NEET 2013

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Biology

Instructions

For the following questions answer them individually

Question 1

The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function. This is an example of:

A Analogous organsthat have evolved dueto divergent evolution.

B Homologousorgansthat have evolved due to convergent evolution.

C Homologous organs that have evolved due to divergent evolution.

D Analogous organsthat have evolved dueto convergent evolution.

Answer: D

Question 2

Select the correct statement with respect to locomotion in humans:

A The joint between adjacent vertebrate is a fibrous joint

B A decreased level of pregesterone causes osteoporosis in old people

C Acumulation of uric acid crystalsin joints causes their inflammation

D The vertebral colum has 10 thoracic vertebrae

Answer: C

Question 3

A phosphoglycerideis always madeupof:

A a saturated or unsaturated fatty acid esterified to a phosphate group whichis also attached to a glycero] molecule

B only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached

C only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate groupis also attached

D a saturated or unsaturated fatty acidesterified to a glycerol molecule to which a phosphate group is also attached

Answer: D

Question 4

Perisperm differs from endosperm in :

A Its formation by fusion of secondary nucleus with several sperms

B being a haploid tissue

C having no reserve food

D being a diploid tissue

Answer: D

Question 5

A sedentary sea anemonegets attachedto the shell lining of hermit crab. The associationis :

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A Amensalism

B Ectoparasitism

C Symbiosis

D Commensalism

Answer: D

Question 6

The cell - mediated immunity inside the human body is carried out by :

A Erythrocytes

B T-lymphocytes

C B-lymphocytes

D Thrombocytes

Answer: B

Question 7

Which of the following are likely to be present in deep sea water?

A Saphrophytic fungi

B Archae bacteria

C Eubacteria

D Blue-green algae

Answer: B

Question 8

one of the representatives of phylum Arthopoda is:

A flying fish

B cuttle fish

C silver fish

D puffer fish

Answer: C

Question 9

Megasporangium is equivalent to:

A Ovule

B Embryo sac

C Fruit

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D Nuclellus

Answer: A

Question 10

Kyoto Protocol was endorsed at :

A CoP-4

B CoP-3

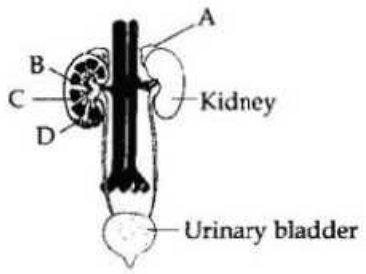
C CoP-5

D CoP-6

Answer: B

Question 11

Figure shows human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and or functions.



A D-cortex-outer part of kidney and do not contain any part of nephrons

B A-Adrenal glands-located at the anterior part of the kidney .Secrete Catecholamines which stimulate glycogen break down

C B-Pelvis-broad funnel shaped space inner to hilum ,direclty connected to loops of Henle

D C-Medulla-inner Zone of the kidney and contains complete nephrons

Answer: B

Question 12

In china rose the flowers are :

A Zygomorphic,epigynous with twisted aestivation

B Actinomorphic,hypogynous with twisted aestivation

C Actinomorphic,epigynous with Valvate aestivation

D Zygomorphic,hypogynous with imbricate aestivation

Answer: B

Question 13

The Golgi complex plays a major role:

A in post translational modification of proteins and glycosidation of lipids

B in trapping the light and transforming it in to chemical energy

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C in digestion protein and carbohydrates

D as energy transforming organelles

Answer: A

Question 14

what external changes are visible after the last moult of a cockroach nymph

A Labium develops

B mandibles becomes harder

C Anal cerci develop

D Both fore wings and hind wing develop

Answer: D

Question 15

Isogamous condition with non-flagellated gametes is found in:

A Fucus

B Chlamydomonas

C Spirogyra

D Volvox

Answer: C

Question 16

Transition state structure of the substrate formed during enzymatic reaction is :

A Permanant and stable

B transient but stable

C permanent but unstable

D transient and unstable

Answer: D

Question 17

Select the answer which correctly matches the endocrine gland with the hormone it secretes and its function/deficiency symptom :

A **Endocrine gland**- corpus lutem, **Harmone** - Testoterone, **Function/deficiency symptoms** : Stimulates spermatogenesis;

B **Endocrine gland** - Anterior pituitary, **Harmone** - Oxytocin, **Function/deficiency symptoms** : Stimulates uterus contraction during child birth;

C **Endocrine gland** - Posterior pituitary, **Harmone** - Growth Harmone (GH), **Function/deficiency symptoms** : Oversecretion stimulates the abnormal growth;

D **Endocrine gland** - Throid gland, **Harmone** - Thyroxine, **Function/deficiency symptoms** : Lack of iodine in diet results in goitre;

Answer: D

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Question 18

The colonies of recombinant bacteria appear white in contrast to blue colonies of non recombinant bacteria because of

A Inactivation of glycosidase enzyme in recombinant bacteria

B Non-recombinant bacteria containing beta galactosidase

C Insertional inactivation of alpha-galactosidase is non-recombinant bacteria

D Insertional inactivation of alpha-galactosidase is recombinant bacteria

Answer: A

Question 19

Monoecious plant of Chara shows occurrence of:

A upper oogonium and lower antheridium on the same plant

B antheridiophore and archegoniophore on the same plant

C stamen and carpel on the sameplant

D upper antheridium and lower oogonium on the sameplant

Answer: A

Question 20

Advantage of cleistogamy is:

A Vivipary

B Higher gentic variability

C More vigorous offspring

D No dependence on pollinators

Answer: D

Question 21

The H-zone in the skeletal muscle fibre is due to:

A externsion of myosin filaments in the central portion of A-band

B the absence of myofibrils in the central portion of A-band

C the central gap between myosin filaments in the A-band

D the central gap between actin filaments extending through myosin filaments in the A-band

Answer: D

Question 22

Artificial insemination means:

A Introduction of a sperms of a healthy donar directly in to ovary

B transfer of sperms of a healthy donar to a test tube containing ova

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C transfer of sperms of husband to atest tube containing ova

D artificial introduction of sperms of healthy donar in to the vagina

Answer: D

Question 23

Which group of animals belong to the same phylum?

A Sponge, Sea anemone,Starfish

B Malarial parasite, Amoeba, Mosquito

C Earthworm, Pinworm, Tapeworm

D Prawn, Scorpion, Locusta

Answer: D

Question 24

Seed coatis not thin, membranous in:

A Gram

B Maize

C Coconut

D Groundnut

Answer: C

Question 25

If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group:'AB' blood group :'B' blood group in1:2:1 ratio. Modern technique of protein electrophoresis reveals presenceof both 'A' and 'B' type proteins in 'AB' blood groupindividuals. This is an exampleof:

A Complete dominance

B Codominance

C Incomplete dominance

D Partial dominace

Answer: B

Question 26

Which of the following cannot be detected in a developing foetus by amniocentesis?

A Jaundice

B Klinefelter syndrome

C sex of foetus

D Down syndrome

Answer: A

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Question 27

The first stable product of fixation of atmospheric nitrogen in leguminous plants is :

A Glutamate

B NO_2^-

C Ammonia

D NO_3^-

Answer: C

Question 28

A biologist studied the population of rats in a barn .He found that the average natality was 250, average mortality 240,immigration 20 and emigration 30.The net increase in population is

A Zero

B 10

C 15

D 05

Answer: A

Question 29

Secondary productivity is rate of formation of new organic matter by :

A Decomposer

B Producer

C Parasite

D Consumer

Answer: D

Question 30

Infection of Ascaris usually occurs by :

A mosquito bite.

B drinking water containing eggs of Ascaris.

C eating imperfectly cooked pork.

D Tse-tse fly

Answer: B

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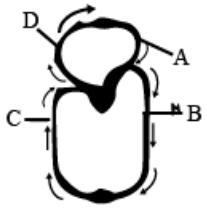
Question 31

Figure shows schematic plan of blood circulation in humans with labels A to D. Identify the label and give its function/s,



A D-Dorsal aorta -takes blood from heart to body parts , PO_2=95 mm Hg

B A-Pulmonary vein -takes impure blood from body parts , PO_2=60 mm Hg

C B-Pulmonary vein -takes impure blood from heart to lungs , PO_2=90 mm Hg

D C-Venacava-takes blood from body parts to right auricle , PCO_2=45 mm Hg

Answer: D

Question 32

The tendency of population to remain in genetic equilibrium maybedisturbed by :

A lack of random mating

B random mating

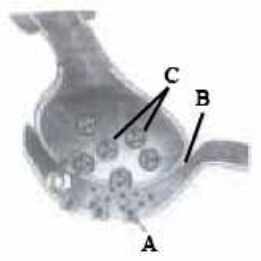
C lack of migration

D lack of mutations

Answer: A

Question 33

A diagram showing axon terminal and synapseis given. Identify correctly at least two of A-D.



A C-Neurotransmitter
$D - Ca^{++}$

B A-Receptor
C-Synaptic vesicles

C B-Synaptic vesicles
$D - K^{+}$

D A-Neurotransmitter
B-Synaptic cleft

Answer: B

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Question 34

A good producer of citric acid is:

A Saccharomyces

B Aspergillus

C Pseudomonas

D Clostridium

Answer: B

Question 35

Age ofatreecan be estimatedby:

A diameter of its heartwood

B its height and girth

C biomass

D number of annual rings

Answer: D

Question 36

The process by which organisms with different evolutionary history evolve similar phenotypic adaptions in response to a common environmental challenge is called:

A Adaptive radiation

B Natural selection

C Convergent evolution

D Non-random evolution

Answer: C

Question 37

A stage in cell division is shown in figure.Select the answer which gives correct identification of the stage with its charecteristics

A Telophase - endoplasmic recticulum and the nucleous not reformed yet ;

B Telophase - nuclear envelop reforms,golgi complex reforms.

C Late anaphase - chromosomes move away from equatorial plate, golgi complex not present.

D Cytokinesis - Cell plate formed,mitochondria distributed between two daughter cells.

Answer: B

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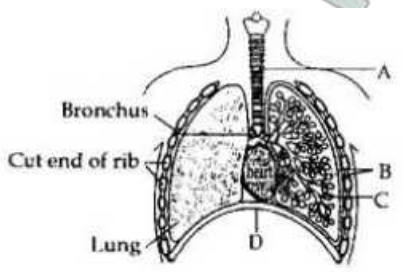
Question 38

The figure shows a diagrammatic view of human respiratory system with labels A, B,C and D. Select the option which gives correct identification and main function and/or characteristic.



A D-Lower end of lungs -diaphragm pulls it down during inspiration

B A-trachea-lung-long tube supported by complete cartilaginous rings for conducting inspired air.

C B-pleural membrane -surround ribs on the both sides to provide cushion against rubbing.

D C-Alveoli-walled vascular bag like structures for exchange of gases

Answer: D

Question 39

Interfascicular cambium develops from thecells of :

A Pericycle

B Medullary rays

C Xhylem Parenchyma

D Endodermis

Answer: B

Question 40

During seed germinationits stored food is mobilized by:

A Gibberellin

B Ethylene

C Cytokinin

D ABA

Answer: A

Question 41

Meiosis takes place in:

A Megaspore

B Meiocyte

C Coraidia

D Gemmule

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Answer: B

Question 42

According to Darwin,the organic evolution is due to:

A Reduced feeding efficiency in one species due to the presence of interfering species

B Intraspecific competition

C Interspecific competition

D Competition within closely related species.

Answer: B

Question 43

Whichof the following criteria does not pertain to facilitated transport ?

A Uphill transport

B Requirement of special membrane proteins

C High selectivity

D Transport saturation

Answer: A

Question 44

A majorsite for synthesis of lipids is :

A Nucleoplasm

B RER

C SER

D Symplast

Answer: C

Question 45

Natural reservoir of Phosphorus is

A Fossils

B Sea water

C Animal bones

D Rock

Answer: D

Question 46

Which of the metabolites is common to respiration-mediated breakdown fats, crabohydrates and proteins

A Acetyl CoA

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B Glucose-6-Phosphate

C Fructose 1,6 -biphosphate

D Pyruvic acid

Answer: D

Question 47

Which of the following process during decomposition is correctly described?

A Leaching-water soluble inorganic nutrients rise to top layers of the soil

B Fragmentation-carried out by organisms such as earthworm

C Humification-Leads to the accumulation of a dark coloured substance humus which undergoes microbial action at a very fast rate

D Catabolism- Last step in the decomposition underfully anaerobic condition

Answer: B

Question 48

If both parents are carriers for thalessemia, whichis an autosomal recessive disorder, what are the chances of pregnancy resulting in an affected child ?

A 100%

B no chance

C 50%

D 25%

Answer: D

Question 49

Whichofthe following statements is not true of two genes that show50% recombination frequency ?

A If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis

B The genes may be on different chromosomes

C The genesare tightly linked

D The genes show independentassortment

Answer: C

Question 50

One of the legal methods of birth control is :

A by a premature ejaculation during coitus

B abortion by taking an appropriate medicine

C by absstaining from the coitus from the day 10 to 17 of the menstraul cycle

D by having coitus at the time of day break

Answer: B

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Question 51

Besides paddy fields, cyanobacteria are also found inside vegetative part of :

A Psilotum

B Pinus

C Cycas

D Equisetum

Answer: C

Question 52

Which ofthe following are correctly matched with respect to their taxonomic classification ?

A Spiny anteater,sea urchin , sea cucumber-Echinodermata

B Flying fish .cuttlefish, silver fish -Pisches

C Centipede,millipede,spider,scorpion-Insecta

D Housefly,butterfly,tsetsefly,silver fish-Insecta

Answer: D

Question 53

Variation in gene frequencies within populations can occur by chance rather than by naturalselection. This is referred to as:

A Genetic load

B Genetic flow

C Genetic drift

D Random mating

Answer: C

Question 54

Select the correct match of the digested products in humans given in column I with their absorption site and mechanism in column II.

A Column I - Cholestrol, maltose; Column II - large intestine,active absorption;

B Column I - Glycine, glucose; Column II - small intestine, active absorption;

C Column I - Fructose, Na^{+}; Column II - small intestine, passive absorption;

D Column I - Glycerol, fatty acids; Column II - duodenum, move as chilomicrons;

Answer: B

Question 55

Select the wrong statement

A Chlamydomonas exhibits both isogamy and anisogamy and Fucus shows oogamy

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B Isogametes are similar in structure, function and behaviour

C Anisogametes differ either in structure, function or behaviour

D In Oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile

Answer: D

Question 56

Which Mendelian idea is depicted by a cross in which the F_1 generation resembles both the parents

A co-dominance

B incomplete dominance

C law of dominance

D inheritance of one gene

Answer: A

Question 57

The diagram given here is the standard ECG of a normal Person> The P-wave represents the :

A End of the systole

B Contraction of both the atria

C Iniation of ventricular Contraction

D Beginning of the systole

Answer: B

Question 58

Which enzyme will be produced in a cell in which there is non sense mutation in the lac Y gene?

A Lactose permease and transacetylase

B β-galactosidase

C Lactose permease

D Transacetylase

Answer: B

Question 59

The most abundant intracellar cation is:

A K_+

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B $Na+$

C $Ca++$

D $H+$

Answer: A

Question 60

Which oneof the following is not the function of placenta ? It:

A secretes oxytocin during parturition.

B facilitates supply of oxygen and nutrients to embryo.

C secretes estrogen.

D facilitates removal of carbon dioxide and waste material from embryo.

Answer: A

Question 61

Inplant breeding programmes, the entire collection (of plants/seeds) havingall the diversealleles for all genes ina given cropis called :

A germplasm collection.

B selection of superior recombinants.

C cross - hybridisation among the selected parents,

D evaluation and selection of parents.

Answer: A

Question 62

Which one of the following is not a correct statement?

A Key is a taxonomic aid for identification of specimens

B Herbarium houses dried, pressed and preserved plant specimens.

C Botanical gardens havecollection of living plants for reference.

D A museum has collection of photographsof plants and animals.

Answer: D

Question 63

Which one of the following organelle in the figure correctly matches with its function ?

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A Rough endoplasmic reticulum , protein synthesis

B Rough endoplasmic recticulum ,formation of glycoprotein

C Golgi apparatus, protein synthesis

D Golgi apparatus,formation of glycolipids

Answer: A

Question 64

Which of the following represent maximum number of species among global biodiversity ?

A Mosses and Ferns

B Algae

C Lichens

D Fungi

Answer: D

Question 65

Which of the following Bt crops is being grown in India by the farmers

A Soyabean

B Maize

C Cotton

D Brinjal

Answer: C

Question 66

Read the following statements (A-E) and answerthe question which follows them.
(A) In liverworts, mosses, and ferns gametophytes are free - living
(B) Gymnosperms and some ferns are heterosporous
(C) Sexual reproduction in Fucus, Volvox and Albugo is oogamous
(D) The sporophytein liverwortsis more elaborate than that in mosses
(E) Both,Pinus and Marchantia are dioecious

A Four

B one

C Two

D Three

Answer: C

Question 67

The essentail chemical components of many co-enzymes are :

A Vitamins

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B Proteins

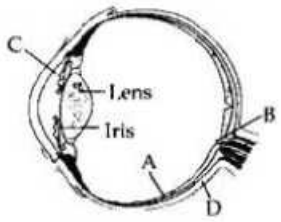
C Nucleic acids

D carbohydrates

Answer: A

Question 68

Parts A,B,C and D of the human eye are shown in the diagram .select the option which gives correct identification along with its functions/ charecteristics:



A D - Choroid - its anterior part formsciliary body.

B A - Retina - contains photo receptors - rods and cones.

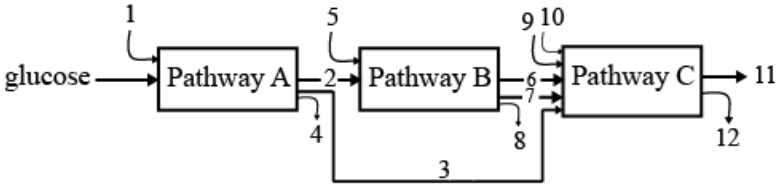
C B - Blind spot - has only a fewrods and cones.

D C-Aqueous Chamber -reflects the light which does not paass through the lens

Answer: B

Question 69

The three boxes in this diagram represent the three major biosynthetic path ways in aerobic respiration. Arrows represent net reactants or products.



Arrows numbered 4, 8 and 12 can all be ;

A $FAD^{+} or FADH_2$

B NADH

C ATP

D H_2O

Answer: C

Question 70

Pigment-containing membranousextensions in some cyanobacteriaare:

A Chromatophores

B Heterocysts

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C Basal bodies

D Pneumataphores

Answer: A

Question 71

Which one of the following statements is correct ?

A Tapetum nourishes the developing pollen

B Hard outer layer of pollen is called intine

C Sporogenous tissue is haploid

D Endothecium produces the microspores

Answer: A

Question 72

The characteristics and an example of a synovial joint in humans is :

A Charecteristics-lymph filled between two bones,limited movement;Examples-gliding joints between carpals;

B Charecteristics-fluid cartilage between two bones,limited movements;Examples-Knee joint;

C Charecteristics-fluid filled between two joints,provides crushion;Examples Skullbones;

D Charecteristics-fluid filled synovial cavity between two bones;Exampl

E Joint between atlas and axis;

Answer: D

Question 73

The Air Prevention and Control of Pollution Act came in to force in:

A 1990

B 1975

C 1981

D 1985

Answer: C

Question 74

Product of sexual reproduction generally penerates :

A Large biomass

B Longerviability of seeds

C Prolonged dormancy

D New genetic combination leading to variation

Answer: D

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Question 75

Amongbitter gourd, mustard, brinjal, pumpkin, china rose, lupin, cucumber, sunnhemp, gram, guava, bean, chilli, plum, petunia, tomato, rose, withania, potato, onion, aloe and tulip how many plants have hypogynous flower

A Eighteen

B Six

C Ten

D Fifteen

Answer: D

Question 76

A pregnant female delivers a baby who suffers from stunted growth,mental retardation, low intelligence quotient and abnormal skin.This is the result of:

A over secretion of pars distalis

B Deficiency of Iodine in the diet

C Low secretion of growth harmone

D cancer of thyroid gland

Answer: B

Question 77

Which of the following is not correctly matched for the organism and its cell wall degrading enzyme?

A Fungi-chitinase

B Bacteria-Lysozyme

C Plant cells-Cellulase

D Algae-Methylase

Answer: D

Question 78

Mentrual flow occurs due to lack of:

A Vasopressin

B Progestrone

C FSH

D Oxytocin

Answer: B

Question 79

Global warming can be controlled by:

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A Increasing deforestation, reducingefficiency of energy usage.

B Reducing deforestation, cutting down use of fossil fuel.

C Reducing reforestation, increasingthe used of fossil fuel.

D Increasing deforestation, slowing down the growth of human population.

Answer: B

Question 80

Which one of the following is not used for ex situ plant conservation?

A Botanical Gardens

B Field gene banks

C Seed banks

D Shifting cultivation

Answer: D

Question 81

During sewage treatment, biogases are produced which include:

A hydrogensulphide, nitrogen, methane

B methane,hydrogensulphide,carbondioxide

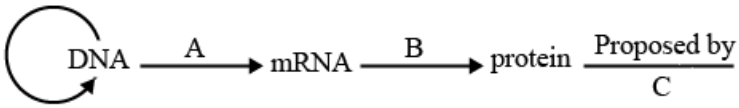
C methane,oxygen,hydrogensulphide

D hydrogensulphide,methane,sulphurdioxide

Answer: B

Question 82

The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C.



A A-translation B - extension C - Rosalind Franklin

B A -transcription B - replication C - James Watson

C A- translation B - transcription C - Erevin Chargaff

D A- translation B - transcription C- Francis Crick

Answer: D

Question 83

DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by :

A Restriction mapping

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B Centrifugation

C Polymerase chain reaction

D Electrophoresis

Answer: D

Question 84

The complex formed by a pair of synapsed homologous chromosomes is called

A Axoneme

B Equatorial plate

C Kinetochore

D Bivalent

Answer: D

Question 85

The incorrect statement with regard to Haemophilia is:

A A single protein involvedin the clotting of blood is affected

B It is a sex - linked disease

C It is a recessive disease

D It is a dominant disease

Answer: D

Question 86

Which of the following statements is correct in relation to the endocrine system ?

A Releasing and inhibitory hormones are produced by thepituitary gland.

B Adenohypophysis is under direct neural regulation of the hypothalamus.

C Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormones.

D Non - nutrient chemicals produced by the body in trace amount that act as intercellular messenger are known as harmones

Answer: D

Question 87

Lenticels are involved in

A Photosynthesis

B Transpiration

C Gaseous Exhange

D Food transport

Answer: C

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Question 88

Match the names of the animal (column I),with one charecteristics (column II), and the phylum /class (colum III) to which it belongs:

A Column I-Adamia;Column II-radially symmetrical;Column III-Porifera;

B Column I-Petromyzon;Column II-ectoparasite;Column III-Cyclostomata;

C Column I-Ichthyposis;Column II-terrestrial;Column III-Reptilia;

D Column I-Limulus;Colum II-body covered by chitinous exoskeleton;Column III-Pisces;

Answer: B

Question 89

What is the correct sequence of sperm formation?

A Spermatagonia,Spermatocyte,Spermatid,SpermatoZoa

B Spermatid,Spermatocyte,Spermatagonia,SpermatoZoa

C Spermatagonia,Spermatocyte,Spermatocyte,Spermatid

D Spermatagonia,SpermatoZoa,Spermatocyte,Spermatid

Answer: A

Question 90

Macro molecule chitin is :

A simple polysaccharide

B nitrogen containing polysaccharide

C phosphorus containing polysaccharide

D sulphur containing polysaccharide

Answer: B

Physics

Instructions
For the following questions answer them individually

Question 91

In Young's double slit experiment, the slits are 2mm apart and are illuminated by photons of two wavelengths λ_1 =12000 A and λ_2 =10000 A. At what minimum distance from the common central bright fringe on the screen 2 m from the slit will a bright fringe from oneinterference pattern coincide with a bright fringe from the other?

A 3 mm

B 8 mm

C 6 mm

D 4 mm

Answer: C

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Question 92

In acommonemitter (CE) amplifier having a voltage gain G, the transistor used has transconductance 0.03 mho and current gain 25. If the abovetransistor is replaced with another one with transconductance 0.02 mho and current gain 20, the voltage gain will be:

A $\frac{5}{4}$ G

B $\frac{2}{3}$ G

C 1.5 G

D $\frac{1}{3}$ G

Answer: B

Question 93

A certain mass of Hydrogen is changed to Helium by the process of fusion. The Mass defect in fusion reactionis 0.02866 u. The energy liberated per u is :
(given 1 u=931 MeV)

A 13.35MeV

B 2.67MeV

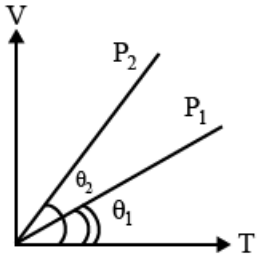
C 26.7MeV

D 6.675 MeV

Answer: D

Question 94

In the given (V-T) diagram, what is the relation between pressures $P_1 and P_2$**?**



A can not be predicted

B $P_2 = P_1$

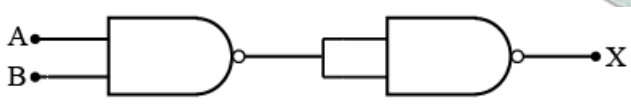
C $P_2 > P_1$

D $P_2 < P_1$

Answer: A

Question 95

The output (X) of the logic circuit shown in figure will be :



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A $X = A + B$

B X=$A.B$

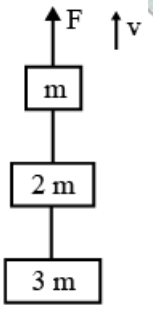
C X=$A.B$

D X=A.B

Answer: D

Question 96

Three blocks with masses m, 2 m and 3 m are connected by strings, as shown in the figure. After an upward force F is applied on block m1, the masses move upward at constant speed v. What is the net force on the block of mass 2 m? (g is the acceleration due to gravity)



A 6 mg

B Zero

C 2 mg

D 3 mg

Answer: B

Question 97

In a n-type semiconductor ,Which of the following statements is true?

A Holes are majority carriers and trivalent atoms are dopants.

B Electrons are majority carriers and trivalent atoms are dopants.

C Electrons are minority carriers and pentavalent atoms are dopants.

D Holes are minority carriers and pentavalent atoms are dopants.

Answer: D

Question 98

The half life of a radioactive isotope 'X' is 20 years .It decades to another element 'Y' is 20 years . It decays to another element 'Y' which is stable . The two elements 'X' and 'Y' were found to be in the ratio 1:7 in a sample of a given rock.The age of the rock is estimated to be:

A 100 years

B 40 years

C 60 years

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D 80 years

Answer: C

Question 99

The molar specific heats of an ideal gas at constant pressure and volume are denoted by C_P and C_V, respectively. If $\gamma = \frac{C_p}{C_v}$ and R is the universal gas constant , then C_v is equal to:

A γ R

B $\frac{1+\gamma}{1-\gamma}$

C $\frac{R}{\gamma-1}$

D $\frac{\gamma-1}{R}$

Answer: C

Question 100

The wavelength λ_c,of an electron and λ_p of a photon of same energy E are related by :

A $\lambda_p \alpha \frac{1}{\sqrt{\lambda_e}}$

B $\lambda_p \alpha {\lambda_e}^2$

C $\lambda_p \alpha \lambda_e$

D $\lambda_p \alpha \sqrt{\lambda_e}$

Answer: B

Question 101

Ratio of longest wave lengths corresponding to Lymanand Balmerseries in hydrogen spectrum is :

A $\frac{9}{31}$

B $\frac{5}{27}$

C $\frac{3}{23}$

D $\frac{7}{29}$

Answer: B

Question 102

A current loop in a magnetic field :

A Can be in equilibrium in two orientations, one stable

B Experiences a torque whether the field is uniform or non uniform in all orientations

C can be equilibrium in one orientation

D can be equilibrium in two orientations,both the equilibrium states are unstable

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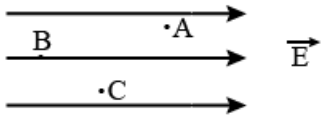
Answer: A

Question 103

A, Band C are three points in a uniform electric field. The electric potential is :



A same at all the three points A,B,C.

B maximuum at A

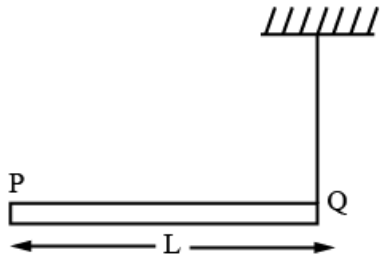
C maximuum at B

D maximuum at C

Answer: C

Question 104

A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a mass less string tied to point Q as shown in figure. When string is cut, the initial angular acceleration of the rod is :



A $\frac{2g}{3L}$

B $\frac{3g}{2L}$

C $\frac{g}{L}$

D $\frac{2g}{L}$

Answer: B

Question 105

A wire of resistance 4 2 is stretched to twice its original length. The resistance of stretched wire would be:

A 16 Ω

B 2 Ω

C 4 Ω

D 8 Ω

Answer: A

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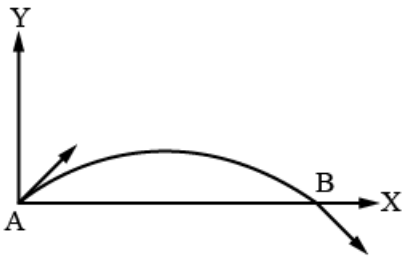
Question 106

The velocity of a projectile at the intial point A is $(2\hat{i}+3\hat{j})\ {}^{m}_{s}$ .Its velocity (in ${}^{m}_{s}$) at the point B is.



A $(2\hat{i}+3\hat{j})$

B $(-2\hat{i}-3\hat{j})$

C $(-2\hat{i}+3\hat{j})$

D $(2\hat{i}-3\hat{j})$

Answer: D

Question 107

A body of mass m is taken from the earth surface to the height equal to twice the radius (R) of the earth .The change in potential energy of the body will be

A $\frac{1}{3}$ mgR

B mg2R

C $\frac{2}{3}$ mgR

D 3 mgR

Answer: C

Question 108

A stone falls freely under gravity.It covers distances h_1, h_2, h_3 in the first five seconds ,the next five seconds and the next 5 seconds respectively .The relation between h_1, h_2 and h_3 is:

A $h_1 = h_2 = h_3$

B $h_1 = 2h_2 = 3h_3$

C $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$

D $h_2 = 3h_1$ and $h_3 = 3h_2$

Answer: C

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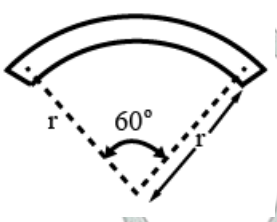
Question 109

A bar magnet of length 'l' and magnetic dipole moment 'M' is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be :



A $\frac{M}{2}$

B M

C $\frac{3}{\pi}$

D $\frac{2}{\pi}$

Answer: C

Question 110

The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is:

A 1.0 Ω

B 0.2 Ω

C 0.5 Ω

D 0.8 Ω

Answer: C

Question 111

For photoelectric emission from certain metal the cutoff frequencyis v. If radiation of frequency 2 v impinges on the metalplate, the maximum possible velocity of the emitted electron will be (m is the electron mass) :

A $2\sqrt{\frac{h\nu}{m}}$

B $\sqrt{\frac{h\nu}{2m}}$

C $\sqrt{\frac{h\nu}{m}}$

D $\sqrt{\frac{2h\nu}{m}}$

Answer: D

Question 112

During an adiabatic process, the pressure of a gasis found to be proportional to the cube of its temperature.The ratio of $\frac{C_p}{C_v}$**.The ratio of** $\frac{C_p}{C_v}$ **of the gas is**

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A $\frac{3}{2}$

B $\frac{4}{3}$

C 2

D $\frac{5}{3}$

Answer: A

Question 113

The following four wires are made of the same material. Which of these will have the largest extension when the sametension is applied ?

A length=300cm, diameter=3mm

B length=50cm, diameter = 0.5mm

C length=100cm, diameter=1mm

D length=200cm, diameter=2mm

Answer: B

Question 114

The resistances of the four arms P,Q, R and S in a Wheatstone's bridge are 10 ohm, 30 ohm, 30 ohm and 90 ohm,respectively. The e.m.f. and internal resistance of the cell are 7 Volt and 5 ohm respectively. If the galvanometerresistance is 50 ohm, the current drawnfromthecell will be :

A 2.0 A

B 1.0 A

C 0.2 A

D 0.1 A

Answer: C

Explanation:
to

Question 115

The amount of heat energy required to raise the temperature of 1 g of Helium at NTP, from T_1K to T_2K is:

A $\frac{3}{4}N_aK_B{}_{T_1}^{T_2}$

B $\frac{3}{8}N_aK_B(T_2-T_1)$

C $\frac{3}{2}N_aK_B(T_2-T_1)$

D $\frac{3}{4}N_aK_B(T_2-T_1)$

Answer: B

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Question 116

A piece of iron is heated in a flame.It first becomes dull red then becomes redissh yellow and finally turns to white hot.The correct explanation for the above observation is possible by using :

A Newton's law of cooling

B Stefan's law

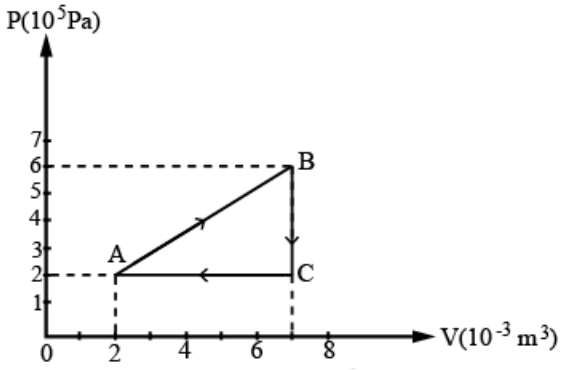
C Wein's displacement law

D Kirchoff's law

Answer: C

Question 117

A gas is taken through the cycle $A \rightarrow B \rightarrow C \rightarrow A$ as shown. What is the net work done by the gas ?



A -2000 J

B 2000 J

C 1000 J

D Zero

Answer: C

Question 118

The condition under which a microwave oven heats up a food item containing water molecules most efficiently is :

A Infra-red waves produce heating in a microwave oven,

B The frequency of the microwaves must match the resonant frequency of the water molecules.

C The frequency of the microwaves has no relation with natural frequency of water molecules.

D Microwaves are heat waves, so always produce heating

Answer: B

Question 119

An explosion breaks a rock into three parts in a horizontal plane. Twoof themgooff at right angles to each other. Thefirst part of mass 1 kg moves with a speed of 12 ms^{-1} and the secondpart of mass 2 kgmoves with 8 ms^{-1} speed. If the thirdpart flies off with 4 ms^{-1} speed, then its mass is :

A 17kg

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B 3 kg

C 5 kg

D 7 kg

Answer: C

Question 120

In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%,3% and 4% respectively. Quantity P is calculated as follows;
$P = \frac{a^3b^2}{cd}$ **% error in P is:**

A 4%

B 14%

C 10%

D 7%

Answer: B

Question 121

A small object of uniform density rolls up a curved surface with aninitial velocity 'v'. It reaches up to a maximum height of $\frac{3v^2}{4g}$ **with respect to the initial position .The object is:**

A Disc

B Ring

C Solid sphere

D Hallow sphere

Answer: A

Question 122

A plano convexlensfits exactly into a plan » concave lens. Their plane surfaces are parallel to each other. If lenses are madeofdifferent materials of refractive indices j1, and po and R is the radius of curvature of the curved surface of the lenses, then the focal length of the combination is:

A $\frac{2R}{(\mu_2-\mu_1)}$

B $\frac{R}{2(\mu_1+\mu_2)}$

C $\frac{R}{2(\mu_1-\mu_2)}$

D $\frac{R}{(\mu_1-\mu_2)}$

Answer: D

Question 123

A parallel beam of fast movingelectrons is incident normally on a narrow slit. A fluorescent screen is placed at a large distance from theslit. If the speed of the electronsis increased, which of the following statements is correct ?

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A The angular width of the central maximum will be unaffected.

B Diffraction pattern is not observed on the |screen in the case of electrons.

C The angular width of the central maximum of the diffraction pattern will increase.

D The angular width of the central maximum will decrease.

Answer: D

Question 124

For a normal eye,the cornea of eye provides converging power of 40 D and the least converging power of eye lens behind the cornea is 20D.using the information , the distance between the retina and cornea-eye lens can be estimated to be:

A 1.5 cm

B 5 cm

C 2.5 cm

D 1.67 cm

Answer: B

Question 125

The upper half of a inclined plane of inclination θ is perfectly smooth while lower half is rough .A blocl starting from the rest top of the plane will gain come to rest at the bottom ,if the coefficients of the friction betwwen the block and lower half of the plane is given by:

A $\mu = \tan\theta$

B $\mu = \frac{1}{\tan\theta}$

C $\mu = \frac{2}{\tan\theta}$

D $\mu = 2\tan\theta$

Answer: D

Question 126

A wave travelling in the +ve direction having displacements along y direction as 1m,wavelength $2\pi m$ and frequency of $\frac{1}{\pi}$ Hz is reperesented by:

A $y = \sin(2\pi x + 2\pi t)$

B $y = \sin(x - 2t)$

C $y = \sin(2\pi x - 2\pi t)$

D $y = \sin(10\pi x - 20\pi t)$

Answer: B

Question 127

A source of unknown frequency gives 4 $\frac{beats}{s}$,when sounded with a source of known frequency 250 Hz. The second harmonic of the source of unknown frequency gives five beats per second, when sounded with a source of frequency 513 Hz. The unknown frequencyis:

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A 260 Hz

B 254 Hz

C 246 Hz

D 240 Hz

Answer: B

Question 128

A coil of self-inductance L is connected in series with a bulb B and an AC source. Brightness of the bulb decreases when:

A an iron rodis inserted in the coil.

B frequency of the AC sourceis decreased.

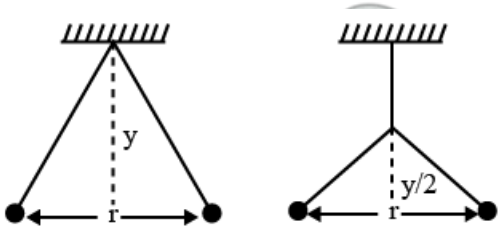
C number of turns in the coil is reduced.

D a capacitance of reactance $X_c = X_L$ is included in the samecircuit.

Answer: A

Question 129

Two pith balls carrying equal charges are suspended from a common point by strings of equal length, the equilibrium separation between them is r. Now the strings are rigidly clamped at half the height. The equilibrium separation between the balls now become:



A $\left(\frac{2r}{3}\right)$

B $\left(\frac{1}{\sqrt{2}}\right)^2$

C $\left(\frac{r}{3\sqrt{2}}\right)$

D $\left(\frac{2r}{\sqrt{3}}\right)$

Answer: C

Question 130

If we study the vibration ofa pipe openatboth ends, then the following statement is not true:

A Pressure change will be maximum at both ends

B Open end will be at antinode

C Odd harmonics of the fundamental frequency will be generated

D All harmonics of the fundamental frequency will be generated

Answer: C

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Question 131

When a proton is released from rest in a room,it starts with an initial acceleration a_o towards west. When it is projected towards north with a speed ν_0 it moves with an initial acceleration $3a_0$ toward west. The electric and magnetic fields in the room are:

A $\frac{ma_0}{e}$ east, $\frac{3ma_0}{e\nu_0}$ $down$

B $\frac{ma_0}{e}$ east, $\frac{2ma_0}{e\nu_0}$ up

C $\frac{ma_0}{e}$ east, $\frac{2ma_0}{e\nu_0}$ $down$

D $\frac{ma_0}{e}$ east, $\frac{3ma_0}{e\nu_0}$ up

Answer: C

Question 132

A wire loop is rotated in a magnetic field. The frequency of change of direction of the induced e.m-f. is :

A six times per revolution

B once per revolution

C twice per revolution

D four times per revolution

Answer: B

Question 133

A uniform force of $(3\hat{i}+\hat{j})$ newtonacts on a particle of mass 2 kg. Hence theparticle is displaced from position $(2\hat{i}+\hat{k})$ meter to position: $(4\hat{i}+3\hat{j}-\hat{k})$ meter, The work done by the force on the particle is :

A 15 J

B 9 J

C 6 J

D 13 J

Answer: B

Question 134

The wettability of a surface by a liquid depends primarly on:

A angle of contact between the surface and the liquid

B viscosity

C surface tension

D density

Answer: A

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Question 135

Infinite number of bodies , each of mass 2 kg are situated on x-axis at distances 1m,2m,4m,8m,..... respectively form the origin. The resulting gravitational potentail due to this system at the origin will be:

A -4 G

B G

C $\frac{8}{3}$ G

D $\frac{4}{3}$ G

Answer: A

Chemistry

Instructions
For the following questions answer them individually

Question 136

The value of Planck's constant is 6.63×10^{-34} Js .The speed of the light is $43 \times 10^{17} nms^{-1}$. Which value is closest to the wavelength in nanometer of a quantum light with frequency of $6 \times 10^{15} ss^{-1}$?

A 75

B 10

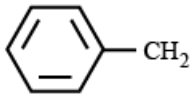
C 25

D 50

Answer: D

Question 137

The radical,



is aromatic because it has:

A 6 p-orbitals and 7 unpairedelectrons

B 6p-orbitals and 6 unpaired electrons

C 7 p-orbitals and 6 unpairedelectrons

D 7 p-orbitals and 7 unpairedelectrons

Answer: E

Question 138

Which of the following is electron-deficient ?

A PH_3

B $(CH_3)_2$

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C $(SiH_3)_2$

D $(BH_3)_2$

Answer: D

Question 139

Which of the following statements about the interstitial compoundsis incorrect ?

A They have higher melting points than the pure metal.

B They retain metallic conductivity.

C They are chemically reactive

D They are much harder than pure metals.

Answer: C

Question 140

How many grams of concentrated nitric acid solution should be used to prepare 250mL of 2.0M HNO_3? The concentrated acid is 70% HNO_3

A $54.0gconc.HNO_3$

B $45.0gconc.HNO_3$

C $590.0gconc.HNO_3$

D $570.0gconc.HNO_3$

Answer: B

Question 141

Which of the following lanthanoid ions is diamagnetic ?
(At nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70)

A Yb^{2+}

B Ce^{2+}

C Sm^{2+}

D Eu^{2+}

Answer: A

Question 142

Which oneof the following molecules contains no π bond ?

A NO_2

B CO_2

C H_2O

D SO_2

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Answer: C

Question 143

Based on equation E= $-2.178 \times 10^{-18} J \left(\frac{Z^2}{N^2}\right)$ **certain conclusions are written. Which of them is not correct ?**

A For n=1, the electron has a more negative energy than it does for n= 6 which meansthat the electron is more loosely bound in the smallest allowed orbit.

B The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would beif the electrons were at the infinite distance from the nucleus.

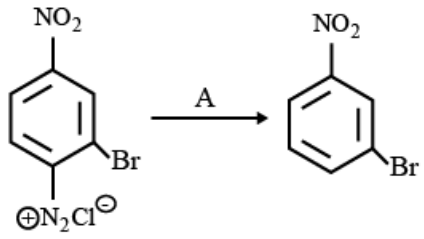
C Larger the value of n, the larger is the orbit radius.

D Equation can be used to calculate the change in energy when the electron changes orbit

Answer: A

Question 144

In the reaction



A is:

A $\underset{H_2O}{H^+}$

B $\underset{H_2SO_4}{HgSO_4}$

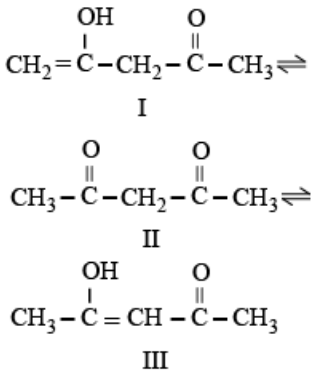
C Cu_2Cl^2

D $H_3PO_2 and H_2O$

Answer: D

Question 145

The order of the stability of the following tautomeric compounds is



A $II > III > I$

B $I > II > III$

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C $III > II > I$

D $II > I > III$

Answer: C

Question 146

Nylon is an example of

A Polythene

B Polyster

C Polysachharide

D Polyamide

Answer: D

Question 147

XeF_2 is iso-structural with:

A $BaCl_2$

B TeF_2

C ICl_2

D $SbCl_3$

Answer: C

Question 148

The basic structural unit of silicates is :

A SiO_4^{2-}

B SiO^-

C SiO_4^{4-}

D SiO_3^{2-}

Answer: C

Question 149

Which of the following structure is similar to graphite ?

A B_2H_6

B BN

C B

D B_4C

Answer: B

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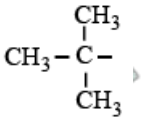
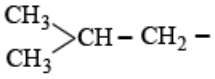
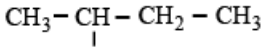
Question 150

The structure of isobutyl group in an organic compound is:

A 

B 

C 

D $CH_3 - CH_2 - CH_2 - CH_2-$

Answer: B

Question 151

Thenumberofcarbon atoms per unit cell of diamond unit cell is :

A 1

B 4

C 8

D 6

Answer: C

Question 152

An excess of $AgNO_3$ is added to 100 mL of a 0.01M solution of dichlorotetraaquachromium(II]) chloride. The number of moles of AgCl precipitated would be:

A 0.01

B 0.001

C 0.002

D 0.003

Answer: B

Question 153

Whatis the maximum numbers of electrons that can be associated with the following set of quantum numbers? n=3,l=1and m=-1.

A 2

B 10

C 6

D 4

Answer: A

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Question 154

Whichof these is nota monomerfor a high molecular mass silicone polymer?

A $PhSiCl_3$

B $MeSiCl_3$

C Me_2SiCl_2

D Me_3SiCl

Answer: D

Question 155

A reaction having equal energies of activation for forward andreverse reactionshas:

A $\triangle H = \triangle G = \triangle S = 0$

B $\triangle S = 0$

C $\triangle G = 0$

D $\triangle H = 0$

Answer: A

Question 156

At 25°C molar conductance of 0.1 molar aqueous solution of ammonium hydroxide is $9.54 ohm^{-1}cm^2mol^{-1}$ and at infinite dilution its molar conductance is 238 $ohm^{-1}cm^2mol^{-1}$. The degree of ionisation of ammonium hydroxide at the same concentration and temperature is:

A 40.800 %

B 2.080%

C 20.800%

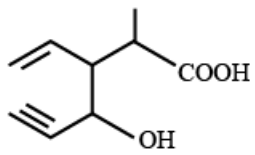
D 4.008 %

Answer: D

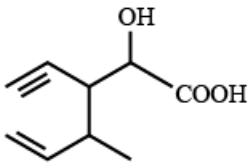
Question 157

Structure of the compound whose IUPAC name is 3-Ethyl-2hydroxy-methylhex-3-en-5-ynoic acid is :

A



B



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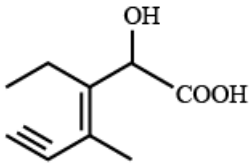
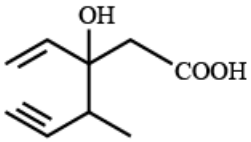
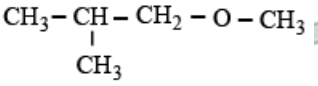
C 

D 

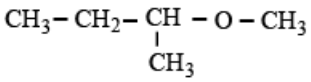
Answer: C

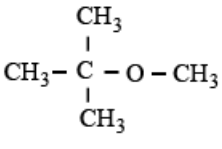
Question 158

Among the following ethers which one will produce methyl alcohol on treatment with hot concentrated HI?

A 

B $CH_3 - CH_2 - CH_2 - CH_2 - O - CH_3$

C 

D 

Answer: D

Question 159

Antiseptics and disinfectants either kill or prevent growth of microrganisms. Identify which of the following statementsis nottrue :

A Disinfectants harm theliving tissues.

B A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant.

C Chlorine and Iodine are used as strong disinfectants.

D Dilute solutions of Boric acid and Hydrogen Peroxideare strong antiseptics.

Answer: C

Question 160

A magnetic moment of 1.73 BM will be shown by one among the following:

A $[CoCl_6]^{4-}$

B $[Cu(NH_3)_4]^{2+}$

C $[Ni(CN)_4]^{2-}$

D $TiCl_4$

Answer: B

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Question 161

$KMnO_4$ can be prepared from K_2MnO_4 as per the reaction $3MnO_4^{2-} + 2H_2O \rightleftharpoons 2MnO_4^- + MnO_2 + 4OH^-$ The reaction can go to completion by removing OH^- ions by adding :

A SO_2

B HCl

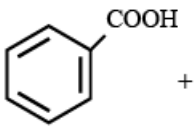
C KOH

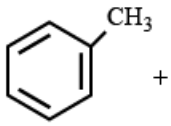
D CO_2

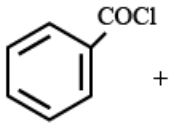
Answer: D

Question 162

Reaction by which Benzaldehyde cannot be prepared :

A  + Zn/Hg and conc. HCl

B  + CrO_2Cl_2 in CS_2 followed by H_3O^+

C  + H_2 in presence of Pd-$BaSO_4$

D  + CO + HCl in presence of anhydrous $AlCl_3$

Answer: A

Question 163

Which of the following does not give oxygen on heating ?

A $(NH_4)_2Cr_2O_7$

B $KClO_3$

C $Zn(ClO_3)_2$

D $K_2Cr_2O_7$

Answer: A

Question 164

A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is 2.72 g cm^{-3}. The molar mass of the metal is : (N_A Avagadro's constant = $6.02 \times 10^{23} mol^{-1}$)

A $20\ g\ mol^{-1}$

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B $40\ g\ mol^{-1}$

C $30\ g\ mol^{-1}$

D $27\ g\ mol^{-1}$

Answer: D

Question 165

Dipole - induced dipole interactions are present in which of the following pairs :

A SiF_4 and He atoms

B H_2O and alcohol

C Cl_2 and CCl_4

D HCl and He atoms

Answer: D

Question 166

Roasting of sulphides gives the gas X as a by-product. This is a colorless gas with choking smell of burnt sulphur and causes great damage to respiratory organs as a result of acid rain. Its aqueoussolutionis acidic, acts as a reducing agent and its acid has never been isolated. The gas X is:

A SO_3

B H_2S

C SO_2

D CO_2

Answer: C

Question 167

Some meat- directing substutients in aromatic substitution are given .Which one is most deactivating?

A $-NO_2$

B -CaN

C $-SO_3H$

D -COOH

Answer: A

Question 168

Nitrobenzene on reaction with $\overset{conc.HNO_3}{H_2SO_4}$ **at 80** -100°**C forms which one of the following products?**

A 1,2,4- Trinirobenzene

B 1,2-Dinirobenzene

C 1,3-Dinirobenzene

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D 1,4-Dinirobenzene

Answer: C

Question 169

A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of pH = 10 and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be ?

A 1.18V

B 0.059V

C O.59V

D 0.118V

Answer: C

Question 170

Which of the following is a polar molecule ?

A XeF_4

B BF_3

C SF_4

D SiF_4

Answer: C

Question 171

A button cell used in watches functions as following $Zn(s) + Ag_2O(S) + H_2O(l) \rightleftharpoons 2Ag(s) + Zn^{2+}(aq) + 2OH^-(aq)$
If half cell potentials are $Zn^{2+}(aq) + 2e^- \rightarrow Zn(s); E^\circ = -0.76V$
$Ag_2O(s) + H_2O(1) + 2e^- \rightarrow 2Ag(s) + 2OH^-(aq), E^\circ = -0.34V$
The cell potential will be:

A 1.34 V

B 1.10 V

C 0.42 V

D 0.84 V

Answer: B

Question 172

Which of these is least likely to act as a Lewis base ?

A PF_3

B CO

C F^-

D BF_3

Answer: D

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Question 173

Which of the following compounds will not undergo Friedal - Craft's reaction easily :

A Toluene

B Cumene

C Xylene

D Nitrobenzene

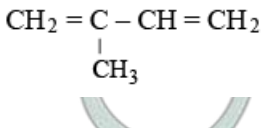
Answer: D

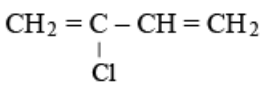
Question 174

Whichis the monomerof Neoprenein the following?

A $CH_2 = CH - \equiv -CH$

B $CH_2 = CH - CH = CH_2$

C 

D 

Answer: D

Question 175

6.02×10^{20} **molecules of urea are present in 100 nb. otits solution. The concentration of solution Is;**

A 0.1 M

B 0.02 M

C 0.01 M

D 0.001 M

Answer: C

Question 176

Maximum deviation from ideal gas is expected from:

A $NH_3(g)$

B $H_2(g)$

C $N_2(g)$

D $CH_4(g)$

Answer: A

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Question 177

Which of the following is paramagnetic ?

A NO^+

B CO

C O_2^-

D CN^-

Answer: C

Question 178

Identify correct order of solubilty in aqueous medium

A $Na_2S > ZnS > CuS$

B $CuS > ZnS > Na_2S$

C $ZnS > Na_2S > CuS$

D $Na_2S > CuS > ZnS$

Answer: A

Question 179

What is the activation energy for a reaction if its rate doubles when the temperature is raised from $2O^\circ$**C to** 35°**C** $(R = 8.314 Jmol^{-1}K^{-1})$

A $15.1 kJmol^{-1}$

B $342 kJmol^{-1}$

C $269 kJmol^{-1}$

D $34.7 kJmol^{-1}$

Answer: D

Question 180

Which is the strongest acid in the following?

A H_2SO_3

B H_2SO_4

C $HClO_3$

D $HClO_4$

Answer: D

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