MEGA Solution Series

Volume II

Biotechnology Biochemistry Microbiology

covers following examinations

- GAT-B Biotechnology
- JNU CEEB Biotechnology
- JNU Life Science
- GRE Biology
- SAT/AP Biology

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Contents

Part-A (JNU CEEB and GAT-B Biotechnology)

Questions

Answer Keys

Explanations

Part-B (JNU Life Science)

Questions

Answer Keys

Explanations

Part-C (GRE Biochemistry, Cell and Molecular Biology)

Questions

Answer Keys

Explanations

Part-D (SAT/AP Biology)

Questions

Answer Keys

Explanations

Part-E (Mock Papers Biotechnology/ Life Science)

Questions

Answer Keys

Explanations

CHAPTER

01 JNU CEEB Biotechnology 2011

PART-A

1. Which of the following does not increase as a consequence of sewage effluent discharge into water bodies?
(*a*) Microbial load
(*b*) Phosphate level
(*c*) Dissolved oxygen
(*d*) Cyanobacterial density

2. Which of the following sequences correctly describes the cell cycle?
(*a*) G, Phase : G2 Phase : Mitosis : Cytokinesis
(*b*) S Phase : G, Phase : Mitosis : Cytokinesis : G, Phase
(*c*) G1 Phase : S Phase : G2 Phase : Cytokinesis : Mitosis
(*d*) Cytokinesis : Mitosis.; G, Phase : S Phase : G2 Phase

3. Which of the following states of chromatin is normally associated with active genes?
(*a*) Euchromatin
(*b*) Facultative heterochromatin
(*c*) Constitutive heterochromatin
(*d*) Centromeric heterochromatin

4. Coenzyme A
(*a*) is derived from thiamine
(*b*) has a functional group containing cobalt
(*c*) forms thioester bonds with substrates
(*d*) has a sulfhydryl functional group that reacts only with amino groups

5. The polymerase chain reaction
(*a*) is a method for sequencing DNA
(*b*) is used to transcribe specific genes
(*c*) amplifies specific DNA sequences
(*d*) uses a DNA polymerase that denatures at 55°C

6. All photosynthetic bacteria
(*a*) use chlorophyll a as their photosynthetic pigment
(*b*) use bacteriorhodopsin as their photosynthetic pigment
(*c*) release oxygen gas
(*d*) are photoautotrophs

7. Which of the following is a likely cause of goiter?
(*a*) The diet contains too much iodine
(*b*) There is an inadequate supply of functional thyroxine
(*c*) Circulating levels of thyrotropin are too low
(*d*) There is an excess level of functional thyroxine

8. Which of the following antibiotics acts by inhibiting bacterial cell wall synthesis?
(*a*) Gentamycin (*b*) Erythromycin
(*c*) Ampicillin (*d*) Amphotericin

9. Amnion and allantois are found in
(*a*) fish, frog, fowl and fox
(*b*) frog and fish
(*c*) fowl and fox
(*d*) fox, frog and fowl

10. After the discharge of oocyte, the Graafian follicle forms a yellow body known as
(*a*) corpus allatum (*b*) corpus callosum
(*c*) corpus cardiacum (*d*) corpus luteum

11. The specific characteristic of a C4 plant is
(*a*) bulliform cell (*b*) Kranz anatomy
(*c*) parallel venation (*d*) isobilateral leaf

12. The isoelectric point of an amino acid is defined as
(*a*) the pH where the molecule carries no net electric charge
(*b*) the pH where the carboxyl group is uncharged
(*c*) the pH where the amino group is uncharged
(*d*) the pH of maximum electrolytic mobility

13. The peptide hormone involved in controlling blood pressure is
(*a*) testosterone (*b*) oxytocin
(*c*) vasopressin (*d*) interferon B

14. Microtubules are made up of one of the following proteins
(*a*) Globulin (*b*) Albumin
(*c*) Gelsolin (*d*) Tubulin

15. The exoskeleton of shrimp is made up of
(*a*) cellulose
(*b*) chitin
(*c*) lipopolysaccharide
(*d*) glycopolysaccharide

16. With an increase in the root-shoot ratio
(*a*) the rate of transpiration increases
(*b*) the rate of absorption of water increases
(*c*) the rate of evaporation increases
(*d*) the rate of transcription and absorption increases

17. 90% of photosynthesis in the world is carried out by
(*a*) angiosperms (*b*) monocots
(*c*) gymnosperina (*d*) algae

18. Which is a typical example of insect pollination?
(*a*) Pisum sativum (*b*) Cicer arietinum
(*c*) Brassica campestris (*d*) Salvia splenderis

19. Spawn is
(*a*) a type of mushroom
(*b*) a type of SCP
(*c*) a type of yeast powder
(*d*) inoculum in mushroom culture

20. Read the following statements regarding sympathetic nerve fiber:
(i) They stimulate an organ.
(ii) They secrete noradrenalin.
(iii) They inhibit an organ.
(iv) They secrete acetyl choline.

Which of the above are correct?
(*a*) 1 and 2 (*b*) 1 and 3
(*c*) 2 and 3 (*d*) 1 and 4

21. Which of the following are isoelectronic with F^-?
(*a*) S^{2-} and Na^+ or Mg^{2+}
(*b*) O^{2-} and Ca^{2+} or Na^+
(*c*) O^{2-} and Mg^{2+} or Li^+
(*d*) O^{2-} and Mg^{2+} or Na^+

22. As the s character of hybridised orbital decreases, the bond angle
(*a*) remains the same
(*b*) increases
(*c*) decreases
(*d*) will increase up to 180°

23. One litre of an unknown gas weighs 1.25 g at NTP. The possible formula of the gas is
(*a*) CO_2 (*b*) N_2 (*c*) NO_2 (*d*) O_2

24. The better process of getting freshwater from sea water is known as
(*a*) osmosis
(*b*) filtration
(*c*) pressure desaltation
(*d*) reverse osmosis

25. In a gaseous reaction $N_2 + O_2 \leftrightarrow 2NO$ + heat, if the pressure is increased, the equilibrium constant would
(*a*) decrease
(*b*) increase
(*c*) remain unchanged
(*d*) sometimes increase, sometimes decrease

26. The pH of an aqueous solution of sodium carbonate is
(*a*) less than 7 (*b*) more than 7
(*c*) 7 (*d*) 0

27. The pH of an aqueous solution of sodium carbonate is
(*a*) Less than 7 (*b*) More than 7
(*c*) 7 (*d*) 0

28. Frankel defect generally appears in
(*a*) AgBr (*b*) ZnS
(*c*) Agl (*d*) all of the above

29. Which of the following metals is protected by a layer of its own oxide?
(*a*) Al (*b*) Ag (*c*) Au (*d*) Fe

30. The shape of SO_4^{2-} is
(*a*) square planar
(*b*) tetrahedral
(*c*) trigonal bipyramidal
(*d*) hexagonal

31. The process of separation of racemic modification into d and l enantiomers is called
(*a*) resolution (*b*) racemization
(*c*) enantiomerization (*d*) deracemization

32. The triple bond of Acetylene is made up of
(*a*) three σ bonds
(*b*) one σ Bond and two π bonds
(*c*) three π bonds
(*d*) two σ bonds and one π bond

33. If chloroform is left open in air in the presence of sunlight
(*a*) explosion takes place
(*b*) phosgene is formed
(*c*) polymerization takes place
(*d*) no reaction takes place

34. Which of the following enzymes hydrolyses triglyceride to fatty acids and glycerol?
(*a*) Zymase (*b*) Dialase
(*c*) Lipase (*d*) Invertase

35. The correct structure of benzene was proposed by
(*a*) Faraday (*b*) Davy
(*c*) Kekule (*d*) Wohler

36. Which of the following is not a dimensionless quantity?
(*a*) Strain (*b*) sound angle
(*c*) dielectric constant (*d*) planck's constant

37. When a semiconductor is continuously heated, the value of its resistance
(*a*) increases
(*b*) decreases
(*c*) decreases and then increases
(*d*) remains unchanged

38. In an atom for the electron to revolve around nucleus, the necessary centripetal force is obtained from the following force exerted by the nucleus on the electron
(*a*) nuclear force (*b*) gravitational force
(*c*) magnetic force (*d*) electrostatic force

39. When a neutral metal sphere is charged by contact with positively charged glass rod, the sphere
(*a*) loses electrons (*b*) Gains electrons
(*c*) loses protons (*d*) gains protons

40. If a bomb at rest explodes into two equal parts then, the constituent parts will
(*a*) have same speed and travel in random directions
(*b*) have same speed but travel in opposite directions
(*c*) have different speeds and travel in random directions
(*d*) have different speeds but travel in the same direction

41. Dispersion of white light into its constituent colours while passing through a prism is caused because
(*a*) different wavelengths travel at different velocities
(*b*) of total internal reflection
(*c*) refractive index of the material is different for different wave lengths
(*d*) all of the above

42. An oscillator is
(*a*) an amplifier with positive feedback
(*b*) an amplifier with negative feedback
(*c*) an amplifier without feedback
(*d*) a converter of AC to DC energy

43. The logic gate NAND is a universal gate because
(*a*) it complements all other gates
(*b*) it can inhibit the function of any other gate
(*c*) it allows any signal to pass through it
(*d*) all basic Boolean functions can be derived

44. The order of radius of nucleus of an atom is
(*a*) 10^{-10} m (*b*) 10^{-12} m
(*c*) 10^{-15} m (*d*) 10^{-17} m

45. For the explanation of the atomic structure, Bohr used
(*a*) quantization of linear momentum
(*b*) quantization of angular momentum
(*c*) quantization of frequency
(*d*) quantization of energy

46. Two projectiles of fired at different angles with the same magnitude of velocity such that they have the same range. Angles at which they are projected are
(*a*) 10° and 50° (*b*) 25° and 65°
(*c*) 35° and 75° (*d*) 30° add 90°

47. The density of gold is 19.3 g cm^{-3} at 20°C. If the coefficient of linear expansion of gold is $1.42 \times 10^{-5}°C^{-1}$. The density of gold at 90°C would be
(*a*) 19.35 g cm^{-3} (*b*) 19.24 g cm^{-3}
(*c*) 19.26 g cm^{-3} (*d*) 19.28 g cm^{-3}

48. If one mole of an ideal gets doubles its volume as it undergoes an isothermal expansion, its pressure is
(*a*) Quadrupled (*b*) Doubled
(*c*) Unchanged (*d*) Halved

49. According to the theory of relativity, the length of a rodin motion
(*a*) is same as its rest length
(*b*) is less than its rest length
(*c*) is more than its rest length
(*d*) may be more or less depending on the speed of the rod

50. In β-decay
(*a*) atomic number decreases by one
(*b*) mass number decreases by one
(*c*) atomic number increases by one
(*d*) None of the above

51. Given $\lim_{x\to 0}\left(\frac{x^n - 2^n}{x-2}\right) = 80$, so then the value of n is
(*a*) 2 (*b*) 4
(*c*) 5 (*d*) 6

CHAPTER

01

JNU Life Science 2010

1 River 'Ganga', also known as National River of India, originates from the Himalayas in Uttarakhand and after traveling several States merges in Bay of Bengal. Approximately how much distance it covers in the journey?

(*a*) 1500 km (*b*) 2500 km

(*c*) 3500 km (*d*) 4500 km

2. What is the significance of Republic Day of India which is celebrated every year on 26th January?

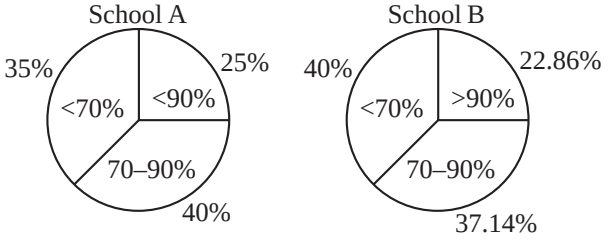
(*a*) The Constitution of India was submitted in the Parliament of India in January 26, 1950

(*b*) The Constitution of India came into effect on January 26, 1949

(*c*) The Indian National Congress celebrated this day as Independence Day of India

(*d*) The Colonial Government of India Act, 1935 was replaced by the Constitution of India in January 26, 1950

3. The figure given below represents the results of two schools A and B in CBSE examination and may be read, e.g., in school A, 25% of the students scored more than 90% marks. School B has 30 students more than school A. 140 students from school B scored less than 70% marks. From these facts, choose the correct statement given below.



(*a*) Schools A and B have equal number of students scoring more than 90% marks

(*b*) School A has more number of students than school B scoring more than 90% marks

(*c*) Number of students scoring marks less than 70% are equal in both the schools

(*d*) School A has more number of students than school B scoring less than 70% marks

4. When Hari was 9 years old, Shyam's father was 48 years old. Shyam's father was 5 years elder than Ravi. Ravi's daughter Rekha was born when Ravi was 32 years old. As per the above, which of the following statements is true?

(*a*) Rekha is elder than Shyam

(*b*) Hari is elder than Rekha

(*c*) Rekha is elder than Hari

(*d*) Shyam is the eldest among all

5. What comes next in the series 3, 7 , 13, 27, 53, ...?

(*a*) 105 (*b*) 106 (*c*) 107 (*d*) 97

6. The median of the sample 1, 7, 8, 10, 12, 15, 17, 23, 24, 29 is

(*a*) 12 (*b*) 15

(*c*) 13.5 (*d*) 14.6

7. Which of the following specifies a nucleotide sequence in DNA to which RNA polymer binds to initiate transcription?

(*a*) Operator (*b*) Promoter

(*c*) Enhancer (*d*) Operon

8. The frequency of crossing over between any two linked genes is

(*a*) more likely if they are recessive

(*b*) determined by their relative dominance

(*c*) same as if they were not linked

(*d*) greater the further apart they are

9. Which one of the following is a macronutrient for plants?

(*a*) Zinc (*b*) Manganese

(*c*) Magnesium (*d*) Cobalt

10. Papaya and date palm produce either male or female flowers in a plant. These kinds of plants are known as

(*a*) monoecious (*b*) dioecious

(*c*) homothallic (*d*) bisexual

11. The most common method of asexual reproduction in Protozoa is

(*a*) conjugation

(*b*) gametangial contact

(*c*) conidiospore production

(*d*) binary fission

12. In the earth atmosphere, nitrogen and oxygen together comprise approximately_____ of the content.

(*a*) 90% (*b*) 95%

(*c*) 99% (*d*) <90%

13. What property of a moving object is constant during the application of a constant force?

(*a*) Velocity (*b*) Acceleration

(*c*) Momentum (*d*) Speed

14. The ionic product of water is

(*a*) $1 \times 10^{-14}\,M^2$ (*b*) $1 \times 10^{14}\,M^2$

(*c*) $1 \times 10^{-14}\,M$ (*d*) $1 \times 10^{14}\,M$

15. Which one Mf the following is the weakest acid?

(*a*) HI (*b*) HBr

(*c*) HCI (*d*) HF

16. The angle (in degrees) between the vectors $\vec{x} = \hat{i} - j + 2\hat{k}$ and $\vec{y} = 2\hat{i} - j - 1.5\hat{k}$ is

(*a*) 30 (*b*) 45

(*c*) 60 (*d*) 90

17. Which of the equations is correct?

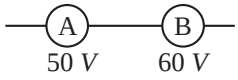
(*a*) $\log(M + N + O) = \log M + \log N + \log O$

(*b*) $\log m(N) = \log n(M)$

(*c*) $\log(M \times N) = \log M \times \log N$

(*d*) $\log(M \times N) = \log M + \log N$

18. Two points A and B are connected with a wire of uniform resistance as shown in the figure below:



According to the figure, which of the following statements is correct?

(*a*) Electron released from point A will move towards point B

(*b*) Electron released from point B will move towards point A

(*c*) Proton released from point A will move towards point B

(*d*) Both (b) and (c) are correct

19. If a polypeptide has 400 amino acid residues, what is the approximate mass?

(*a*) 44000 KD (*b*) 44 KD

(*c*) 4.4 KD (*d*) 0.44 KD

20. Name the way to visualize dihedral angles o against w of amino acid residues in protein structure

(*a*) Ramachandran plot

(*b*) Hydropathy plot

(*c*) Zimmermann-Simha plot

(*d*) Lineweaver-Burke plot

21. Snakes wave their forked tongue in the air

(*a*) to keep the tongue dry

(*b*) to take suspended acrobes

(*c*) to take olfactory samples from the air

(*d*) to grasp food

22. The retina in the human eye is a part of

(*a*) peripheral nervous system

(*b*) central nervous system

(*c*) optic nerve

(*d*) ganglionic layer

23. Which of the following is true for human tears?

(*a*) Tears have no proteins

(*b*) Tears contain immunoglobulin E

(*c*) Tears contain immunoglobulin A

(*d*) Tears have no anti-pathogenic properties

24. Secondary antibody response is mediated by

(*a*) memory B cells

(*b*) plasma B cells

(*c*) helper T cells

(*d*) natural killer cells

25. Mitotic spindle fiber is mainly composed of

(*a*) actin (*b*) myosin

(*c*) tubulin (*d*) myoglobin

26. Microtubule is involved in

(*a*) muscle contraction

(*b*) intracellular trafficking

(*c*) cell division

(*d*) mitochondrial structure

27. In eukaryotic cell, DNA replication takes place during

(*a*) S phase (*b*) G phase

(*c*) G2 phase (*d*) M phase

28. ATP is a

(*a*) deoxyribonucleotide

(*b*) ribonucleotide

(*c*) nucleic acid

(*d*) ribonucleoside

29. Photosynthesis is a process of converting

(*a*) heat energy into chemical energy

(*b*) light energy into heat energy

(*c*) electromagnetic energy into chemical energy

(*d*) light energy into mechanical energy

30. A tiny droplet of water (volume one microliter) may contain
(*a*) less than a trillion water molecules
(*b*) between 104-109 trillion water molecules
(*c*) between 103-106 trillion water molecules
(*d*) between 106-109 trillion water molecules

31. Molality of a solution implies the presence of number of moles
(*a*) per kilogram of solvent
(*b*) per kilogram of solution
(*c*) per liter of solution
(*d*) per liter of solvent

32. You are in a trip to desert areas. Which kinds of plants will you mostly see?
I. Fleshy green stem with spines
II. Vivipary germination and pneumatophore roots
III. Small stem, leathery leaves and extended root system
IV. Big trees with bright and tender leaves
(*a*) I and I (*b*) I and III
(*c*) II and III (*d*) II and IV

33. Echolocation is
(*a*) the study of a specific population of organisms in a given ecological niche
(*b*) the process by which migratory birds locate the landing area
(*c*) the system of understanding ores in mining area
(*d*) the process by which bats know their path while flying at night

34. Choose the one that shows proper hierarchy
(*a*) Tissue → Organism → Organ
(*b*) Population → Community → Ecosystem
(*c*) Organism → Biosphere → Ecosystem
(*d*) Population → Biosphere→ Ecosystem

35. Limnetic zone of an aquatic habitat indicates
(*a*) shallow and muddy water in coastal area
(*b*) an open water system away from coastal area
(*c*) a zone where light does not reach
(*d*) a zone up to which light can penetrate

36. Consider an infinite number of cylinders. The first cylinder has a radius of 1 meter and higher of meter. The second one has a radius of 0.5 meter and height of 0.5 meter. Every subsequent cylinder has half the radius and half the height of the preceding cylinder. The sum of the volumes (in cubic meters) of these infinite number of cylinders is
Given data: $\pi = 3.14$
(*a*) 1.562 (*b*) 2.675
(*c*) 3.588 (*d*) 5.802

37. The basic structure of the 5'-cap of the eukaryotic mRNA is
(*a*) 5'm 70pppA (*b*) 5'm7Gppa
(*c*) 5'pppm7GpA (*d*) 5'ppm7GPA

38. Holliday junction is used to explain which of the following pathways?
(*a*) Homologous recombination
(*b*) Non-homologous recombination
(*c*) Single-strand break repair
(*d*) Mismatch repair

39. 5S rRNA is transcribed by
(*a*) RNA polymerase I (*b*) RNA polymerase II
(*c*) RNA polymerase III (*d*) RNA polymerase V

40. Which of the following diseases occurs due to chromosomal non-disjunction during meiosis?
(*a*) Huntington disease
(*b*) Down syndrome
(*c*) Prader-Willi syndrome
(*d*) Xeroderma pigmentosum

41. Generally deleterious effects caused by inbreeding are due to
(*a*) an increase in genetic variability that disrupts developmental sequences
(*b*) an increase in homozygosity of recessive deleterious alleles
(*c*) an increase in allozygosity of all alleles
(*d*) an increase in the mutation rate

42. In the polytene' chromosome of Drosophila melanogaster, the bands and the puffs respectively represent
(*a*) gene regions and gene expression
(*b*) heterochromatin and euchromatin
(*c*) AT-rich DNA and GC-rich DNA
(*d*) B-DNA and Z-DNA

43. Dosage compensation of the X chromosome in fruit flies occurs by
(*a*) the formation of Barr bodies in females
(*b*) the formation of Barr bodies in males
(*c*) hyperactivity of the X chromosome in males
(*d*) reduced activity of the autosomes in males

Answer Keys

Chapter-01 : JNU Life Science 2010

1. (*b*)	**2.** (*d*)	**3.** (*a*)	**4.** (*c*)	**5.** (*c*)	**6.** (*c*)	**7.** (*b*)	**8.** (*d*)	**9.** (*c*)	**10.** (*b*)
11. (*d*)	**12.** (*c*)	**13.** (*b*)	**14.** (*a*)	**15.** (*d*)	**16.** (*d*)	**17.** (*d*)	**18.** (*b*)	**19.** (*b*)	**20.** (*a*)
21. (*c*)	**22.** (*b*)	**23.** (*d*)	**24.** (*a*)	**25.** (*c*)	**26.** (*c*)	**27.** (*a*)	**28.** (*b*)	**29.** (*c*)	**30.** (*c*)
31. (*a*)	**32.** (*b*)	**33.** (*d*)	**34.** (*b*)	**35.** (*a*)	**36.** (*c*)	**37.** (*b*)	**38.** (*a*)	**39.** (*c*)	**40.** (*b*)
41. (*b*)	**42.** (*a*)	**43.** (*c*)	**44.** (*b*)	**45.** (*a*)	**46.** (*c*)	**47.** (*a*)	**48.** (*d*)	**49.** (*d*)	**50.** (*d*)
51. (*b*)	**52.** (*a*)	**53.** (*d*)	**54.** (*b*)	**55.** (*d*)	**56.** (*a*)	**57.** (*c*)	**58.** (*d*)	**59.** (*b*)	**60.** (*c*)
61. (*b*)	**62.** (*c*)	**63.** (*a*)	**64.** (*b*)	**65.** (*b*)	**66.** (*c*)	**67.** (*c*)	**68.** (*a*)	**69.** (*b*)	**70.** (*d*)
71. (*c*)	**72.** (*b*)	**73.** (*a*)	**74.** (*b*)	**75.** (*c*)	**76.** (*b*)	**77.** (*d*)	**78.** (*b*)	**79.** (*b*)	**80.** (*a*)
81. (*b*)	**82.** (*c*)	**83.** (*d*)	**84.** (*c*)	**85.** (*b*)	**86.** (*b*)	**87.** (*d*)	**88.** (*b*)	**89.** (*b*)	**90.** (*a*)
91. (*c*)	**92.** (*b*)	**93.** (*b*)	**94.** (*a*)	**95.** (*a*)	**96.** (*d*)	**97.** (*c*)	**98.** (*d*)	**99.** (*c*)	**100.** (*a*)
101. (*b*)	**102.** (*b*)	**103.** (*a*)	**104.** (*d*)	**105.** (*d*)	**106.** (*c*)	**107.** (*b*)	**108.** (*c*)	**109.** (*d*)	**110.** (*a*)
111. (*c*)	**112.** (*d*)	**113.** (*a*)	**114.** (*d*)	**115.** (*d*)	**116.** (*b*)	**117.** (*b*)	**118.** (*b*)	**119.** (*b*)	**120.** (*b*)
121. (*b*)	**122.** (*d*)	**123.** (*a*)	**124.** (*c*)	**125.** (*c*)					

Chapter-02 : JNU Life Science 2011

1. (*b*)	**2.** (*b*)	**3.** (*c*)	**4.** (*d*)	**5.** (*b*)	**6.** (*d*)	**7.** (*c*)	**8.** (*b*)	**9.** (*c*)	**10.** (*a*)
11. (*b*)	**12.** (*c*)	**13.** (*c*)	**14.** (*b*)	**15.** (*a*)	**16.** (*c*)	**17.** (*c*)	**18.** (*d*)	**19.** (*b*)	**20.** (*b*)
21. (*c*)	**22.** (*c*)	**23.** (*a*)	**24.** (*d*)	**25.** (*c*)	**26.** (*d*)	**27.** (*a*)	**28.** (*a*)	**29.** (*d*)	**30.** (*a*)
31. (*a*)	**32.** (*c*)	**33.** (*d*)	**34.** (*c*)	**35.** (*c*)	**36.** (*b*)	**37.** (*d*)	**38.** (*d*)	**39.** (*a*)	**40.** (*c*)
41. (*a*)	**42.** (*a*)	**43.** (*c*)	**44.** (*a*)	**45.** (*c*)	**46.** (*c*)	**47.** (*b*)	**48.** (*b*)	**49.** (*d*)	**50.** (*a*)
51. (*b*)	**52.** (*c*)	**53.** (*d*)	**54.** (*b*)	**55.** (*a*)	**56.** (*c*)	**57.** (*b*)	**58.** (*a*)	**59.** (*c*)	**60.** (*b*)
61. (*b*)	**62.** (*d*)	**63.** (*b*)	**64.** (*a*)	**65.** (*c*)	**66.** (*a*)	**67.** (*d*)	**68.** (*d*)	**69.** (*a*)	**70.** (*c*)
71. (*c*)	**72.** (*d*)	**73.** (*b*)	**74.** (*a*)	**75.** (*d*)	**76.** (*c*)	**77.** (*d*)	**78.** (*a*)	**79.** (*d*)	**80.** (*b*)
81. (*c*)	**82.** (*a*)	**83.** (*a*)	**84.** (*b*)	**85.** (*a*)	**86.** (*a*)	**87.** (*b*)	**88.** (*c*)	**89.** (*d*)	**90.** (*c*)
91. (*b*)	**92.** (*b*)	**93.** (*d*)	**94.** (*d*)	**95.** (*a*)	**96.** (*b*)	**97.** (*d*)	**98.** (*a*)	**99.** (*a*)	**100.** (*b*)
101. (*b*)	**102.** (*c*)	**103.** (*d*)	**104.** (*d*)	**105.** (*b*)	**106.** (*c*)	**107.** (*a*)	**108.** (*c*)	**109.** (*c*)	**110.** (*c*)
111. (*a*)	**112.** (*b*)	**113.** (*d*)	**114.** (*d*)	**115.** (*b*)	**116.** (*b*)	**117.** (*b*)	**118.** (*d*)	**119.** (*c*)	**120.** (*c*)
121. (*b*)	**122.** (*b*)	**123.** (*d*)	**124.** (*b*)	**125.** (*d*)					

Chapter-03 : JNU Life Science 2012

1. (*c*)	**2.** (*d*)	**3.** (*d*)	**4.** (*d*)	**5.** (*d*)	**6.** (*d*)	**7.** (*a*)	**8.** (*c*)	**9.** (*d*)	**10.** (*a*)
11. (*b*)	**12.** (*b*)	**13.** (*c*)	**14.** (*b*)	**15.** (*d*)	**16.** (*c*)	**17.** (*a*)	**18.** (*b*)	**19.** (*a*)	**20.** (*d*)
21. (*d*)	**22.** (*a*)	**23.** (*c*)	**24.** (*d*)	**25.** (*a*)	**26.** (*d*)	**27.** (*c*)	**28.** (*a*)	**29.** (*b*)	**30.** (*d*)
31. (*b*)	**32.** (*a*)	**33.** (*a*)	**34.** (*a*)	**35.** (*b*)	**36.** (*a*)	**37.** (*c*)	**38.** (*c*)	**39.** (*a*)	**40.** (*a*)
41. (*c*)	**42.** (*d*)	**43.** (*c*)	**44.** (*b*)	**45.** (*c*)	**46.** (*d*)	**47.** (*a*).	**48.** (*c*)	**49.** (*b*)	**50.** (*a*)
51. (*a*)	**52.** (*d*)	**53.** (*a*)	**54.** (*a*)	**55.** (*d*)	**56.** (*b*)	**57.** (*a*)	**58.** (*b*)	**59.** (*a*)	**60.** (*d*)
61. (*d*)	**62.** (*a*)	**63.** (*b*)	**64.** (*a*)	**65.** (*a*)	**66.** (*a*)	**67.** (*b*)	**68.** (*a*)	**69.** (*a*)	**70.** (*b*)
71. (*d*)	**72.** (*c*)	**73.** (*a*)	**74.** (*d*)	**75.** (*c*)	**76.** (*a*)	**77.** (*d*)	**78.** (*c*)	**79.** (*a*)	**80.** (*d*)
81. (*c*)	**82.** (*a*)	**83.** (*d*)	**84.** (*d*)	**85.** (*a*)	**86.** (*a*)	**87.** (*b*)	**88.** (*a*)	**89.** (*a*)	**90.** (*c*)
91. (*a*)	**92.** (*b*)	**93.** (*b*)	**94.** (*d*)	**95.** (*a*)	**96.** (*a*)	**97.** (*b*)	**98.** (*a*)	**99.** (*a*)	**100.** (*a*)
101. (*a*)	**102.** (*c*)	**104.** (*a*)	**105.** (*a*)	**106.** (*b*)	**107.** (*a*)	**108.** (*a*).	**109.** (*d*)	**110.** (*b*)	**111.** (*c*)
112. (*a*)	**113.** (*a*)	**114.** (*d*)	**115.** (*b*)	**116.** (*c*)	**117.** (*a*)	**118.** (*b*)	**119.** (*b*)	**120.** (*d*)	**121.** (*a*)
122. (*a*)	**123.** (*c*)	**124.** (*d*)	**125.** (*a*)						

Chapter-04 : JNU Life Science 2013

1. (*d*)	**2.** (*b*)	**3.** (*b*)	**4.** (*a*)	**5.** (*d*)	**6.** (*b*)	**7.** (*d*)	**8.** (*c*)	**9.** (*a*)	**10.** (*c*)
11. (*d*)	**12.** (*c*)	**13.** (*d*)	**14.** (*d*)	**15.** (*b*)	**16.** (*b*)	**17.** (*b*)	**18.** (*a*)	**19.** (*a*)	**20.** (*a*)
21. (*d*)	**22.** (*d*)	**23.** (*c*)	**24.** (*c*)	**25.** (*c*)	**26.** (*c*)	**27.** (*d*)	**28.** (*b*)	**29.** (*d*)	**30.** (*b*)
31. (*c*)	**32.** (*b*)	**33.** (*d*)	**34.** (*b*)	**35.** (*b*)	**36.** (*d*)	**37.** (*a*)	**38.** (*b*)	**39.** (*b*)	**40.** (*a*)
41. (*b*)	**42.** (*b*)	**43.** (*b*)	**44.** (*b*)	**45.** (*b*)	**46.** (*a*)	**47.** (*c*)	**48.** (*b*)	**49.** (*a*)	**50.** (*b*)
51. (*d*)	**52.** (*d*)	**53.** (*a*)	**54.** (*d*)	**55.** (*a*)	**56.** (*b*)	**57.** (*d*)	**58.** (*c*)	**59.** (*d*)	**60.** (*d*)
61. (*b*)	**62.** (*c*)	**63.** (*b*)	**64.** (*b*)	**65.** (*c*)	**66.** (*a*)	**67.** (*c*)	**68.** (*b*)	**69.** (*b*)	**70.** (*b*)
71. (*b*)	**72.** (*b*)	**73.** (*b*)	**74.** (*c*)	**75.** (*d*)	**76.** (*b*)	**77.** (*c*)	**78.** (*a*)	**79.** (*b*)	**80.** (*d*)
81. (*b*)	**82.** (*d*)	**83.** (*a*)	**84.** (*a*)	**85.** (*d*)	**86.** (*c*)	**87.** (*b*)	**88.** (*c*)	**89.** (*c*)	**90.** (*a*)
91. (*c*)	**92.** (*c*)	**93.** (*b*)	**94.** (*c*)	**95.** (*d*)	**96.** (*a*)	**97.** (*c*)	**98.** (*a*)	**99.** (*d*)	**100.** (*b*)
101. (*a*)	**102.** (*c*)	**103.** (*b*)	**104.** (*a*)	**105.** (*b*)	**106.** (*d*)	**107.** (*d*)	**108.** (*d*)	**109.** (*b*)	**110.** (*a*)
111. (*c*)	**112.** (*c*)	**113.** (*c*)	**114.** (*a*)	**115.** (*d*)	**116.** (*b*)	**117.** (*b*)	**118.** (*d*)	**119.** (*c*)	**120.** (*d*)
121. (*c*)	**122.** (*c*)	**123.** (*b*)	**124.** (*c*)	**125.** (*d*)					

Explanations

Chapter-01 : JNU Life Science 2010

1. (*b*)

2. (*d*)

3. (*a*)

4. (*c*)

5. (*c*) If x is any number, then the next number is $2x + 1$ or $2x - 1$ alternately. Just observe the two numbers before x and you can easily know whether next number is $(2x + 1)$ or $(2x - 1)$

First number 3

Next $3 \times 2 + 1 = 7$

Next $7 \times 2 - 1 = 13$

Next $13 \times 2 + 1 = 27$

Next $27 \times 2 - 1 = 53$

Next $53 \times 2 + 1 = 107$

6. (*c*) First, let's arrange the numbers in ascending order:
1, 7, 8, 10, 12, 15, 17, 23, 24, 29

Now, count the number of values in the sample, which is 10. Since there is an even number of values, we will take the average of the two middle numbers, which are the 5th and 6th numbers in the ordered list:

$$\text{Median} = \frac{(12+15)}{2}$$

$$\text{Median} = \frac{27}{2}$$

Median = 13.5

So, the median of the given sample is 13.5.

7. (*b*) Transcription is the process of RNA formation from DNA. During transcription, RNA polymerase makes a copy of a gene from the DNA to mRNA. During transcription, the DNA site at which RNA polymerase binds is called a promoter. Transcription begins with binding of sigma factor proteins to the RNA polymerase holoenzyme, thus, allowing it to bind to promoter DNA. RNA polymerase creates a transcription bubble, which separates the two strands of the DNA helix. Then RNA polymerase moves towards the transcription start site for the process of transcription.

8. (*d*) A linkage map is a map based on the frequencies of recombination between markers during crossover of homologous chromosomes. The greater the frequency of recombination (segregation) between two genetic markers, the further apart they are assumed to be. Conversely, the lower the frequency of recombination between the markers, the smaller the physical distance between them.the nearer two genes are on a chromosome, the lower the chance of recombination between them, and the more likely they are to be inherited together.

9. (*c*) There are two types of nutrients that are absorbed by the plants- macronutrient and micronutrient. Macronutrients are the nutrients that are absorbed in large quantities such as potassium, sulphur, calcium, nitrogen, phosphorus, magnesium etc. The nutrients required in small amounts are called micronutrients such as manganese, boron, cobalt, molybdenum, zinc, iron, copper and iodine.

10. (*b*) Dioecious plants house the male and female flowers on different plants. So not only does the plant have separate male/female flowers, they have male plants (with only male flowers) and female plants (with only female flowers).

11. (*d*) The most common type of asexual multiplication is binary fission, in which the organelles are duplicated and the protozoan then divides into two complete organisms. Many protozoa also exchange genetic material by sexual means (typically, through conjugation), but this is generally decoupled from the process of reproduction, and does not immediately result in increased population.

12. (*c*) The air in Earth's atmosphere is made up of approximately 78 percent nitrogen and 21 percent oxygen. Air also has small amounts of lots of other gases, too, such as carbon dioxide, neon, and hydrogen.

13. (*b*)When constant force is applied to a body,its acceleration remains constant as force is the product of mass of body and acceleration, F = ma , here mass is constant ,force is constant thus acceleration is uniform.

14. (*a*)At 25 degrees Celsius (298 K), the value of Kw is approximately:
$Kw = 1 \times 10^{(-14)}\ M^2$

15. (*d*)Hydrofluoric acid (HF) is the weakest acid among HCl, HBr, and HI. HF is a weak acid because it has a strong H-F bond. The small size of fluorine allows it to overlap better with hydrogen's 1s orbital, resulting in a strong bond. This strong bond makes it difficult to break the bond between hydrogen and fluorine.

HF is a weak acid because it cannot easily give protons. The pKa value of HF is 3.8, which is higher than the pKa values of HI (–9.3), HBr (–9.0), and $HClO_4$ (–15.2). Because a weaker acid has a higher pKa value, HF is the weakest acid.

16. (*d*)Dot product of the two vectors will be = $(\hat{i} - j + 2\hat{k})(2\hat{i} - j - 1.5\hat{k})$
$= (1 \times 2) + \{(-1) \times (-1)\} + \{2 \times (-1.5)\}$
$= 2 + 1 - 3 = 0$

We know that $-\cos\theta = \vec{x} \cdot \vec{y} \ / | \vec{x} \cdot \vec{y} | = 0$
$\theta = 90^o$

17. (*d*)The correct equation is $\log(M \times N) = \log M + \log N$.
This is a logarithmic identity that states that the logarithm of a product is equal to the sum of the logarithms of the individual factors.

18. (*b*)Electrons are negatively charged particles, and they are attracted to positive charges. Point B has a higher voltage than point A, which means that it has a higher surplus of positive charges. Therefore, an electron released from point B will move towards point A.

Proton released from point A will not move towards point B. Protons are positively charged particles, and they are repelled by positive charges. Therefore, a proton released from point A will move away from point B.

19. (*b*)A standard way to estimate the Molecular Weight of a protein, given the number of amino acids that compose it, is to multiply that number to the average weight of an amino acid that is 110Da. So the MW of a 400aa-long protein would be around 44kDa.

20. (*a*)A Ramachandran plot can be used in two somewhat different ways. One is to show in theory which values, or conformations, of the ψ and φ angles are possible for an amino-acid residue in a protein . A second is to show the empirical distribution of data points observed in a single structure in usage for structure validation, or else in a database of many structures .

21. (*c*) Snakes inspect new things by flicking their tongue like Kob is demonstrating. This allows them to bring scents from the air to a specialized organ inside their mouths that can interpret this scent information.This special organ is called the vomeronasal system.

22. (*b*)Despite its peripheral location, the retina or neural portion of the eye, is actually part of the central nervous system. During development, the retina forms as an outpocketing of the diencephalon, called the optic vesicle, which undergoes invagination to form the optic cup.

23. (*d*)Tears contain a number of antimicrobial proteins that help in protecting the ocular surface from microbial pathogens. Among these lysozyme is the major protein.Time kill assay also showed that the bacterial cell death was not much affected by lysozyme.

24. (*a*)B lymphocytes are the cells of the immune system that make antibodies to invade pathogens like viruses. They form memory cells that remember the same pathogen for faster antibody production in future infections.

25. (*c*) Spindle fibres are structures formed from microtubules in the cytoplasm during cell division. Microtubules are made up of tubulin protein. Spindle fibres move chromatids or chromosomes diametrically apart and gather then in two clusters at opposite ends (poles) of the cell.

26. (*c*) Microtubule is involved in the cell division during the cell movements, chromosome movements, and intracellular transport. Microtubules are found in all eukaryotic cells which involve the process of mitosis, cell motility, and maintenance of cell shape.

27. (*a*)The interphase of a typical cell cycle comprises of G1 phase, S phase and G2 phase. The S phase stands for synthesis phase in which DNA replication occurs followed by synthesis of histones. This is the phase occurring between G1 and G2 phase.

28. (*b*)Ribonucleotides are incorporated into nucleic acids as their triphosphates, with the liberation of pyrophosphate during polymerization. An extremely important energy-carrying ribonucleotide is adenosine triphosphate (ATP).

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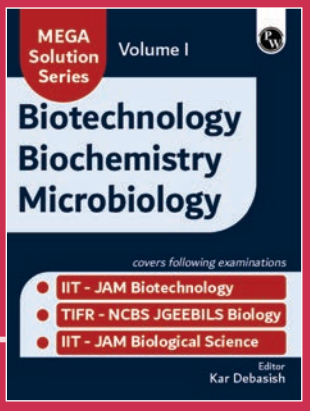

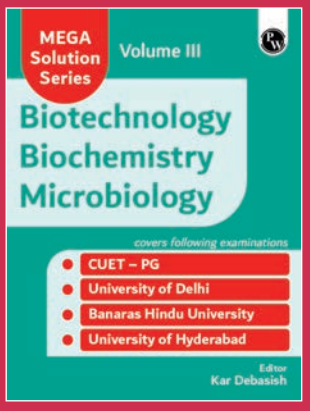

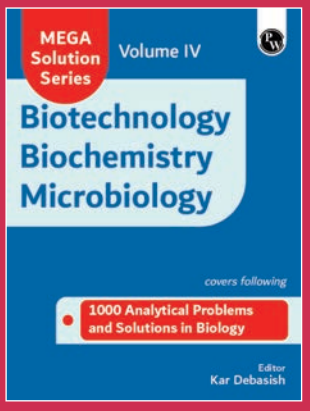

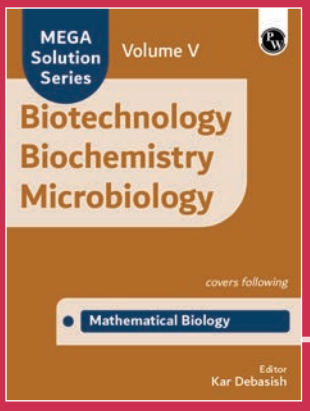

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