

J.M.I : B.Sc.Biotechnology - 2019

Q-1: A compound XY is formed by element X which is highly electropositive and Y which is highly electronegative. What type of bond is present between XY?

- A Ionic bond
B Covalent bond
C Metallic bond
D Co-ordinate bond

Q-2: Number of NaCl molecules present in the per unit cell or rock-salt is

- A. 4
B. 6
C. 2
D. 1

Q-3: The molecular formula of cyclohexane is

- A. C_6H_{12}
B. C_6H_{14}
C. C_6H_{10}
D. C_6H_{15}

Q-4: Which of the following solutions is most basic in nature?

- A. Solution A with $pH = 8$
B. Solution B $pH = 9$
C. Solution C $pH = 10$
D. Solution D $pH = 6$

Q-5: Hybridisation of N in NH_3 is

- A. sp^3
B. sp^2
C. sp
D. Both sp^3 and sp^2

Q-6: Total number of spectral lines present in visible region during transition from 2nd excited state to 5th excited state in hydrogen atom is

- A. 2
B. 6

C. 0

D. 1

Q-7: The bond energies of $H - H$, $Br - Br$ and HBr are 433, 192 and 365 kJ/mol respectively. The ΔH for the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$ is

A. +26 kJ

B. -105 kJ

C. -26 kJ

D. 105 kJ

Q-8: The molarity of solution obtained by mixing 750ml of 0.5M HCl with 250ml of 2M HCl will be

A. 0.875 M

B. 1.0 M

C. 1.75 M

D. 0.975 M

Q-9: In 'EcoRI' what does 'R' stand for?

A. Bacterial strain

B. Restriction endonuclease enzyme

C. Replication site

D. Recombinant DNA

Q-10: Which of the following will be expressed only in homozygous condition?

A. Phenyl ketonuria

B. Thalassemia

C. Yellow colour of pod

D. All the these

Q-11: Which of the following molecule will not be produced during fermentation?

A. H_2O

B. CO_2

C. Ethanol

D. Lactic acid

Q-12: An example of multiple gene is

A. Human blood group

B. Human skin colour

C. Phenyl ketonuria

D. Albinism

Q-13: How many nullisomy are possible if an organism has 24 chromosomes in somatic cell ?

- A. 24
B. 12
C. 6
D. 3

Q-14: Select the odd one out w.r.t. nitrogen fixation.

- A. Nostoc, Anabaena
B. Rhizobium, Axotobacter
C. Agrobacterium,
D. Clostridium, Rhizobium

Q-15: In skeletal muscle, each thick myofilament is surrounded by ____ thin myofilaments while each thin myofilament is surrounded by _____ thick myofilaments.

- A. Two, four
B. Six, three
C. Three, six
D. Four, two

Q-16: Free-central placentation is found in

- A. Dianthus
B. Argemone
C. Brassica
D. Citrus

Q-17: Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria?

- A. 5S rRNA
B. 18S rRNA
C. 23rRNA
D. 5.8S rRNA

Q-18: Which kind of therapy was given in 1990 to a four-year-old girl with adenosine deaminase (AdA) deficiency?

- A. Gene therapy
B. Chemotherapy
C. Immunotherapy
D. Radiation therapy.

Q-19: Which of the following is a sexually transmitted bacterial disease?

- A. Syphilis
B. Warts

C. AIDS

D. Typhoid

Q-20: Phytoplankton → *Snail* → *Tuna* → Dolphin. In the above food chain, if 1 J energy is available to the secondary consumer then, how much energy was assimilated by the producers?

A. 100 J

B. 10 J

C. 1000 J

D. 0.1 J

Q-21: Enzymes which catalyse linking of C – O, C – S, P – O etc. bonds, belong to which of the following category?

A. Isomerase

B. Ligases

C. Lyases

D. Transferases

Q-22: During urine formation, in which part of nephron, maximum reabsorption of water takes place?

A. DCT

B. PCT

C. Glomerulus

D. Loop of Henle

Q-23: Number of meiotic divisions required to produce 500 pollen grains is

A. 100

B. 125

C. 500

D. 1000

Q-24: In genetic finger printing, the probe refers to

A. A radioactively labeled single stranded RNA molecule

B. A radioactively labeled single stranded DNA molecule

C. A radioactively labeled double stranded RNA molecule

D. A radioactively labeled double stranded DNA molecule

Q-25: In crop improvement programmes, virus free clones can be obtained through

A. Hybridization

B. Embryo culture

C. Grafting

D. Shoot tip culture

Q-26: Pyruvate dehydrogenase complex, needed for the conversion of pyruvic acid to acetyl CoA is located in

- A. Intermembrane space of mitochondria
- B. Matrix of mitochondria
- C. Cytoplasm
- D. Grana of chloroplast

Q-27: During nerve impulse conduction, hyperpolarization occurs due to

- A. Influx of Ca^{++} and efflux of Na^+
- B. Influx of Na^+
- C. Efflux of K^+
- D. Efflux of Na^+

Q-28: Which of the following factors can affect the enzymatic activity ? A. Change in temperature B. Change in pH C. change in substrate concentration D. Binding of specific chemical to enzyme

- A. A, B, C, D
- B. A, B, D
- C. A, B
- D. B, C, D

Q-29: For its activity, carboxypeptidase requires

- A. Zinc
- B. Iron
- C. Niacin
- D. Copper

Q-30: How many organisms in the list given below are autotrophs? *Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Sachromyces, Trypanosoma, Porphyra, Wolfia*

- A. Four
- B. Five
- C. Six
- D. Three

Q-31: Which one of the following pairs of chemical substances, is correctly categorized?

- A. Calcitonin and thymosin – Thyroid hormones
- B. Pepsin and prolactin – Two digestive enzymes secreted in stomach
- C. Troponin and myosin – complex proteins in striated muscles
- D. Secretin and rhodopsin – polypeptide hormones

Q-32: The domestic sewage in large cities

- | | |
|--|---|
| A. Has a high BOD as it containing both aerobic and anaerobic bacteria | B. Is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs) |
| C. When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen | D. Has very high amounts of suspended solids and dissolved salts |

Q-33: Name the blood cells, whose reduction in number can cause clotting disorder, leading to excessive loss of blood from the body.

- | | |
|-----------------|-----------------|
| A. Erythrocytes | B. Leucocytes |
| C. Neutrophils | D. Thrombocytes |

Q-34: DNA-dependent RNA polymerase catalyses transcription on one strand of the DNA which is called the

- | | |
|--------------------|------------------|
| A. Template strand | B. Coding strand |
| C. Alpha strand | D. Anti strand |

Q-35: During cell growth, DNA synthesis takes place in

- | | |
|-------------------------|------------|
| A. S phase | B. G phase |
| C. G ₁ phase | D. M phase |

Q-36: Choose the correct statement.

- | | |
|---|--|
| A. All mammals are viviparous. | B. All cyclostomes do not possess jaws and paired fins |
| C. All reptiles have a three-chambered heart. | D. All pisces have gills covered by an operculum |

Q-37: The half-life of radioactive substance is 30 minutes. The time (in minutes) taken between 40% decay and 85% decay of the same radioactive substance is

- | | |
|-------|-------|
| A. 15 | B. 30 |
| C. 45 | D. 60 |

Q-38: A person can see clearly objects only when they lie between 50 cm and 400 cm from his eyes. In order to increase the maximum distance of distinct vision to infinity, the type and power of the correcting lens, the person has to use, will be

- A. Convex, +2.25 diopter
- B. Concave, -0.25 diopter
- C. Concave, -0.2 diopter
- D. Convex, +0.15 diopter

Q-39: A filament bulb (500 W, 100 V) is to be used in a 230 V main supply. When a resistance- R is connected in series, it works perfectly and the bulb consumes 500 W. The value of R in ohms is

- A. 230
- B. 26
- C. 46
- D. 13

Q-40: Potentiometer is an accurate and versatile device to make electrical measurements of E.M.F, because the method involves:

- A. Cells
- B. Potential gradients
- C. A condition of no current flow through the galvanometer
- D. A combination of cells, galvanometer and resistances

Q-41: The Magnetic Susceptibility is negative for

- A. Ferromagnetic material only
- B. Paramagnetic and ferromagnetic materials
- C. Diamagnetic material only
- D. Paramagnetic material only

Q-42: A Refrigerator works between 4°C and 30°C . It is required to remove 600 calories of heat every second in order to keep the temperature of refrigerated space constant, the power required is

- A. 236.5 W
- B. 2365 W
- C. 2.365 W
- D. 23.65 W

Q-43: When 1 kg of ice at 0°C melts, the resulting change in its entropy be, taking latent heat of ice to be $80 \text{ cal}/^{\circ}\text{C}$

- A. 273 cal/K
- B. $8 \times 10^4 \text{ cal/K}$
- C. 80 cal/K
- D. 293 cal/K

Q-44: A current of 2 A flows through a 2Ω resistor when connected across a battery. The same battery supplies a current of 0.5 A when connected across a 9Ω resistor. The internal resistance of the battery is

- A. 0.5Ω
- B. $1/3\Omega$
- C. $1/4\Omega$
- D. 1Ω

Q-45: An Engine pumps water through a hose pipe. Water passes through a pipe and leaves it with a velocity of 2m/s. The mass per unit length of water in the pipe is 100kg/m. What is the power of the engine?

- A. 400 W
- B. 200 W
- C. 100 W
- D. 800 W

Q-46: A common emitter amplifier has gain of 50, an input impedance of 100Ω and an output impedance 200Ω . The Power gain in the ampilifier is

- A. 500
- B. 1000
- C. 1250
- D. 50

Q-47: For a Satellite moving in an orbit around the earth, the ration of kinetic energy to potential energy is

- A. $1/2$
- B. $1/\sqrt{2}$
- C. 2
- D. $\sqrt{2}$

Q-48: A Car is moving towards a high cliff. The driver sounds a horn of frequency f . The reflected sound heard by the driver has the frequency $2f$. If v is the velocity of sound then the velocity of the car, in the same velocity units will be

- A. $v/\sqrt{2}$
- B. $v/3$
- C. $v/4$
- D. $v/2$

Q-49: The earth is Flattened at the poles and bulges at the equator, this is due the fact that

- A. The earth revolves around the sun in an elliptical orbit
- B. The angular velocity of spinning about its axis is more at equator
- C. The centrifugal force is more at
- D. None of these

the equator than at the poles

Q-50: Identify the wrong statement

- A. For Isothermal process, $\Delta T = 0$ B. For Isochoric process, $\Delta V = 0$
C. For isobaric process, $\Delta P = 0$ D. For cyclic process, $\Delta W = 0$

Q-51: A concave mirror has a focal length of 5 cm, when an object is placed at a distance of 15 cm from the mirror, where is the image formed?

- A. 10 cm in front of the mirror B. 7.5 cm behind the mirror
C. 2.5 cm in front of the mirror D. 7.5 cm in front of the mirror

Q-52: A boy multiplies a certain number by 987 and obtains 559981 as his answer. If in the answer all the 9's are wrong but the other digits are correct, then the correct answer is

- A. 553681 B. 555181
C. 555681 D. 556581

Q-53: $4^{61} + 4^{62} + 4^{63} + 4^{64}$ is divisible by

- A. 3 B. 10
C. 11 D. 13

Q-54: The sum of two numbers is 2000 and their LCM is 21897. The nos. are

- A. 1993, 7 B. 1991, 9
C. 1989, 11 D. 1987, 13

Q-55: A man plants 15376 apple trees in his garden and arranges them so that there are as many rows as there are trees in each row. The number of rows are

- A. 124 B. 126
C. 134 D. 144

Q-56: When a ball bounces it rises to $\frac{3}{4}$ of the height from which it fell. If the ball is dropped from 32 m, how high it will rise at the third bounce?

- A. 13 m
B. $13\frac{1}{2}$ m
C. $14\frac{1}{2}$ m
D. None of these

Q-57: A tank is $\frac{2}{5}$ full. When 16 litres of water is added to it, becomes $\frac{6}{7}$ full. The capacity of the tank is

- A. 28 litres
B. 32 litres
C. 35 litres
D. 42 litres

Q-58: What is the smallest number by which 3500 should be divided to make it a perfect cube?

- A. 9
B. 50
C. 300
D. 450

Q-59: The average age of students of a class is 15:8 years. The average age of boys in the class is 16.4 years and the average of girls is 15.4. The ratio of number of boys to the number of girls in the class is

- A. 1:2
B. 2:3
C. 3:4
D. 3:5

Q-60: A reduction of 21% in the price of wheat enables person to buy 10.5 kg more for Rs.100.What is the reduced price per kg?

- A. Rs. 2
B. Rs. 2.25
C. Rs. 2.30
D. Rs. 2.50

Q-61: 12 men working 8 hours a day complete a piece of work in 10 days. To complete the same work in 8 days working 15 hours a day, the number men required is

- A. 4
- B. 5
- C. 6
- D. 8

Q-62: Which of the following statement is incorrect?

- A. Rolling Friction is smaller than sliding Friction
- B. Limiting value of static friction is directly proportional to normal reaction
- C. Frictional force opposes the relative motion
- D. Coefficient of sliding friction has dimensions of length

Q-63: A tuning fork is used to produce resonance in a glass tube, the length of the air column in this tube can be adjusted by a variable piston. At room temperature of 27°C two successive resonances are produced at 20 cm and 73 cm of column length .If

- A. 330 ms^{-1}
- B. 339 ms^{-1}
- C. 350 ms^{-1}
- D. 300 ms^{-1}

Q-64: For a radioactive material half-life is 10 minutes. If initially there are 600 number of nuclei, the time taken in minutes for the disintegration of 450 nuclei is

- A. 20
- B. 10
- C. 17.5
- D. 15

Q-65: If the Mass of the sun, were 10 times smaller and the universal Gravitational constant 10 times larger in magnitude, which of the following is not correct?

- A. Raindrops will fall faster
- B. Walking on the ground will become more difficult
- C. Time period of the simple pendulum on the earth would decrease
- D. G on the earth will not change

Q-66: The height at which the weight of body becomes $1/16^{\text{th}}$ of its weight on the surface of earth (radius), is

- A. 5 R
- B. 15 R

C. 3 R

D. 4 R

Q-67: Which one of the following represents a palindromic sequence in DNA?

A. 5' - GAATTC -3'
3' -CTTAAG -5'

B. 5' - CCAATG - 3'
3' -CAATCC - 5'

C. 5' - CATTAG - 3'
3' - GATAAC - 5'

D. 5' - GATACC - 3'
3' -CCTAAG - 5'

Q-68: Which of the following is the correct matching of a vitamin, its nature and its deficiency disease?

A. Vitamin K -Fat Soluble - Beri-Beri

B. Vitamin A -Fat Soluble - Night Blindness

C. Vitamin A -Fat Soluble - Beri-Beri

D. Vitamin K -Water Soluble - Pellagra

Q-69: The following ratio is generally constant for a given species:

A. $A + G / C + T$

B. $T + C / A + T$

C. $G + C / A + T$

D. $A + C / T + G$

Q-70: Anthesis is a phenomenon which refers to

A. Reception of Pollen by stigma

B. Formation of Pollen

C. Development of Anther

D. Opening of flower Bud

Q-71: Which one to the following pairs is wrongly matched?

A. Ginkgo - Archegonia

B. Salvinia - Prothallus.

C. Viroids - RNA

D. Mustard - Synergids

Q-72: Which one of the following pairs is wrongly matched?

A. Ribosome

B. Peroxisome

C. ER

D. Mesosome

Q-73: For its action, nitrogenase requires

- A. High input of energy
- B. Light
- C. Mn^{2+}
- D. Super oxygen radicals

Q-74: *Cuscuta* is an example of

- A. Ectoparasitism
- B. Brood parasitism
- C. Predation
- D. Endoparasitism

Q-75: Which of the following activities center is not located in medulla of human brain?

- A. Swallowing
- B. Vomiting
- C. Sneezing
- D. Thirst

Q-76: The process that involves the use of a complementary RNA molecule to prevent mRNA molecules from taking part in translation thereby preventing the expression of a gene is

- A. ELISA
- B. Spooling
- C. Elution
- D. RNA interference

Q-77: A male with copulatory organ is

- A. *Struthiocamelus*
- B. *Coraclousbengalensis*
- C. *Columba livia*
- D. *pavocristatus*

Q-78: Which of the following is not seen in first triploblastic animals?

- A. Bilateral symmetry
- B. Ladde like nervous system
- C. Gut with mouth and anus
- D. Moderate cephalization

Q-79: Trypsinogen is converted into trypsin by an enzyme

- A. Carboxy peptidase
- B. Rennin
- C. Enterokinase
- D. Chymotrypsinogen

Q-80: A non-proteinaceous enzyme is

- A. Lysozyme
- B. Ribozyme
- C. Ligase
- D. Dextroxyribonuclease

Q-81: Phytochrome is a

- A. Flavoprotein
- B. Glycoprotein
- C. Lipoprotein
- D. Chromoprotein

Q-82: The process which major difference between C3 and C4 is

- A. Glycolysis
- B. Calvin cycle
- C. Photorespiration
- D. Respiration

Q-83: Which of the following biomolecules is common to respiration-mediated breakdown of fats, carbohydrates and proteins?

- A. Glucose-6-phosphate
- B. Fructose 1, 6-bisphosphate
- C. Pyruvic acid
- D. Acetyl CoA

Q-84: Taylor conducted the experiments to prove semiconservative mode of chromosome replication on

- A. *Vincarosea*
- B. *Viciafaba*
- C. *Drosophila melanogaster*
- D. *E. coli*

Q-85: Read the following carefully and one to the correct option

X: $FADH_2$ transport only 3 pairs of protons outside the membrane through F0 and F1 complex and produce 3 molecules of ATP.

Y: RQ of tripalmitin is 1

Z: In glycolysis 2 molecules of ATP are produced during substrate based phosphorylation

- A. X is correct and Y and Z are incorrect B. X and Y are correct and Z is incorrect
C. All statement are correct D. All statement are incorrect

Q-86: Which of the following bone formula is correct for hind limb of human?

- A. 2, 3, 3, 3, 3 B. 1, 2, 8, 5, 14
C. 1, 1, 2, 7, 5, 14 D. 7, 3, 2

Q-87: Following statement are major bioethical concerns pertaining to biotechnology, except

- A. Use of animals in biotechnology causes great suffering to them.
B. When animals are used for production of certain pharmaceutical proteins, they are treated as factory or machine.
C. Introduction of a transgene from one species into another species maintains the integrity of species.
D. Transfer of human genes into animals or voice versa is great ethic threat for human.

Q-88: Which of the following blood corpuscles have bilobed nucleus and participate in allergic reaction?

- A. Neutrophil B. Monocyte
C. Acidophil D. Basophil

Q-89: Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2 , When 0.1 mole of XY_2 weighs 10 g and 0.05 mole of X_3Y_2 weighs 9 g, the atomic weights of X and Y are

- A. 40, 30 B. 60, 40
C. 20, 30 D. 30, 20

Q-90: The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = 1.60×10^{-19} C)

- A. 6×10^{23} B. 6×10^{20}
C. 3.75×10^{20} D. 7.48×10^{23}

Q-91: During the electrolysis of molten sodium chloride, the time required to produce 0.1 mol of chlorine gas using a current of 3 amperes is

- A. 55 minutes
- B. 110 minutes
- C. 220 minutes
- D. 330 minutes

Q-92: The suspension of slaked lime in water is known as

- A. Limewater
- B. Quicklime
- C. Milk of lime
- D. Aqueous solution of slaked lime

Q-93: Bakelite is

- A. Thermosetting polymer
- B. Thermoplastic polymer
- C. Elastomer
- D. Fiber

Q-94: The van't Hoff factor (i) for a dilute aqueous solution of strong electrolyte barium hydroxide is:

- A. 0
- B. 1
- C. 2
- D. 3

Q-95: How many structural isomers are possible for C₃H₆O?

- A. 3
- B. 5
- C. 7
- D. 9

Q-96: What do we get when ethyne is passed through red hot iron tube at 873 K?

- A. Benzene
- B. Toluene
- C. Mesitylene
- D. Anthracene

Q-97: Basicity of orthoboric acid is

- A. 1
- B. 2
- C. 3
- D. 4

Q-98: pH of a saturated solution of $Ba(OH)_2$ is 12. The solubility product (K_{sp}) of $Ba(OH)_2$ is

- A. 4×10^{-6}
- B. 5×10^{-5}
- C. 5×10^{-7}
- D. 2×10^{-4}

Q-99: Oxidation number of oxygen in peroxide is

- A. -1
- B. -1/2
- C. -2
- D. 0

Q-100: A certain reaction is endothermic in nature and has a positive entropy change. This reaction is:

- A. Spontaneous at all temperatures
- B. Non-spontaneous at all temperatures
- C. Spontaneous at high temperatures, but not at low temperatures
- D. Spontaneous at low temperatures, but not at high temperature

AnswersKey

1	B	17	A	33	A	49	D	65	D	81	A	97	A
2	D	18	D	34	C	50	D	66	D	82	C	98	B
3	D	19	C	35	C	51	A	67	B	83	C	99	B
4	B	20	D	36	A	52	D	68	C	84	A	100	A
5	D	21	B	37	A	53	B	69	C	85	C		
6	A	22	A	38	D	54	AC	70	B	86	C		
7	B	23	A	39	D	55	B	71	A	87	A		
8	A	24	C	40	D	56	C	72	A	88	C		
9	D	25	C	41	A	57	C	73	D	89	B		
10	A	26	D	42	B	58		74	A	90	A		
11	B	27	C	43	C	59	C	75	B	91			
12	B	28	A	44	A	60	B	76	A	92			
13	D	29	D	45	A	61	D	77	C	93			
14	C	30	A	46	B	62	D	78	C	94			
15	B	31	C	47	A	63	C	79	C	95			
16	A	32	C	48	B	64	A	80	C	96	B		

