AIPMT 2010

BIOLOGY

Q. 1. An element playing important role in nitrogen fixation is :

1. Molybdenum
2. Copper
3. Manganese
4. Zinc

Answer: (1)

Q. 2. Select the correct statement from the ones given below:

1. Barbiturates when given to criminals make them tell the truth
2. Morphine is often given to persons who have undergone surgery as a pain killer.
3. Chewing tobacco lowers blood pressure and heart rate
4. Cocaine is given to patients after surgery as it stimulates recovery

Answer: (2)

Q. 3. Listed below are four respiratory capacities (a – d) and four jumbled respiratory volumes of a normal human adult: Respiratory Respiratory capacities volumes.

1. Residual volume 2500 mL
2. Vital capacity 3500 mL
3. Inspiratory reserve volume 1200 mL
4. Inspiratory capacity 4500 mL

Which one of the following is the correct matching of two capacities and volumes?

- (b) 2500 mL, (c) 4500 mL
- (c) 1200 mL, (d) 2500 mL
- (d) 3500 mL, (a) 1200 mL
- (a) 4500 mL, (b) 3500 mL

Answer: (3)

Q. 4. Transfer of pollen grains from the anther to the stigma of another flower of the

same plant is called:

1. Xenogamy
2. Geitonogamy
3. Karyogamy
4. Autogamy

Answer: (2)

Q. 5. ABO blood groups in humans are controlled by the gene I. It has three alleles – I^A,I^B and i. Since there are three different alleles, six different genotypes are possible. How many phenotypes can occur?

1. Three
2. One
3. Four
4. Two

Answer: (3)

Q. 6. Low Ca^{++} in the body fluid may be the cause of:

1. Tetany
2. Anaemia
3. Angina pectoris
4. Gout

Answer: (1)

Q. 7. The nerve centres which control the body temperature and the urge for eating

recontained in:

1. Hypothalamus
2. Pons
3. Cerebellum
4. Thalamus

Answer: (1)

Q. 8. During mitosis ER and nucleolus begin to disappear at:

1. Late prophase
2. Early metaphase
3. Late metaphase
4. Early prophase

Answer: (1)

Q. 9. Darwin's finches are a good example of:

1. Industrial melanism
2. Connecting link
3. Adaptive radiation
4. Convergent evolution

Answer: (3)

Q. 10. The common nitrogen-fixer in paddy fields is:

1. Rhizobium
2. Azospirillum
3. Oscillatoria
4. Frankia

Answer: (2)

Q. 11. Which two of the following changes (a – d) usually tend to occur in the plain dwellers when they move to high altitudes (3,500 m or more)?

1. Increase in red blood cell size
2. Increase in red blood cell production
3. Increased breathing rate
4. Increase in thrombocyte count Changes occurring are :

(1) (b) and (c) (2) (c) and (d) (3) (a) and (d) (4) (a) and (b)

Answer: (1)

Q. 12. What is true about RBCs in humans?

1. They carry about 20 – 25 per cent of CO_2
2. They transport 99.5 per cent of O_2
3. They transport about 80 per cent oxygen only and the rest 20 per cent of it is transported in dissolved state in blood plasma
4. They do not carry CO_2 at all

Answer: (1)

Q. 13. The main arena of various types of activities of a cell is:

1. Plasma membrane
2. Mitochondrian
3. Cytoplasm
4. Nucleus

Answer: (3)

Q. 14. If for some reason our goblet cells are non-functional, this will adversely affect:

1. production of somatostatin
2. secretion of sebum from the sebaceous glands
3. maturation of sperms
4. smooth movement of food down the intestine

Answer: (4)

Q. 15. The plasma membrane consists mainly of:

1. phospholipids embedded in a protein bilayer
2. proteins embedded in a phospholipid bilayer
3. proteins embedded in a polymer of glucose molecules
4. proteins embedded in a carbohydrate bilayer

Answer: (2)

Q. 16. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons?

1. Cotyledon
2. Endosperm
3. Aleurone layer
4. Plumule

Answer: (1)

Q. 17. The energy – releasing metabolic process in which substrate is oxidised without an external electron acceptor is called:

1. Glycolysis
2. Fermentation
3. Aerobic respiration
4. Photorespiration

Answer: (1)

Q. 18. Photoperiodism was first characterised in:

1. Tobacco
2. Potato
3. Tomato
4. Cotton

Answer: (1)

Q. 19 . The second maturation division of the mammalian ovum occurs:

1. Shortly after ovulation before the ovum makes entry into the Fallopian tube
2. Until after the ovum has been penetrated by a sperm
3. Until the nucleus of the sperm has fused with that of the ovum
4. in the Graafian follicle following the first maturation division

Answer: (2)

Q. 20. Satellite DNA is useful tool in:

1. Organ transplantation
2. Sex determination
3. Forensic science
4. Genetic engineering

Answer: (3)

Q. 21. Which one of the following does not follow the central dogma of molecular biology?

1. Pea
2. Mucor
3. Chlamydomonas
4. HIV

Answer: (4)

Q. 22. Which one of the following statements about human sperm is correct?

1. Acrosome has a conical pointed structure used for piercing and penetrating the egg, resulting in fertilisation
2. The sperm lysins in the acrosome dissolve the egg envelope facilitating fertilisation
3. Acrosome serves as a sensory structure leading the sperm towards the ovum
4. Acrosome serves no particular function.

Answer: (2)

Q 23. The genetically-modified (GM) brinjal in India has been developed for:

1. Insect-resistance
2. Enhancing shelf life
3. Enhancing mineral content
4. Drought-resistance

Answer: (1)

Q. 24. Apomictic embryos in citrus arise from:

1. Synergids
2. Maternal sporophytic tissue in ovule
3. Antipodal cells
4. Diploid egg

Answer: (2)

Q. 25. One example of animals having a single opening to the outside that serves both as mouth as well as anus is:

1. Octopus
2. Asterias
3. Ascidia
4. Fasciola

Answer: (3)

Q. 26. Membrane-bound organelles are absent in :

1. Saccharomyces
2. Streptococcus
3. Chlamydomonas
4. Plasmodium

Answer: (2)

Q. 27. Keel is characteristic of the flowers of :

1. Gulmohur
2. Cassia
3. Calotropis
4. Bean

Answer: (4)

Q. 28. The kind of epithelium which forms the inner walls of blood vessels is :

1. cuboidal epithelium
2. columnar epithelium
3. ciliated columnar epithelium
4. squamous epithelium

Answer: (4)

Q .29. Which one of the following has its own DNA?

1. Mitochondria
2. Dictyosome
3. Lysosome
4. Peroxisome

Answer: (1)

Q .30. Select the correct statement from the following:

1. Biogas is produced by the activity of aerobic bacteria on animal waste
2. Methanobacterium is an aerobic bacterium found in rumen of cattle
3. Biogas, commonly called gobar gas, is pure methane
4. Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria

Answer : (4)

because small amounts are used as inoculum in secondary treatment or biological treatment stage of sewage treatment.

Q .31. Study the four statements (a – d) given below and select the two correct ones out of them:

1. A lion eating a deer and a sparrow feeding on grain are ecologically similar in being consumers
2. Predator star fish Pisaster helps in maintaining species diversity of some invertebrates
3. Predators ultimately lead to the extinction of prey species.
4. Production of chemicals such as nicotine, strychnine by the plants are metabolic disorders

The two correct statements are:

(b) and (c)

(c) and (d)

(a) and (d)

(a) and (b)

Answer: (4)

Q .32. Breeding of crops with high levels of minerals, vitamins and proteins is called:

1. Somatic hybridisation
2. Biofortification
3. Biomagnification
4. Micropropagation

Answer: (2)

Q .33. Widal test is used for the diagnosis of:

1. Malaria
2. Pneumonia
3. Tuberculosis
4. Typhoid

Answer: (4)

Q. 34. In vitro fertilisation is a technique that involves transfer of which one of the following into the fallopian tube?

1. Embryo only, upto 8 cell stage
2. Either zygote or early embryo upto 8 cell stage
3. Embryo of 32 cell stage
4. Zygote only

Answer: (1)

because the embryo is introduced into fallopian tube.

Q. 35. Which one of the following structures between two adjacent cells is an effective transport pathway?

1. Plasmodesmata
2. Plastoquinones
3. Endoplasmic reticulum
4. Plasmalemma

Answer: (1)

Q. 36. Single-celled eukaryotes are included in:

1. Protista
2. Fungi
3. Archaea
4. Monera

Answer: (1)

Q. 37. In unilocular ovary with a single ovule the placentation is :

1. Marginal
2. Basal
3. Free Central
4. Axile

Answer: (2)

Q. 38. Sertoli cells are found in:

1. ovaries and secrete progesterone
2. adrenal cortex and secrete adrenaline
3. seminiferous tubules and provide nutrition to germ cells
4. pancreas and secrete cholecystokinin

Answer: (3)

Q. 39. Which one of the following cannot be explained on the basis of Mendel's Law of Dominance?

1. The discrete unit controlling a particular character is called a factor
2. Out of one pair of factors one is dominant, and the other recessive
3. Alleles do not show any blending and both the characters recover as such in F2 generation.
4. Factors occur in pairs

Answer: (3)

Q. 40. The chief water conducting elements of xylem in gymnosperms are:

1. Vessels
2. Fibres
3. Transfusion tissue
4. Tracheids

Answer: (4)

Q. 41. Ringworm in humans is caused by :

1. Bacteria
2. Fungi
3. Nematodes
4. Viruses

Answer: (2)

Q. 42. Which one of the following is not a micronutrient?

1. Molybdenum
2. Magnesium
3. Zinc
4. Boron.

Answer: (2)

Q. 43. Vasa efferentia are the ductules leading from:

1. Testicular lobules to rete testis
2. Rete testis to vas deferens
3. Vas deferens to epididymis
4. Epididymis to urethra

Answer: (2)

Q. 44. Select the two correct statements out of the four (a – d) given below about lac operon.

1. Glucose or galactose may bind with the repressor and inactivate it
2. In the absence of lactose the repressor binds with the operator region
3. The z-gene codes for permease
4. This was elucidated by Francois Jacob and Jacque Monod

The correct statements are:

(b) and (c)

(a) and (c)

(b) and (d)

(a) and (b)

Answer: (3)

Q. 45. The genotype of a plant showing the dominant phenotype can be determined by :

1. Test cross
2. Dihybrid cross
3. Pedigree analysis
4. Back cross

Answer: (1)

Q. 46. PGA as the first CO_2 fixation product was discovered in photosynthesis of:

1. Bryophyte
2. Gymnosperm
3. Angiosperm
4. Alga

Answer: (4)

Q. 47. Seminal plasma in human males is rich in :

1. fructose and calcium
2. glucose and calcium
3. DNA and testosterone
4. ribose and potassium

Answer: (1)

Q. 48. A common biocontrol agent for the control of plant diseases is :

1. Baculovirus
2. Bacillus thuringiensis
3. Glomus
4. Trichoderma

Answer: (4)

Q. 49. Injury to adrenal cortex is not likely to affect the secretion of which one of the following?

1. Aldosterone
2. Both Androstenedione and Dehydroepiandrosterone
3. Adrenaline
4. Cortisol

Answer: (3)

Q. 50. Which one of the following pairs is incorrectly matched?

1. Glucagon – Beta cells (source)
2. Somatostatin – Delta cells (source)
3. Corpusluteum – Relaxin (secretion)
4. Insulin – Diabetes mellitus (disease)

Answer: (1)

Q. 51. Select the correct statement from the ones given below with respect to dihybrid cross.

1. Tightly linked genes on the same chromosome show higher recombinations
2. Genes far apart on the same chromosome show very few recombinations
3. Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones
4. Tightly linked genes on the same chromosome show very few recombinations.

Answer: (4)

Q. 52. Which one of the following statements in regard to the excretion by the human kidneys is correct?

1. Descending limb of Loop of Henle is impermeable to water
2. Distal convoluted tubule is incapable of reabsorbing HCO_3
3. Nearly 99 per cent of the glomerular filtrate is reabsorbed by the renal tubules
4. Ascending limb of Loop of Henle is impermeable to electrolytes

Answer: (3)

Q. 53. The biomass available for consumption by the herbivores and the decomposers is called :

1. Net primary productivity
2. Secondary productivity
3. Standing crop
4. Gross primary productivity

Answer: (1)

Q. 54. If due to some injury the chordae tendinae of the tricuspid valve of the human heart is partially non-functional, what will be the immediate effect?

1. The flow of blood into the aorta will be slowed down
2. The ' pacemaker ' will stop working
3. The blood will tend to flow back into the left atrium
4. The flow of blood into the pulmonary artery will be reduced

Answer: (4)

Q. 55. Ovary is half-inferior in the flowers of :

1. Guava
2. Plum
3. Brinjal
4. Cucumber

Answer: (2)

Q. 56. Which one of the following is used as vector for cloning genes into higher organisms ?

1. Baculovirus
2. Salmonella typhimurium
3. Rhizopus nigricans
4. Retrovirus

Answer: (4)

Q. 57. The one aspect which is not a salient feature of genetic code, is its being:

1. Degenerate
2. Ambiguous
3. Universal
4. Specific

Answer: (2)

Q. 58. Which one of the following is an example of ex-situ conservation?

1. Wildlife sanctuary
2. Seed bank
3. Sacred groves
4. National park

Answer: (2)

Q.59. Which one of the following palindromic base sequences in DNA can be easily cut at about the middle by some particular restriction enzyme?

1. 5′ –––––––– CGTTCG –––––––– 3′
   3′ –––––––– ATGGTA –––––––– 5′
2. 5′ –––––––– GATATG –––––––– 3′
   3′ –––––––– CTACTA –––––––– 5′
3. 5′ –––––––– GAATTC –––––––– 3′
   3′ –––––––– CTTAAG –––––––– 5′
4. 5′ –––––––– CACGTA –––––––– 3′
   3′ –––––––– CTCAGT –––––––– 5′

Answer: (3)

Q. 60. Which one of the following statements is correct with respect to AIDS?

1. The HIV can be transmitted through eating food together with an infected person
2. Drug addicts are least susceptible to HIV infection
3. AIDS patients are being fully cured cent per cent with proper care and nutrition
4. The causative HIV retrovirus enters helper T-lymphocytes thus reducing their numbers.

Answer: (4)

Q. 61. Phototropic curvature is the result of uneven distribution of :

1. Gibberellin
2. Phytochrome
3. Cytokinins
4. Auxin

Answer: (4)

Q. 62. Male and female gametophytes are independent and free-living in:

1. Mustard
2. Castor
3. Pinus
4. Sphagnum

Answer: (4)

Q. 63. The technical term used for the androecium in a flower of China rose (Hibiscus rosasinensis) is:

1. Monadelphous
2. Diadelphous
3. Polyandrous
4. Polyadelphous

Answer: (1)

Q. 64. Virus envelope is known as:

1. Capsid
2. Virion
3. Nucleoprotein
4. Core

Answer: (1)

Q. 65. The permissible use of the technique amniocentesis is for:

1. detecting sex of the unborn foetus
2. artificial insemination
3. transfer of embryo into the uterus of the surrogate mother
4. detecting any genetic abnormality

Answer: (4)

Q. 66. One of the free-living, anaerobic nitrogen-fixer is:

1. Beijernickia
2. Rhodospirillum
3. Rhizobium
4. Azotobacter

Answer: (2)

Q. 67. DNA or RNA segment tagged with a radioactive molecule is called:

1. Vector
2. Probe
3. Clone
4. Plasmid

Answer: (2)

Q. 68.The signals for parturition originate from:

1. placenta only
2. placenta as well as fully developed foetus
3. oxytocin released from maternal pituitary
4. fully developed foetus only

Answer: (2)

Q. 69.The principal nitrogenous excretory compound in humans is synthesised:

1. in kidneys but eliminated mostly through liver
2. in kidneys as well as eliminated by kidneys
3. in liver and also eliminated by the same through bile
4. in the liver, but eliminated mostly through kidneys

Answer: (4)

Q. 70.Carrier ions like Na+ facilitate the absorption of substances like:

1. amino acids and glucose
2. glucose and fatty acids
3. fatty acids and glycerol
4. fructose and some amino acids

Answer: (1)

Q. 71. Toxic agents present in food which interfere with thyroxine synthesis lead to the development of:

1. toxic goitre
2. cretinism
3. simple goitre
4. thyrotoxicosis

Answer: (3)

Q. 72.Which one of the following statements about all the four of Spongilla, Leech, Dolphin and Penguin is correct?

1. Penguin is homiothermic while the remaining three are poikilothermic
2. Leech is a fresh water form while all others are marine
3. Spongilla has special collared cells called choanocytes, not found in the remaining three
4. All are bilaterally symmetrical

Answer: (3)

Q. 73. The first movements of the foetus and appearance of hair on its head are usually observed during which month of pregnancy?

1. Fourth month
2. Fifth month
3. Sixth month
4. Third month

Answer: (2)

Q. 74. Which one of the following kinds of animals are triploblastic?

1. Flat worms
2. Sponges
3. Ctenophores
4. Corals

Answer: (1)

Q. 75. Which one of the following statements about certain given animals is correct?

1. Round worms (Aschelminthes) are pseudocoelomates
2. Molluscs are acoelomates
3. Insects are pseudocoelomates
4. Flat worms (Platyhelminthes) are coelomates

Answer: (1)

Q. 76. Cu ions released from copper − releasing Intra Uterine Devices (IUDs):

1. make uterus unsuitable for implantation
2. increase phagocytosis of sperms
3. suppress sperm motility
4. prevent ovulation

Answer: (3)

Q. 77. Restriction endonucleases are enzymes which:

1. make cuts at specific positions within the DNA molecule
2. recognize a specific nucleotide sequence for binding of DNA ligase
3. restrict the action of the enzyme DNA polymerase
4. remove nucleotides from the ends of the DNA molecule

Answer: (1)

Q. 78. Which one of the following is not a lateral meristem?

1. Intrafascicular cambium
2. Interfascicular cambium
3. Phellogen
4. Intercalary meristem

Answer: (4)

Q. 79. A renewable exhaustible natural resource is:

1. Coal
2. Petroleum
3. Minerals
4. Forest

Answer: (4)

Q. 80. C4 plants are more efficient in photosynthesis than C_3 plants due to:

1. Higher leaf area
2. Presence of larger number of chloroplasts in the leaf cells
3. Presence of thin cuticle
4. Lower rate of photorespiration

Answer: (4)

Q. 81. Algae have cell wall made up of:

1. Cellulose, galactans and mannans
2. Hemicellulose, pectins and proteins
3. Pectins, cellulose and proteins
4. Cellulose, hemicellulose and pectins

Answer: (1)

Q. 82. Some hyperthermophilic organisms that grow in highly acidic (pH2) habitats belong to the two groups:

1. Eubacteria and archaea
2. Cyanobacteria and diatoms
3. Protists and mosses
4. Liverworts and yeasts

Answer: (1)

Q. 83.Genetic engineering has been successfully used for producing:

1. transgenic mice for testing safety of polio vaccine before use in humans
2. transgenic models for studying new treatments for certain cardiac diseases
3. transgenic Cow – Rosie which produces high fat milk for making ghee
4. animals like bulls for farm work as they have super power

Answer: (1)

Q. 84. Some of the characteristics of Bt cotton are:

1. Long fibre and resistance to aphids
2. Medium yield, long fibre and resistance to beetle pests
3. High yield and production of toxic protein crystals which kill dipteran pests
4. High yield and resistance to bollworms

Answer: (4)

Q. 85. Heartwood differs from sapwood in:

1. Presence of rays and fibres
2. Absence of vessels and parenchyma
3. Having dead and non-conducting elements
4. Being susceptible to pests and pathogens

Answer: (3)

Q. 86. Consider the following four statements (a – d) regarding kidney transplant and select the two correct ones out of these.

1. Even if a kidney transplant is proper the recipient may need to take immunosuppresants for a long time
2. The cell-mediated immune response is responsible for the graft rejection
3. The B-lymphocytes are responsible for rejection of the graft
4. The acceptance or rejection of a kidney transplant depends on specific interferons

The two correct statements are:

(1) (b) and (c) (2) (c) and (d)

(3) (a) and (c) (4) (a) and (b)

Answer: (4)

Q. 87. Wind pollinated flowers are:

1. small, brightly coloured, producing large number of pollen grains
2. small, producing large number of dry pollen grains
3. large producing abundant nectar and pollen
4. small, producing nectar and dry pollen

Answer: (2)

Q. 88. dB is a standard abbreviation used for the quantitative expression of:

1. the density of bacteria in a medium
2. a particular pollutant
3. the dominant Bacillus in a culture
4. a certain pesticide

Answer: (2)

Q. 89. Which one of the following is one of the characteristics of a biological community?

1. Stratification
2. Natality
3. Mortality
4. Sex-ratio

Answer: (1)

Q. 90. Which one of the following statements about morula in humans is correct?

1. It has almost equal quantity of cytoplasm as an uncleaved zygote but much more DNA
2. It has far less cytoplasm as well as less DNA than in an uncleaved zygote
3. It has more or less equal quantity of cytoplasm and DNA as in uncleaved zygote.
4. It has more cytoplasm and more DNA than an uncleaved zygote

Answer: (1)

Q. 91. Coiling of garden pea tendrils around any support is an example of:

1. Thigmotaxis
2. Thigmonasty
3. Thigmotropism
4. Thermotaxis

Answer: (3)

Q. 92. The two gases making highest relative contribution to the greenhouse gases are:

1. CO_2 and CH_4
2. CH_4 and N_2O
3. CFC_{55} and N_2O
4. CO_2 and N_2O

Answer: (1)

Q. 93. Which one of the following is not used in organic farming?

1. Glomus
2. Earthworm
3. Oscillatoria
4. Snail

Answer: (4)

Q. 94. Stirred-tank bioreactors have been designed for:

1. Addition of preservatives to the product
2. Purification of the product
3. Ensuring anaerobic conditions in the culture vessel
4. Availability of oxygen throughout the process

Answer: (4)

Q. 95. The part of Fallopian tube closest to the ovary is:

1. Isthmus
2. Infundibulum
3. Cervix
4. Ampulla

Answer: (2)

Q. 96. An improved variety of transgenic basmati rice:

1. does not require chemical fertilizers and growth hormones
2. gives high yield and is rich in vitamin A
3. is completely resistant to all insect pests and diseases of paddy
4. gives high yield but has no characteristic aroma

Answer: (3)

Q. 97. Infectious proteins are present in:

1. Gemini viruses
2. Prions
3. Viroids
4. Satellite viruses

Answer: (2)

Chemistry

Q. 1. Which one of the following does not exhibit the phenomenon of mutarotation?

1. (+) Sucrose
2. (+) Lactose
3. (+) Maltose
4. (-) Fructose

Answer : (1)

Solution:- Sucrose does not have free − CHO and CO groups

Q.2. Liquid hydrocarbons can be converted to a mixture of gaseous hydrocarbons by:

1. Oxidation
2. Cracking
3. Distillation under reduced pressure
4. Hydrolysis

Answer : (2)

Solution: - During cracking, lower gaseous hydrocarbons are formed.

Q. 3. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be:

1. III > II > IV> I
2. II > III > I > IV
3. II > III > IV > I
4. III > IV > II > I

Answer : (1)

Q. 4. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus, 'X' and 'Y' are:

1. X = Benzal chloride, Y = o-chlorotoluene
2. X = m-chlorotoluene, Y = p-chlorotoluene
3. X = o-and p-chlorotoluene, Y = Trichloromethyl benzene
4. X = Benzyl chloride, Y = m-chlorotoluene

Answer : (3)

Q. 5. For an endothermic reaction, energy of activation is Ea and enthalpy of reaction is ΔH (both of these in kJ/mol). Minimum value of Ea will be:

1. less than ΔH
2. equal to ΔH
3. more than ΔH
4. equal to zero

Answer : (3)

Q. 6. A solution of sucrose (molar mass = 342 g mol^{-1}) has been prepared by dissolving 68.5 g of sucrose in 1000 g of water. The freezing point of the solution obtained will be: (Kf for water = 1.86 K kg mol^{-1})

1. $-0.372^{o}C$
2. $-0.520^{o}C$
3. $+ 0.372^{o}C$
4. $-0.570^{o}C$

Answer: (1)

Q. 7. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to:

1. increase in ionic mobility of ions
2. 100% ionisation of electrolyte at normal dilution
3. increase in both i.e. number of ions and ionic mobility of ions
4. increase in number of ions.

Answer : (1)

Q. 8. Oxidation states of P in $H_4P_2O_5$, $H_4P_2O_6$, $H_4P_2O_7$ are respectively:

1. +3, +5, +4
2. +5, +3, + 4
3. +5, +4, +3
4. +3, +4, +5

Answer : (4)

Q. 9. Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy?

1. $CaSO_4$
2. $BeSO_4$
3. $BaSO_4$
4. $SrSO_4$

Answer : (2)

Sol:- Be^{+2} is very small, hence its hydration enthalpy is greater than its lattice Enthalpy

Q. 10. Which of the following statements about primary amines is 'False'?

1. Alkyl amines are stronger bases than aryl amines
2. Alkyl amines react with nitrous acid to produce alcohols
3. Aryl amines react with nitrous acid to produce phenols
4. Alkyl amines are stronger bases than ammonia

Answer : (3)

Sol:- Aryl amines will not produce phenol on Treatment with nitrous acid.

Q. 11. For the reduction of silver ions with copper metal, the standard cell potential was found to be + 0.46 V at 25°C. The value of standard Gibbs energy, $\Delta G0$ will be ($F = 96500\ C\ mol^{-1}$)

1. − 89.0 kJ
2. − 89.0 J
3. − 44.5 kJ
4. − 98.0 kJ

Answer : (1)

Q. 12. Property of the alkaline earth metals that increases with their atomic number:

1. Solubility of their hydroxides in water
2. Solubility of their sulphates in water
3. Ionization energy
4. Electronegativity

Answer : (1)

Solution:- Lattice energy decreases more rapidly than hydration energy for alkaline earth metal hydroxides

Q. 13. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl?

1. Cl < F < O < S
2. O < S < F < Cl
3. F < S < O < Cl
4. S < O < Cl < F

Answer : (2)

Sol:- O < S < F < Cl Electron gain enthalpy − 141 − 200 − 333 − 349 kJ mol^{-1}

Q. 14. Which one of the following is employed as a Tranquilizer drug?

1. Promethazine
2. Valium
3. Naproxen
4. Mifepristone.

Answer : (2)

Q. 15. Which of the following reactions will not result in the formation of carbon-carbon bonds?

1. Reimer-Tieman reaction
2. Cannizaro reaction
3. Wurtz reaction
4. Friedel-Crafts acylation

Answer: (2)

Q. 16. AB crystallizes in a body centred cubic lattice with edge length 'a' equal to 387 pm. The distance between two oppositively charged ions in the lattice is:

1. 335 pm
2. 250 pm
3. 200 pm
4. 300 pm

Answer : (1)

PHYSICS

Q.1. Consider the following two statements:

a. Kirchhoff's junction law follows from the conservation of charge.
b. Kirchhoff's loop law follows from the conservation of energy Which of the following is correct?
    1. Both (A) and (B) are wrong
    2. (A) is correct and (B) is wrong
    3. (A) is wrong and (B) is correct
    4. (4) Both (A) and (B) are correct

Answer: (4)

Solution:-Junction − conservation of charge Loop − conservation of energy

Q. 2. Electromagnets are made of soft iron because soft iron has:

1. low retentivity and high coercive force
2. high retentivity and high coercive force
3. low retentivity and low coercive force
4. high retentivity and low coercive force

Answer : (4)

Q. 3. The potential difference that must be applied to stop the fastest photoelectrons emitted by a nickel surface, having work function 5.01 eV, when ultraviolet light of 200 nm falls on it, must be:

1. 2.4 V
2. − 1.2 V
3. − 2.4 V
4. 1.2 V

Answer : (4)

Q. 4. The displacement of a particle along the x-axis is given by $x = a \sin^2 \omega t$. The motion of the particle corresponds to:

1. Simple harmonic motion of frequency ω/π
2. Simple harmonic motion of frequency $3\omega/2\pi$
3. Non simple harmonic motion
4. Simple harmonic motion of frequency $\omega/2\pi$

Answer : (1)

Q. 5. The radii of circular orbits of two satellites A and B of the earth, are 4R and R, respectively. If the speed of satellite A is 3 V, then the speed of satellite B will be:

1. 3 V/4
2. 6 V
3. 12 V
4. 3 V/2

Answer : (2)

Q. 6. An engine pumps water through a hose pipe. Water passes through the pipe and leaves it with a velocity of 2 m/s. The mass per unit length of water in the pipe is 100 kg/m. What is the power of the engine?

1. 400 W
2. 200 W
3. 100 W
4. 800 W

Answer : (1)

Q.7. Which one of the following bonds produces a solid that reflects light in the visible region and whose electrical conductivity decreases with temperature and has high melting point?

1. metallic bonding
2. van der Waal's bonding
3. ionic bonding
4. covalent bonding

Answer : (1)

Solution: - Metal – conductivity decreases with increase in temperature.

Q. 8. A tuning fork of frequency 512 Hz makes 4 beats per second with the vibrating string of a piano. The beat frequency decreases to 2 beats per sec when the tension in the piano string is slightly increased. The frequency of the piano string before increasing the tension was:

1. 510 Hz
2. 514 Hz
3. 516 Hz
4. 508 Hz

Answer : (4)

Q. 9. A galvanometer has a coil of resistance 100 ohm and gives a full-scale deflection for 30 mA current. If it is to work as a voltmeter of 30 volt range, the resistance required to be added will be:

1. 900 Ω
2. 1800 Ω
3. 500 Ω
4. 1000 Ω

Answer : (1)

Q. 10. The energy of a hydrogen atom in the ground state is – 13.6 eV. The energy of a He^{+}ion in the first excited state will be:

1. – 13.6 eV
2. – 27.2 eV
3. – 54.4 eV
4. – 6.8 eV

Answer : (1)

Q. 11. A man of 50 kg mass is standing in a gravity free space at a height of 10 m above the floor. He throws a stone of 0.5 kg mass downwards with a speed 2 m/s. When the stone reaches the floor, the distance of the man above the floor will be:

1. 9.9 m
2. 10.1 m
3. 10 m
4. 20 m

Answer : (2)

Q. 12. A vibration magnetometer placed in magnetic meridian has a small bar magnet. The magnet executes oscillations with a time period of 2 sec in earth's horizontal magnetic field of 24 microtesla. When a horizontal field of 18 microtesla is produced opposite to the earth's field by placing a current carrying wire, the new time period of magnet will be:

1. 1 s
2. 2 s
3. 3 s
4. 4 s

Answer : (4)

Q. 13. A 220 volts input is supplied to a transformer. The output circuit draws a current of 2.0 ampere at 440 volts. If the efficiency of the transformer is 80%, the current drawn by the primary windings of the transformer is:

1. 3.6 ampere
2. 2.8 ampere
3. 2.5 ampere
4. 5.0 ampere

Answer : (4)

Q. 14. The mass of a 7/3 Li nucleus is 0.042 u less than the sum of the masses of all its nucleons. The binding energy per nucleon of 7/3 Li nucleus is nearly :

1. 46 MeV
2. 5.6 MeV
3. 3.9 MeV
4. 23 MeV

Answer : (2)

Q. 15. A particle moves a distance x in time t according to equation x-(t+5)-2 The acceleration of particle is proportional to:

1. (Velocity)3/2
2. (distance)2
3. (distance)−2
4. (velocity)2/3

Answer : (1)

Q. 16. Two particles which are initially at rest, move towards each other under the action of their internal attraction. If their speeds are v and 2v at any instant, then the speed of centre of mass of the system will be:

1. 2 v
2. Zero
3. 1.5 v
4. v

Answer : (2)

Sol:- No change in state of motion of COM due to internal forces.speed of COM = zero

Q. 17. Which of the following statement is false for the properties of electromagnetic waves?

1. Both electric and magnetic field vectors attain the maxima and minima at the same place and same time
2. The energy in electromagnetic wave is divided equally between electric and magnetic vectors
3. Both electric and magnetic field vectors are parallel to each other and perpendicular to the direction of propagation of wave
4. These waves do not require any material medium for propagation

Answer : (3)

Q. 18. If ΔU and ΔW represent the increase in internal energy and work done by the system respectively in a thermodynamical process, which of the following is true?

1. ΔU = − ΔW, in a adiabatic process
2. ΔU = ΔW, in a isothermal process
3. ΔU = ΔW, in a adiabatic process
4. ΔU = − ΔW, in a isothermal process.

Answer : (1)

Solution:- $\Delta Q = \Delta U + \Delta W$

In adiabatic, $\Delta Q = 0$

$\Delta U = -\Delta W$

In isothermal, $\Delta U = 0$

Q.19. The device that can act as a complete electronic circuit is:

1. Junction diode
2. Integrated circuit
3. Junction transistor
4. Zener diode

Answer : (2)

Q. 20. A ball moving with velocity 2 m/s collides head on with another stationary ball of double the mass. If the coefficient of restitution is 0.5, then their velocities (in m/s) after collision will be:

1. 0, 1
2. 1, 1
3. 1, 0.5
4. 0, 2

Answer : (1)

Q. 21. Which one of the following statement is FALSE?

1. Pure Si doped with trivalent impurities gives a p-type semiconductor
2. Majority carriers in a n-type semiconductor are holes
3. Minority carriers in a p-type semiconductor are electrons
4. The resistance of intrinsic semiconductor decreases with increase of temperature

Answer : (2)