cambiums are shortliving. After a few cycles of cell division cork cells cease dividing and undergo a program cell death. Thus during every growth cycle, the cork cambium must regenerate from the permanent cells. Which of the following is the source of cork-cambium cells in large trees?

(a) Xylem parenchyma

(b) Phloem parenchyma

(c) Vascular cambium

(d) Pericycle

41. A region deep in the brain may be accurately localized, using

(a) stereoscopic method

(b) stereotaxic procedure

(c) cranioplasty

(d) laparoscopy

42. In an adult, sleep deprivation strongly affects

(a) body length

(b) body temperature

(c) muscle length

(d) salivation

43. Which of the following is the most correct statement for an evolved and developed mammalian brain?

(a) The number of neuron is more than the number of synapses

(b) The numbers of neuron and synapse are equal

(c) The number of glia is more than the neurons

(d) The numbers of neuron, synapse and glia remain same as that during birth

44. A neuron at resting state when treated with *X* showed transmembrane potential – 50 mV, while when treated with *Y* it showed – 90 mV. Given such a condition, which of the following statements would be most appropriate?

(a) The *X* induced depolarization, while *Y* induced hyperpolarization

(b) The threshold for inducing a response by the neuron was higher for *X* than that for *Y*

(c) Both the treatments induced depolarization of the neuron

(d) Both the treatments induced hyperpolarization of the neuron

45. Swallowing

(a) is voluntary and regulated by IX and X cranial nerves

(b) is involuntary and regulated by X and XI cranial nerves

(c) is voluntary and regulated by V and X cranial nerves

(d) does not have any nerve regulation

46. Vagovagal reflexes are present in

(a) stomach

(b) intestine

(c) rectum

(d) oesophagus

47. Fatty acids are used to synthesize triglycerides in

(a) agranular endoplasmic reticulum

(b) granular endoplasmic reticulum

(c) liposomes

(d) Golgi bodies

48. Patient suffering from dysarthria has abnormal

(a) speech

(b) vision

(c) urinary bladder

(d) urinating frequency

49. Aglomerular kidney is a characteristic feature of

(a) camel

(b) freshwater fishes

(c) tadpoles

(d) seawater fishes

50. Which of the following represents the form of *Plasmodium* that is released from the erythrocyte by lysis?

(a) Trophozoite

(b) Schizont

(c) Merozoite

(d) Microgametocyte

51. Which of the following groups contain many unique coenzymes, such as coenzyme M and coenzyme F_{420}?

(a) Sulphate-reducing bacteria

(b) Methanotrophs

(c) Methanogens

(d) Acetogens

52. In a microarray experiment, the RNA samples from treated and the control cells were labelled with Cyanine–3. Which of the following is correct about the assessment of $\log_2$ ratio (treated/control) in the microarray data analysis?

(a) $\log_2$ ratio 2·0 indicates 2-fold upregulation in control versus treated RNA

(b) $\log_2$ ratio 4·0 indicates 16-fold upregulation in treated versus control RNA

(c) Two-fold induction in treated versus control corresponds to $\log_2$ ratio 2·0

(d) $\log_2$ ratio −1·0 indicates 2-fold upregulation in treated versus control RNA

53. The identification of a species or organism at the species level using a single standardized DNA fragment is known as

(a) DNA fingerprinting

(b) phylogeny

(c) DNA bar coding

(d) systematics

54. Evolution of different species in a given area starting from a point and spreading to other geographical areas is known as

(a) migration

(b) divergent evolution

(c) adaptive radiation

(d) natural selection

55. A polygenic trait is controlled by three genes—A, B and C. In a cross, AaBbCc × AaBbCc, the phenotypic ratio of the offsprings was observed as 1 : 6 : x : 20 : x : 6 : 1. What is the possible value of x?

(a) 3

(b) 9

(c) 15

(d) 25

56. The immune system protects against both extracellular and intracellular pathogens. Out of the following diseases which one is caused by an extracellular pathogen?

(a) Tetanus

(b) Malaria

(c) Chickenpox

(d) Leprosy

57. While on a backpacking trip a person is bitten by a poisonous snake. The person receives human immunoglobulin treatment (gamma globulin or antiserum) against the poisonous snake venom and recovers. One year later during an environmental studies field trip, the person is bitten once again by the same type of snake. Which of the following is true?

(a) Since he fully recovered from the first snakebite, he is protected from the effects of the poison this second time

(b) Compared to the first snakebite, he is more sensitive to the venom from the second bite

(c) Compared to the first snakebite, he is less sensitive to the venom from the second bite

(d) Compared to the first snakebite, he is equally sensitive to the venom from the second bite

58. Which of the following characteristics does NOT apply to the adaptive arm of immunity?

(a) It is the first to engage upon initial encounter with antigen

(b) It is the most pathogen-specific

(c) It responds more effectively during a subsequent exposure

(d) It is the target of vaccination

59. Granulocytic cells, important in the body's defense against parasitic organisms, are

(a) natural killer (NK) cells

(b) mast cells

(c) neutrophils

(d) eosinophils

60. During splicing of pre-mRNA into mRNA, the 5′-splice site is cleaved by the

(a) branch point A-2′OH

(b) 3′-OH of the 3′-splice site

(c) U1snRNP

(d) U5snRNP

61. Active chromatin is strongly characterized by which of the following histone modifications?

(a) H3·K9 trimethylation

(b) H3·K4 acetylation

(c) H4·S1 phosphorylation

(d) H4·K5 acetylation

62. During initiation of translation in eukaryotes, the 43S preinitiation complex binds to the mRNA

(a) upstream of the start codon (AUG)

(b) on the start codon (AUG)

(c) downstream of the start codon (AUG)

(d) downstream of the 5′-untranslated region

63. Which of the following allows transcription by RNA polymerase II to proceed further?

(a) TFIID binding with TATA element

(b) Phosphorylation of the CTD of RNA polymerase II

(c) TBP dissociation from TATA element

(d) Dissociation of mediator complex from RNA polymerase II

64. A cycle of peptide bond formation consumes which of the following?

(a) 2 molecules ATP and 1 molecule GTP

(b) 1 molecule ATP and 3 molecules GTP

(c) 2 molecules GTP and 1 molecule ATP

(d) 2 molecules ATP and 2 molecules GTP

65. The length of *E.coli* chromosome after circularization [Given, size of the genome is $4 \cdot 6 \times 10^6$ base pairs with 0·1 nm distance between two base pairs] is

(a) 1·5 mm

(b) 0·75 mm

(c) 0·48 mm

(d) 0·24 mm

66. Which of the following is the correct order of protein assembly at bacterial replication origin?

(a) DNA A, DNA B, primase, polymerase

(b) DNA B, DNA A, primase, polymerase

(c) DNA A, primase, DNA B, polymerase

(d) DNA B, primase, DNA A, polymerase

67. Which of the following statements is TRUE?

(a) Enhancers are *trans*-acting elements that are present only upstream of the promoter sequence

(b) Enhancers are *cis*-acting elements that are present only upstream of the promoter sequence

(c) Enhancers are *trans*-acting elements that can function in an orientation-independent manner with respect to the promoter sequence

(d) Enhancers are *cis*-acting elements that can function in an orientation-independent manner with respect to the promoter sequence

68. The first child of a couple has cystic fibrosis, an autosomal recessive disorder. What is the probability that the second child of this couple would also have cystic fibrosis?

(a) 1

(b) 1/2

(c) 1/3

(d) 1/4

69. Interrupted mating of several Hfr strains with an F^- *E. coli* cell resulted in generation of the following strains :

A. Strain 1 *bio* + *str* + *gal* + *tyr* +

B. Strain 2 *ara* + *pro* + *tyr* + *gal* +

C. Strain 3 *str* + *gal* + *tyr* + *pro* +

D. Strain 4 *ara* + *bio* + *str* + *gal* +

The order of genes are

(a) *bio–str–gal–tyr–pro–ara*

(b) *ara–pro–tyr–gal–bio–str*

(c) *str–bio–ara–tyr–gal–pro*

(d) *gal–tyr–pro–str–bio–ara*

70. Shell coiling is a maternal effect phenotype controlled by S gene, where S is dominant over s. If a snail has left-handed coiled shell, which of the following statements is TRUE?

(a) The genotype of the snail must be s/s

(b) The genotype of the mother of the snail must be s/s

(c) The genotype of the father of the snail must be s/s

(d) The genotype of the grandmother of the snail must be s/s

71. The proteins which have predominant role in angiogenesis are

(a) VEGF and matrix metalloproteases

(b) VEGF and urokinase

(c) PDGF and urokinase

(d) PDGF and matrix metalloproteases

72. Ras is a proto-oncogene which gets converted into a potent oncogene after undergoing

(a) non-sense mutation

(b) mis-sense mutation

(c) frameshift mutation

(d) deletion mutation

73. Which one of the following is not the part of apoptosome complex during the initiation of mitochondrial apoptosis?

(a) Apaf-1

(b) Caspase 9

(c) Cytochrome c

(d) Caspase 3

74. Which one of the following lipid molecules is exposed on non-cytosolic half of the plasma membrane as an apoptotic signal?

(a) Phosphatidylserine

(b) Phosphatidylethanolamine

(c) Phosphatidylinositol

(d) Phosphatidylcholine

75. A 1 : 2 : 1 phenotypic ratio in the F2 generation of a monohybrid cross is a sign of

(a) complete dominance

(b) multiple alleles

(c) incomplete dominance

(d) polygenic inheritance

76. Mendel accounted for the observation that traits which had disappeared in the F1 generation reappeared in the F2 generation by proposing that

(a) new mutations were frequently generated in the F2 progeny, reinventing traits that had been lost in the F1

(b) the mechanism controlling the appearance of traits was different between the F1 and the F2 plants

(c) traits can be dominant or recessive, and the recessive traits were obscured by the dominant ones in the F1

(d) some of the traits might be lost in the F1

77. Which of the following statements on the distribution of biological diversity is false?

(a) Tropical rain forests have more plant species per unit area compared to temperate forests

(b) Tropical rain forests have more plant species per unit area compared to tropical dry forests

(c) Tropical rain forests have more plant species per unit area compared to bird species

(d) Tropical rain forests have more bird species per unit area compared to beetle species

78. Doubling time for a bacterial population is 12 minutes. Given a population with a start density of 35 cells per ml in its exponential growth phase, which is provided with unlimited resources, the time taken by the population to reach 560 cells per ml would be

(a) 48 minutes

(b) 24 minutes

(c) 60 minutes

(d) 72 minutes

79. In a wildlife reserve, we have two species of mammals. Species A reproduces thrice a year and produces 6–10 offspring per litter. Species B reproduces once in 2–3 years and produces 1–2 offsprings during each cycle of reproduction. Which of the following statements is true given the reproductive biology of these two species?

(a) Species A will have a shorter life span than species B

(b) Species A will have a larger body size than species B

(c) Species A will be more territorial than species B

(d) Species A will provide more maternal care to its offspring compared to species B

80. Which one of the following statements regarding photosynthesis is correct?

(a) Light is absorbed by chlorophyll during Calvin cycle

(b) The site of light reaction is the stroma of the chloroplast

(c) H_2O and ADP are generated during the light cycle to power Calvin cycle

(d) Plastoquinone and plastocyanin carry electrons between photosystems II and I

81. During photosynthesis, the final product of the Calvin cycle is

(a) ribulose biphosphate

(b) phosphoglycerate

(c) glyceraldehyde-3-phosphate

(d) pyruvate

82. During noncyclic photophosphorylation, plants and cyanobacteria produce

(a) ATP

(b) NADPH

(c) NADPH and ATP

(d) NADH and ATP

83. In CAM plants, which one of the following works as a CO_2 acceptor?

(a) RuBP

(b) PEP

(c) OAA

(d) PGA

84. Plants, but not animals, can convert fatty acids to sugars by a series of reactions, known as

(a) glycolate cycle

(b) glycolic acid cycle

(c) glyoxylate cycle

(d) HMP pathway

85. Which of the following types of reaction involves biotin?

(a) Hydroxylation

(b) Carboxylation

(c) Decarboxylation

(d) Dehydration

86. Which of the following plant hormones has reported to mediate the stress responses?

(a) Abscisic acid

(b) Gibberellin

(c) Cytokinin

(d) Ethylene

87. Which one of the following is an artificial promoter derived from naturally occurring auxin-responsive elements?

(a) rd29A

(b) 35S CaMV

(c) DR5

(d) LEA

88. Import of vitamin B12 into gram-negative bacterial cells is facilitated by a special class of proteins in the outer membrane, known as

(a) integrin

(b) adhesin

(c) tubulin

(d) porin

89. Ebola virus contains which of the following as its genetic material?

(a) Single-stranded RNA

(b) Double-stranded RNA

(c) Single-stranded DNA

(d) Not yet characterized

90. A root cortex cell has a solute potential of – 0·5 MPa. The water potential of the soil is – 0·3 MPa. At what turgor pressure would the root cortex cell no longer take up water?

(a) 0 MPa

(b) – 0·15 MPa

(c) + 0·15 MPa

(d) + 0·2 MPa

91. Virus-free plants have been propagated commercially through

(a) cell culture

(b) pollen culture

(c) apical meristem culture

(d) embryo culture

92. Consider a container of $V = 5{\cdot}0$ L that is divided into 2 compartments of equal size. In the left compartment there is N_2 at 1·0 atm and 25° C and in the right compartment there is H_2 at the same temperature and pressure. What will happen when partition is removed?

(a) Entropy will increase and free energy will decrease

(b) Entropy will decrease and free energy will decrease

(c) Entropy will increase and free energy will increase

(d) Entropy will decrease and free energy will increase

93. A boy stands straight in front of a mirror at a distance away from it. He sees his erect image whose height is 1/5th of his real height. He is using

(a) plane mirror

(b) concave mirror

(c) convex mirror

(d) planoconvex mirror

94. A radioactive substance has a half-life of 60 minutes. After 3 hours, the fraction of radioactive atom left would be

(a) 12·5%

(b) 8·5%

(c) 87·5%

(d) 25·1%

95. Cells secrete signalling substances that are used for intercelluar communication. In inflammatory responses, localized vasodilatation is induced by histamine, which is released by the mast cells in the areas of tissue damage. This secretion is an example of

(a) autocrine secretion

(b) paracrine secretion

(c) endocrine secretion

(d) exocrine secretion

96. The hormone 'progesterone' which is involved in the growth of uterine lining, mammary gland and maternal behaviour is secreted by the

(a) preluteal follicle

(b) follicular cells

(c) parafollicular cells

(d) corpus luteum

97. A rattle snake can detect a mouse through radiant heat of its body. The receptor in the snake that detects radiant heat

(a) is an olfactory receptor located in the nostril

(b) is a thermoreceptor located on the tongue

(c) is a thermoreceptor located in the facial pits

(d) both by an olfactory receptor as well as a thermoreceptor located in the nostril

98. Many aquatic and terrestrial animals migrate over long distance through unfamiliar territory. Which of the following cues help them in navigation to find their way?

(a) Polarized light of the sun and direction of wind/water current

(b) Earth's magnetic field and rotation of the earth

(c) The position of stars, polarized light of the sun and earth's magnetic field

(d) Through visual landmarks only

99. In a single-substrate enzyme-catalyzed reaction only 0·05% of the 0·1*M* substrate survived at equilibrium. If two products were formed in the reaction, what would be the apparent equilibrium constant of the reaction?

(a) 200 *M*

(b) 2000 *M*

(c) 20000 *M*

(d) 200000 *M*

100. An increase in sterol content on the plasma membrane at low temperatures will cause

(a) increased membrane fluidity

(b) stabilization of membrane protein

(c) increase in synthesis of intracellular lipid signalling molecules

(d) increased permeability to water

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