Test Paper Code : BL

Time : 3 Hours   **Maximum Marks : 100**

INSTRUCTIONS

A. General :

1. This Booklet is your Question Paper. It contains **20** pages and has **100 questions.**
2. The Question Booklet **Code** is printed on the right-hand top corner of this page.
3. The Question Booklet contains blank spaces for your rough work. No additional sheets will be provided for rough work.
4. **Clip board, log tables, slide rule, cellular phone and electronic gadgets in any form are NOT allowed. Non Programmable Calculator is allowed.**
5. Write your **Name** and **Registration Number** in the space provided at the bottom.
6. All answers are to be marked only on the machine gradable Objective Response Sheet **(ORS)** provided along with this booklet, as per the instructions therein.
7. The Question Booklet along with the Objective Response Sheet **(ORS)** must be handed over to the Invigilator before leaving the examination hall.

B. Filling-in the ORS :

8. Write your Registration Number in the boxes provided on the **ORS** and darken the appropriate bubble under each digit of your Registration Number using a **black ink ball point pen.**
9. Ensure that the **code** on the **Question Booklet** and the **code** on the **ORS** are the same. If the codes do not match, report to the Invigilator immediately.
10. On the **ORS**, write your Name, Registration Number, Name of the Test Centre and put your signature in the appropriate box with ball-point pen. Do not write these anywhere else.

C. Marking of Answers on the ORS :

11. Each question has **4 choices** for its answer : (A), (B), (C) and (D). Only **ONE** of them is the correct answer.
12. On the right-hand-side of **ORS**, for each question number, darken with a **black ink ball point pen** ONLY one bubble corresponding to what you consider to be the most appropriate answer, from among the four choices.
13. There will be **negative marking** for wrong answers.

MARKING SCHEME :

(a) For each correct answer, you will be awarded **1 (One)** mark.
(b) For each wrong answer, you will be awarded **–1/3 (Negative 1/3)** mark.
(c) Multiple answers to a question will be treated as a wrong answer.
(d) For each un-attempted question, you will be awarded **0 (Zero)** mark.

Name	
Registration Number	

Q.1 Elasmobranchs are
(A) jelly fish
(B) bony fish
(C) cartilaginous fish
(D) cartilaginous gills

Q.2 Biomimetics is the science of designing functional objects by drawing inspiration from nature. The design of Velcro was inspired by
(A) interlocking sutures of bivalves
(B) hairy fruit
(C) hairy feet of lizards
(D) interlocking spicules of sponges

Q.3 The mode and the median of the following set of numbers are respectively:
1,1,1,1,1,1,3, 5, 5, 7, 7, 7, 7
(A) 1, 3
(B) 7, 3
(C) 3, 7
(D) 5, 7

Q.4 Flower colour in a population of wild plant species is in Hardy-Weinberg equilibrium. The yellow flower allele is dominant over the white flower allele. If the frequency of white flowers in this population is 0.09, then the frequency of the yellow flower allele is
(A) 0.91
(B) 0.7
(C) 81
(D) 0.49

Q.5 In some insects, XX-XO is the sex-determining mechanism. XX is a female and XO is a male. Red body colour is caused by a recessive mutation, while the wild type body colour is green. The gene for body colour is on the X chromosome. If a homozygous red female is crossed with a wild type male, the phenotypes of their offspring will be
(A) all females red; all males green
(B) all females green; all males red
(C) all females red; all males red
(D) all females green; all males green

Q.6 In order to test whether tail lengths differ significantly between male and female fish, one must use the following statistical test
(A) Mantel test
(B) Chi-square test
(C) t-test
(D) binomial test

Q.7 In a family with 3 children, what is the probability that 2 are boys and 1 is a girl?
(A) 1/8
(B) 3/8
(C) 1/3
(D) 2/3

Q.8 Which of the following has the longest cell cycle?
(A) Human liver cells
(B) Human fibroblasts
(C) Yeast cells
(D) *Escherichia coli*

Q.9 A line is described by the equation $3y = 5x$. The slope of this line is
(A) 5
(B) 3
(C) 1.67
(D) 0.6

Q.10 Myelination results in
(A) an increase in conduction of synaptic potentials
(B) a decrease in conduction of action potentials
(C) an increase in conduction of action potentials
(D) a decrease in conduction of synaptic potentials

Q.11 The phenomenon in which one gene affects the trait determined by a non-allelic gene is called
(A) dominance
(B) linkage
(C) epistasis
(D) pleiotropy

Q.12 The 'eyes' of a potato tuber are
(A) shoot meristems
(B) root meristems
(C) floral buds
(D) leaf primordia

Q.13 _____ were present during the Mesozoic era.
(A) Pangolins
(B) Sabre-toothed tigers
(C) Woolly mammoths
(D) Dinosaurs

Q.14 During evolution, which is the most likely sequence of events: I) differential reproduction; II) new selection pressure; III) environmental change; IV) phenotypic change
(A) I, II, III, IV
(B) III, II, I, IV
(C) II, I, III, IV
(D) III, IV, II, I

Q.15 If a mosquito population of size N shows exponential growth, then which of the following plots will be a straight line?
(A) N over log(time)
(B) N over time
(C) Log(N) over log(time)
(D) Log(N) over time

Q.16   Insects have never become as large as elephants. This is most likely because of a constraint in
        (A)   the feeding rate
        (B)   the mutation rate
        (C)   strength of the exoskeleton
        (D)   oxygen diffusion

Q.17   The metaphase to anaphase ratio in human cervical cancer cells is 4:1. The cell cycle duration
        is 20 h and only 0.5% of the cells are in anaphase. The duration of the metaphase is
        (A)   60 min   (B)   24 min   (C)   36 min   (D)   48 min

Q.18   Which of the following processes is the least likely to have an impact on the evolution of body
        size of frogs in a large population?
        (A)   Immigration
        (B)   Emigration
        (C)   Random genetic drift
        (D)   Environmental change

Q.19   Which of the following plant species would be least vulnerable to extinction over long periods
        of evolutionary time?
        (A)   Outcrossing plant with specialist pollinator
        (B)   Self-pollinating plant with generalist pollinator
        (C)   Outcrossing plant with generalist pollinator
        (D)   Self-pollinating plant with specialist pollinator

Q.20.   Which classification is correct?
        (A)   Mollusca-Gastropoda-Squid
        (B)   Arthropoda-Myriapoda-Scorpion
        (C)   Mollusca-Cephalopoda-Octopus
        (D)   Arthropoda-Diplopoda-Lobster

Q.21   You have optimized the production of phenol hydroxylase for a period of 36 hours in a
        fermenter, with addition of phenol at 12 hours and 24 hours. This is an example of
        (A)   fed batch fermentation
        (B)   fed continuous fermentation
        (C)   batch fermentation
        (D)   continuous fermentation

Q.22 A biologist collected two plant species, one native to the Himalayan region and the other to the Rajasthan desert. If she/he analyzes the cell membranes of these two species, which of the following would she/he note?
(A) Both species have equal proportions of saturated and unsaturated fatty acids in the cell membrane
(B) The Himalayan species would have more unsaturated fatty acids than the desert species
(C) The desert species would have more unsaturated fatty acids than the Himalayan species
(D) There are no unsaturated fatty acids in either species

Q.23 An enzyme is active only when four wild type protomers make a tetramer. A mutant form of the enzyme can form tetramers, but shows no enzyme activity. If the enzyme is purified from an organism which is heterozygous for the gene coding for the mutant protomer, what fraction of the protein would be active?
(A) 100 %   (B) 50 %   (C) 25 %   (D) 20 %

Q.24 In the complete absence of recombination and crossing over in *Drosophila* (n=4), *Arabidopsis* (n=5) and humans (n=23), the amount of variation in successive generations would be
(A) the maximum in humans
(B) the maximum in *Drosophila*
(C) the maximum in *Arabidopsis*
(D) similar in all three species

Q.25 Humans have 23 pairs of chromosomes. What is the probability that two randomly chosen traits, A and B, would be on chromosome 1?
(A) 23^2 (B) 2^{23} (C) $(1/2)^{23}$ (D) $(1/23)^2$

Q.26 In a square field of 100 metres length, if the distance between two adjacent plants must be maintained at not less than 1 metre, then the maximum number of seedlings that can be planted is
(A) 9,900   (B) 10,000
(C) 10,100   (D) 10,201

Q.27 An atom contains 6 protons, 6 electrons and 6 neutrons. What is its atomic weight?
(A) 6   (B) 12   (C) 24   (D) 18

Q.28 Arrange the following processes in increasing order of their energy content, from the smallest to largest :

i. ATP hydrolysis in cells

ii. average thermal motions

iii. complete oxidation of glucose

iv. non-covalent bond in water

(A) ii, iv, i, iii   (B) iii, ii, i, iv   (C) i, ii, iii, iv   (D) iv, ii, i, iii

Q.29 Which of the following property of an enzyme is primarily responsible for its saturation behavior (i.e., a maximum rate insensitive to increasing substrate concentrations)?

(A) The enzyme does not change the overall equilibrium constant for the reaction

(B) The enzyme lowers the activation energy of the chemical reaction

(C) The enzyme has a fixed number of active sites to which the substrate binds

(D) The product of the enzyme reaction inhibits the enzyme

Q.30 Consider an uncatalyzed reaction A ↔ B. The rate constants for the forward and reverse reactions are $k_f = 10^{-4}$/sec and $k_r = 10^{-7}$/sec. What is the overall reaction rate at equilibrium?

(A) 0   (B) 1000   (C) 1   (D) −1

Q.31 An enzyme follows Michaelis-Menten kinetics. By what factor should the substrate concentration increase to change the rate of the reaction from 20 % to 80 %?

(A) 4

(B) 8

(C) 16

(D) Factor cannot be calculated without knowing the K_m

Q.32 An eukaryotic organism

i. is haploid for most of its life

ii. can show the phenomenon of locomotion

iii. can occur both as multicellular and unicellular forms

iv. has no flagella

Select the organism.

(A) *Plasmodium vivax*

(B) *Dictyostelium discoideum*

(C) *Physarum polycephalum*

(D) *Chlamydomonas vivalis*

Q.33 If a giant spherical cell of 80 μm radius undergoes 4 rounds of symmetrical division without any net increase in volume, the total surface area would approximately

(A) decrease 2.5 times

(B) increase 2.5 times

(C) increase 16 times

(D) remain unchanged

Q.34 In the shoot meristem of an actively growing plant, cell division is

(A) equal all over the meristem

(B) more at the centre and less in the periphery

(C) less at the centre and more at the periphery

(D) absent

Q.35 Papaya, a dioecious species, has the XY genotype for male and XX for female plants. Following double fertilization, what would be the genotypes of the endosperm and the embryo?

(A) All seeds would have XXX endosperm and XX embryo

(B) All seeds would have XXX endosperm and XY embryo

(C) All seeds would have XXX endosperm and 50% would have XX embryo and 50% would have XY embryos

(D) 50% of the seeds would have XXX endosperm and XX embryo. The other 50% would have XXY endosperm and XY embryo

Q.36 If the total red blood cell (RBC) count of a person is 3×10^{13}, and the average longevity of a red blood cell is 120 days, then how many new RBCs are produced per day in the bone marrow?

(A) 2.5×10^{11}

(B) 3×10^{13}

(C) 3.6×10^{15}

(D) $(3 \times 10^{13}) - 120$

Q.37 If arginine (R), glycine (G), isoleucine (I), phenylalanine (F) and tryptophan (W) are coded by 6, 4, 3, 2, and 1 codons respectively, then how many unique DNA sequences can code for the following peptide: I-R-R-G-W-F-G-I?

(A) 24

(B) 10,368

(C) 16

(D) 432

Q.38 While comparing sequences of two homologous proteins
(A) sequence identity is always equal to sequence similarity
(B) sequence identity is always more than sequence similarity
(C) sequence identity is always equal to or less than sequence similarity
(D) sequence identity is never equal to sequence similarity

Q.39 β–oxidation of fatty acids in eukaryotic cells leading to the formation of acyl CoA takes place in the _____ followed by the _____ .
(A) cytoplasm, mitochondrial cisternae
(B) cytoplasm, mitochondrial matrix
(C) mitochondrial matrix, mitochondrial cristae
(D) cytoplasm, mitochondrial membrane

Q.40 Your friend has measured the absorbance (y) of a double stranded DNA sample at 260 nm as a function of temperature (x), between 25 and 100 °C. If you now plot $\frac{dy}{dx}$ as a function of x, the plot would resemble
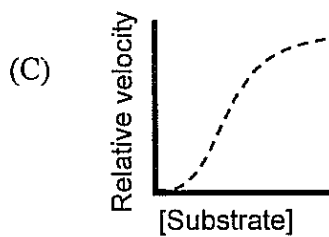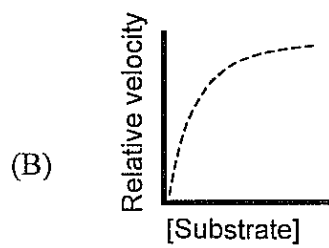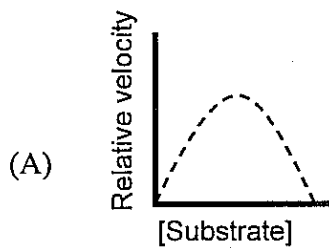
(A) $\frac{dy}{dx}$ Temperature

(B) $\frac{dy}{dx}$ Temperature

(C) $\frac{dy}{dx}$ Temperature

(D) $\frac{dy}{dx}$ Temperature
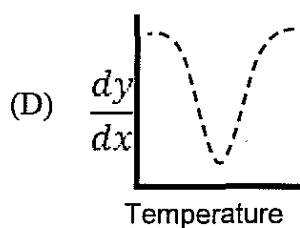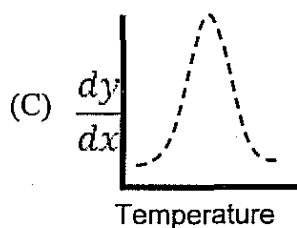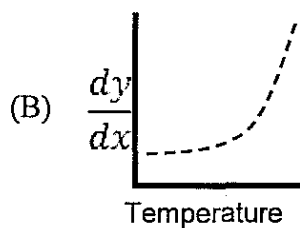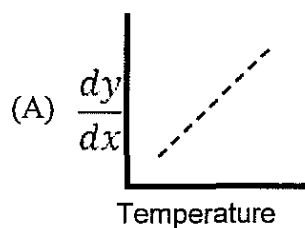
Q.41 The feature distinguishing DNA polymerase I from RNA polymerase in *E. coli* is the
(A) direction of chain elongation
(B) need for a primer
(C) need for a template
(D) bidirectional activity

Q.42 Two pure-bred parents P1 and P2 are crossed to generate the hybrid F_1, which is then back-crossed to P1 for several generations. If the fraction of the P1 genome is measured after each back-cross and plotted as a function of the number of back-crosses, it would resemble

(A)

% P1 genome

Back-cross

(B)

% P1 genome

Back-cross

(C)

% P1 genome

Back-cross

(D)

% P1 genome

Back-cross
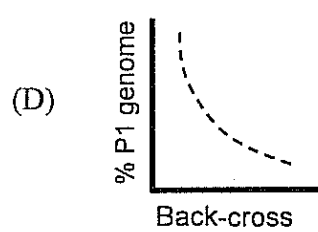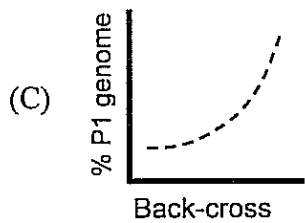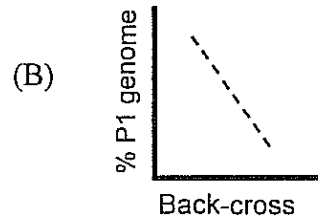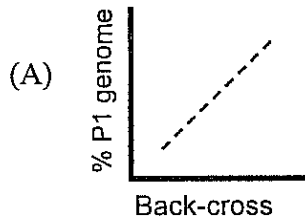
Q.43 Allosteric enzymes are distinguished by their response to substrate concentration, in addition to their susceptibility to regulation by other molecules. Which of the following curves represents an allosteric enzyme?

(A)

Relative velocity

[Substrate]

(B)

Relative velocity

[Substrate]

(C)

Relative velocity

[Substrate]

(D)

Relative velocity

[Substrate]
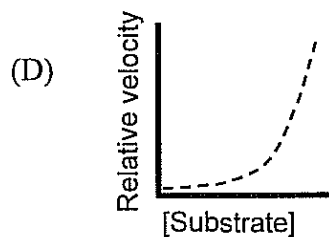
Q.44 Consider the following equations

$\Delta H = \Delta G + T\Delta S$

$\Delta G = -RT\ln K$

The intercept of the plot $\ln K$ versus $\frac{1}{T}$ will be

(A) $\dfrac{-\Delta H}{R}$ 　　 (B) $\dfrac{\Delta H}{R}$ 　　 (C) $\dfrac{\Delta S}{R}$ 　　 (D) $\dfrac{-\Delta S}{R}$

Q.45 SNPs are substitutions of one base at a precise location within the genome. What are cSNPs?
(A) Complementary SNPs
(B) SNPs that occur in coding regions
(C) SNPs that occur in circular DNA
(D) Group of common SNPs

Q.46 For a single-substrate enzyme-catalyzed reaction, the double reciprocal plot at three different enzyme concentrations would look like
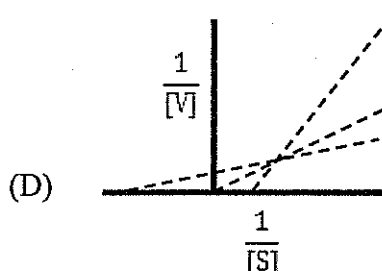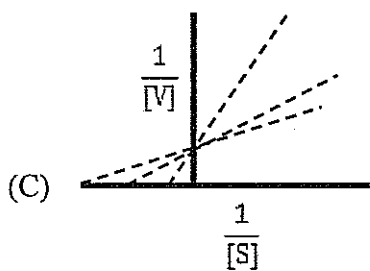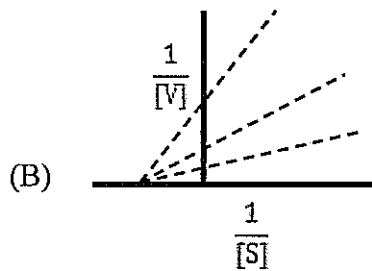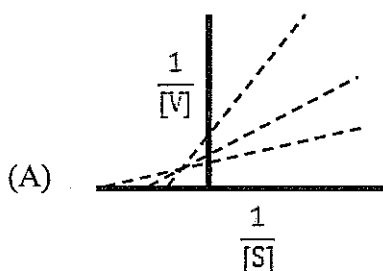
Q.47 During DNA replication, the lagging strand is produced in relatively short stretches of Okazaki fragments in the 5' to 3' direction, using RNA primers. The RNA primers are removed by
(A) 5' to 3' exonuclease activity of DNA polymerase I
(B) proof reading activity of DNA polymerase I
(C) RNase H
(D) 5' to 3' exonuclease activity of DNA polymerase III

Q.48 Base pairing between the Shine-Dalgarno sequence and the complementary sequence within the 16S rRNA of the 30S subunit in the ribosome, ensures translation of the correct reading frame by

(A) positioning of the ribosome at the 5' end of the mRNA

(B) establishing the correct starting point (i.e., AUG) for movement of the ribosome along the mRNA

(C) positioning the mRNA with the incoming elongator tRNA to establish codon-anticodon complementarity

(D) prevent interaction of the 60S subunit with the complex during initiation

Q.49 The size of the DNA in a mutant microorganism is 15 μm in length, while the non-mutant organism has a DNA length of 18.4 μm. How many base pairs are missing in the DNA of the mutant strain?

(A) 100   (B) 1000   (C) 10,000   (D) 100,000

Q.50 Histones are by far the most abundant proteins associated with eukaryotic DNA. The assembly of nucleosomes involves the ordered association of the 'core histones'. Which of the following comprise the core histones?

(A) H2A, H2B, H3, H4   (B) H1, H2, H3, H4

(C) H1, H2A, H2B   (D) H1, H2A, H3

Q.51 Which of the following mutational changes would you predict to be the most deleterious to gene function?

(A) Insertion of a single nucleotide near the end of the coding sequence

(B) Removal of a single nucleotide near the beginning of the coding sequence

(C) Deletion of 3 consecutive nucleotides in the middle of the coding sequence

(D) Deletion of 4 consecutive nucleotides in the middle of the coding sequence

Q.52 M13 virions produce turbid plaques because

(A) virions are released without killing the infected cells

(B) virions lyse the host cells

(C) M13-infected host cells grow faster than uninfected cells

(D) virions do not replicate inside the host cell

Q.53 Which of the following viral genomes do not contain a positive-stranded RNA?

(A) Poliovirus

(B) Rhinovirus

(C) Severe Acute Respiratory Syndrome (SARS) virus

(D) Influenza virus (H1N1)

Q.54 While host cell RNAs are synthesized in the nucleus, poliovirus RNAs are synthesized in the cytoplasm. This is because viral RNAs are replicated by the action of
(A) DNA-dependent RNA polymerase
(B) RNA-dependent DNA polymerase
(C) RNA-dependent RNA polymerase
(D) host-encoded RNA polymerase

Q.55 Antigenic shift is thought to bring about major pandemics and epidemics of influenza. Antigenic shift is a phenomenon where
(A) the RNA genomes from two genetically distinct strains infecting the same host cell are reassorted
(B) the neuraminidase in the influenza virus is altered
(C) the haemagglutinin proteins on the surface of the influenza virus are altered
(D) mutations in the polymerase gene occur that induce changes in the influenza virus

Q.56 Mimivirus is the largest known virus in terms of its physical size and genome size. It normally infects
(A) Bacillus subtilis
(B) Amoeba
(C) Paramecium
(D) Green algae

Q.57 Select the correctly matched options between items of column A and column B

Column A | Column B
1. antibody | a. non-specific defense
2. innate immunity | b. the entity that interacts with peptides and MHC
3. T cell receptor | c. a substance secreted by T lymphocytes
4. cytokine | d. B cell antigen receptor

(A) 1-a, 2-c, 3-b, 4-d
(B) 1-d, 2-a, 3-b, 4-c
(C) 1-c, 2-a, 3-d, 4-b
(D) 1-d, 2-b, 3-a, 4-c

Q.58 Molecules produced by macrophages that play an important role in the induction of fever are
(A) opsonins
(B) interferon γ
(C) interleukin I
(D) TNFα

Q.59 In newborn and very young animals, the organ that undergoes involution and is almost completely replaced by fat tissues in the adult is the
(A) thymus
(B) spleen
(C) appendix
(D) pancreas

Q.60 Which of the following antibodies has the highest avidity?
(A) IgM
(B) IgG
(C) IgA
(D) IgE

Q.61 Myasthenia gravis is a classical autoimmune disease where a major role in tissue injury is played by

(A) T-cells   (B) antibodies

(C) macrophages   (D) interleukins

Q.62 $\beta2$ microglobulin is involved in the final assembly of

(A) T cell receptors   (B) MHC-II

(C) MHC-I   (D) B cell receptors

Q.63 All immunoglobulin molecules in the immature B cell belong to the _____ class.

(A) IgD   (B) IgA   (C) IgM   (D) IgG

Q.64 The use of HAT medium in the generation of monoclonal antibodies is an example of

(A) positive selection

(B) neutral selection

(C) negative selection

(D) sequential negative and positive selection

Q.65 The molar absorption coefficient of benzene is $100\ M^{-1}\ cm^{-1}$ at 260 nm. What concentration would allow 1% of the light to be transmitted through a 1 cm cell?

(A) 0.02 M   (B) 0.002 M   (C) 0.2 M   (D) 0.01 M

Q.66 Infrared spectroscopy (IR) deals with light in the infrared range of 10^3-10^5 nm. Measurements using IR are based on

(A) ground state to excited state electronic transitions

(B) vibrational level transitions within the ground electronic state

(C) rotational spin level transitions in the ground electronic state

(D) both vibrational and rotational spin levels

Q.67 Calculate the standard free energy change ($\Delta G°$) for the isomerization reaction of dihydroacetone phosphate (DHAP) to glyceraldehyde 3-phosphate (GAP) given that the K_{eq} at 25 °C at pH 7.0 is 0.0475. ($Log_{10}\ 0.0475 = -1.3233$ and $R = 1.987 \times 10^{-3}$)

(A) 0.9 kcal/mol   (B) 1.8 kcal/mol

(C) 3.6 kcal/mol   (D) 18 kcal/mol

Q.68 Nerve impulse transmission through an axon occurs in the form of action potential, which is initiated by
(A) simultaneous influx of K^+ and efflux of Na^+
(B) simultaneous efflux of Na^+ and K^+
(C) K^+ influx
(D) Na^+ influx

Q.69 In animal cells, the nuclear envelope breaks down during
(A) the onset of mitosis
(B) telophase
(C) S phase
(D) anaphase

Q.70 Cells replicate DNA during the
(A) G_1 phase
(B) S phase
(C) G_2 phase
(D) M phase

Q.71 The contractile ring in animal cells is made of
(A) microtubules
(B) intermediate filaments
(C) actin filaments
(D) FtsZ filaments

Q.72 Which of the following organelles is thought to have originated from bacteria?
(A) Endoplasmic reticulum
(B) Golgi apparatus
(C) Mitochondria
(D) Lysosomes

Q.73 If a double stranded DNA molecule contains 15% thymidine then the percentage of guanosine would be
(A) 35
(B) 15
(C) 40
(D) 85

Q.74 Which of the following statements is correct for the 'plus' end of a microtubule?
(A) It grows faster than the minus end
(B) It grows slower than the minus end
(C) It is positively charged
(D) It binds to the centrosome

Q.75 G proteins are important for cell signaling. Which statement is true for the active form of its α-subunit?
(A) It is complexed with GTP
(B) It is complexed with GDP
(C) It is phosphorylated
(D) It is complexed with ATP

Q.76 Which of the following is in the correct order, based on cell membrane permeability?
(A) DNA > glucose > ethanol > N_2
(B) N_2 > glucose > ethanol > DNA
(C) N_2 > ethanol > glucose > DNA
(D) Ethanol > glucose > N_2 > DNA

Q.77   Erythrocytes, when placed in a 2M NaCl solution, will
(A)   swell   (B)   shrink
(C)   maintain the same size   (D)   start dividing

Q.78   The transformation of nitrates to gaseous nitrogen (denitrification) is accomplished by some microorganisms in soil. Which one of the following genera of bacteria is usually NOT involved in the loss of nitrogen from the soil?
(A)   *Agrobacterium*   (B)   *Pseudomonas*
(C)   *Bacillus*   (D)   *Rhizobium*

Q.79   Symbiotic associations between fungi and green algae are called
(A)   mycorrhizae   (B)   lichens
(C)   haustoria   (D)   pycnidia

Q.80   Regulation of the lactose operon in *E.coli* is an example of
(A)   positive control of transcription   (B)   negative control of transcription
(C)   dual control of transcription   (D)   a two component regulatory system

Q.81   The generation time of *E.coli* is 20 min. After an initial phase of exponential growth for 2 hours, the number of cells in the culture was found to be 64×10^6. The number of cells at the beginning of the experiment was
(A) 2×10^4 (B) 1×10^5 (C) 1×10^6 (D) 2×10^6

Q.82   Select the correct matches between the items in column A and column B

        Column A   Column B
i.   Thiamine   a.   coenyzme A
ii.   Vitamin A   b.   beriberi
iii.   Pantothenic Acid   c.   hormone
iv.   Catecholamine   d.   night blindness

(A)   i-a; ii-b; iii-c; iv-d   (B)   i-b; ii-d; iii-a; iv-c
(C)   i-d; ii-c; iii-b; iv-a   (D)   i-b; ii-a; iii-d; iv-c

Q.83   The pKa value of acetic acid is 4.8. What will be the pH of a solution containing 0.4 M sodium acetate and 0.2 M acetic acid?
(A)   4.8   (B)   5.1   (C)   4.5   (D)   5.5

Q.84   Ligand 'L' binds to human serum albumin at a single site with a dissociation constant of 9 μM. If 10 μM of human serum albumin is mixed with 10 μM of the ligand 'L', the concentration of the protein-ligand complex will be
(A)   5 μM   (B)   4 μM   (C)   8 μM   (D)   3 μM

Q.85 A peptide of 23 amino acid residues folds into a double stranded antiparallel β-structure with a 3-residue hairpin turn. What could be the maximum length of this folded peptide?
(A) 35 Å (B) 40 Å (C) 30 Å (D) 45 Å

Q.86 Bone is made by cells called
(A) fibroblasts (B) osteoblasts
(C) chondrocytes (D) epithelial cells

Q.87 For a right handed α-helix the rise per residue is
(A) 0.66 Å (B) 1.5 Å (C) 3.6 Å (D) 1.8 Å

Q.88 Which of the following statement(s) is/are NOT true?
(i) The crystal structure of oxy-haemoglobin is significantly different from its deoxy form
(ii) Haemoglobin is a homotetramer
(iii) The globin fold is present in haemoglobin and myoglobin
(iv) Haemoglobin is a heterotetramer

(A) iv (B) ii (C) ii and iii (D) i and iii

Q.89 The fraction of radioactivity remaining in a sample after 10 half-lives is approximately
(A) 1/5 (B) 1/10 (C) 1/100 (D) 1/1000

Q.90 _____ is present in low quantities in the plasma membrane of mammalian cells and has an important role to play in cell signaling.
(A) Phosphatidylcholine (B) Phosphatidylethanolamine
(C) Phosphatidylinositol (D) Phosphatidylserine

Q.91 In the 1860s Louis Pasteur noticed that when he added oxygen to a culture of yeast growing anaerobically on glucose, the rate of glucose consumption declined dramatically. This can be explained on the basis of
(A) more ATP generation per glucose molecule in the presence of oxygen.
(B) less ATP generation per glucose molecule in the presence of oxygen.
(C) utilization of other metabolites as the carbon source in the presence of oxygen.
(D) the yeast cell membrane becomes more impermeable and rigid, thereby reducing glucose intake.

Q.92 In cells, the enzyme that unwinds DNA during replication is
(A) topoisomerase I (B) helicase
(C) DNA gyrase (D) DNA polymerase

Q.93 The transition of vertebrates from an aquatic to terrestrial life style was helped mostly by
(A) the presence of jointed legs (B) the evolution of the amniote egg
(C) thick heat-resistant scales (D) fully terrestrial respiration

Q.94 The structure which has shown a disproportionate increase in size during the evolution of humans from hominid ancestors is the
(A) corpus callosum (B) corpora allata
(C) cerebral cortex (D) cerebellum

Q.95 Melatonin does NOT
(A) influence circadian rhythms (B) protect against sunlight
(C) act as an antioxidant (D) regulate breeding

Q.96 Which of the following is true about plants with the crassulacean acid metabolism (CAM) pathway?
(A) They are mostly found in areas of high rainfall
(B) Their stomata open during the night
(C) They fix carbon during the day
(D) The Calvin cycle occurs in their bundle sheath cells

Q.97 In 1973 Konrad Lorenz was a recipient of the Nobel Prize for research in animal behavior. He was well known for his work on
(A) the dance language of the honey bees (B) imprinting
(C) conditioning (D) habituation

Q.98 The loop of Henle is likely to be large in animals which are found in
(A) deserts (B) rain forests
(C) temperate meadows (D) woodlands

Q.99 Homeotic genes are primarily responsible for
(A) body size (B) location and identity of body parts
(C) olfaction (D) vision

Q.100 The lens, retina and cornea of the vertebrate eye originate from
(A) ectoderm and mesoderm (B) ectoderm, mesoderm and endoderm
(C) ectoderm (D) ectoderm and endoderm

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