NEET 2016

Physics

Instructions

For the following questions answer them individually

Question 1

A solid sphere of mass m and radius R is rotating about its diameter. A solid cylinder of the same mass and sameradiusis also rotating about its geometrical axis with an angular speed twice that of the sphere. The ratio of their kinetic energies of rotation $\left(\frac{E_{sphere}}{E_{cylinder}}\right)$ will be:

A 1: 5

B 1: 4

C 3: 1

D 2: 3

Answer: A

Question 2

A light rod of length l has two masses m_1 and m_2 attatched to its two ends. The moment of inertia of the system about an axis perpendicular to the rod and passing through the center of mass is

A $\frac{m_1+m_2}{m_1m_2}\,l_2$

B $(m_1+m_2)l_2$

C $\sqrt{m_1m_2}l_2$

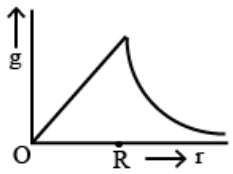
D $\frac{m_1m_2}{m_1+m_2}\,l_2$

Answer: D

Question 3

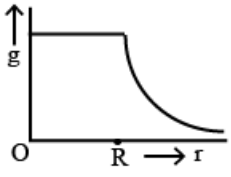
Starting from the centre of the earth having radius R, the variation of g (accelaration) due to gravity) is shown by

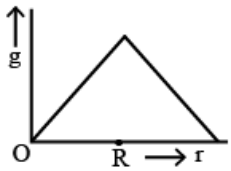
A



B

C



D 

Answer: A

Question 4

A satellite of mass m is orbiting the earth (of radius R) at a height h from its surface. The total energy of the satellite in terms of g_0, the value of acceleration due to gravity at the earth's surface, is

A $\frac{mg_0R^2}{-2(R+h)}$

B $\frac{2mg_0R^2}{R+h}$

C $\frac{2mg_0R^2}{-R+h}$

D $\frac{mg_0R^2}{2(R+h)}$

Answer: A

Question 5

A rectangular film of liquid is extended from $(4cm \times 2cm)$ to $(5cm \times 4cm)$. If the work done is 3×10^{-4} J, the value of the surface tension of the liquid is

A $0.125Nm^{-1}$

B $0.2Nm^{-1}$

C $8.0Nm^{-1}$

D $0.250Nm^{-1}$

Answer: A

Question 6

Three liquids of densities p_1, p_2 and p_3 (with $p_1 > p_2 > p_3$), having the same value of surface tension T, rise to the same height in three identical capillaries. The angles of contact θ_1, θ_2 and θ_3 obey

A $0 \leq \theta_1 < \theta_2 < \theta_3 < \frac{\pi}{2}$

B $\frac{\pi}{2} < \theta_1 < \theta_2 < \theta_3 < \pi$

C $\pi > \theta_1 > \theta_2 > \theta_3 > \frac{\pi}{2}$

D $\frac{\pi}{2} > \theta_1 > \theta_2 > \theta_3 \geq 0$

Answer: A

Question 7

Two identical bodies are made of a material for which the heat capacity increases with temperature. One of these is at $100°C$, while the other one is at $0°C$. If the two bodies are brought into contact, then, assuming no heat loss, the final common temperature is

A more than $50^{\circ}C$

B less than $50^{\circ}C$ but greater than $0^{\circ}C$

C $0^{\circ}C$

D $50^{\circ}C$

Answer: A

Question 8

A body cools from a temperature 3T to 2T in 10 minutes. The room temperature is T. Assume that Newton's law of cooling is applicable. The temperature of the body at the end of next 10 minutes will be

A $\frac{3}{2}T$

B $\frac{4}{3}T$

C T

D $\frac{7}{4}T$

Answer: A

Question 9

One mole of an ideal monatomic gas undergoes a process described by the equation PV^3 = constant. The heat capacity of the gas during this process is

A $\frac{5}{2}R$

B $2R$

C R

D $\frac{3}{2}R$

Answer: C

Question 10

The temperature inside a refrigerator is t_2^0c and the room temperature is t_1^0c. The amount of heat delivered to the room for each joule of electrical energy consumed ideally will be

A $\frac{t_1+273}{t_1-t_2}$

B $\frac{t_2+273}{t_1-t_2}$

C $\frac{t_1+t_2}{t_1+273}$

D $\frac{t_1}{t_1-t_2}$

Answer: A

Question 11

A given sample of an ideal gas occupies a volume V at a pressure P and absolute temperature T. The mass of each molecule of the gas is m. Which ofthe following gives the density of the gas ?

A $\frac{Pm}{(KT)}$

B $\frac{P}{(KTV)}$

C mkT

D $\frac{P}{(KT)}$

Answer: A

Question 12

A body of mass m is attached to the lower end of a spring whose upper end is fixed. The spring has negligible mass. When the mass m is slightly pulled down andreleased, it oscillates with a time period of 3s. When the mass m is increased by 1kg, the time period of oscillations becomes 5s. The value of m in kg is

A $\frac{4}{3}$

B $\frac{16}{9}$

C $\frac{9}{16}$

D $\frac{3}{4}$

Answer: C

Question 13

The second overtone of an. open organ pipe has the same frequency as the first overtone of a closedpipe L metre long. The length of the open pipe will be

A $2L$

B $\frac{L}{2}$

C $4L$

D L

Answer: A

Question 14

Three sound waves of equal amplitudes have frequencies $(n-1)$, n, $(n+1)$. They superimpose to give beats. The number of beats produced per second will be

A 4

B 3

C 2

D 1

Answer: C

Question 15

An electric dipole is placed at an angle of 30^0c with an electric field intensity $2 \times 10^5 \frac{N}{C}$. It experiences a torque equal to 4Nm. The charge on the dipole, if the dipole length is 2 cm,is

A $2mC$

B $5mC$

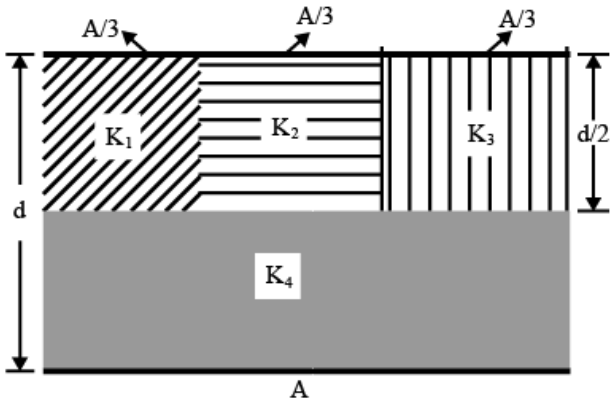
C $7\mu\ C$

D $8mC$

Answer: A

Question 16

A parallel-plate capacitor of area A, plate separation d and capacitance C is filled with four dielectric materials having dielectric constants k_1, k_2, k_3 and k_4 as shown in the figure below. If a single dielectric material is to be used to have the same capacitance C in this capacitor, then its dielectric constant k is given by



A $k = \frac{2}{3}(k_1 + k_2 + k_3) + 2k_4$

B $\frac{2}{k} = \frac{3}{k_1+k_2+k_3} + \frac{1}{k_4}$

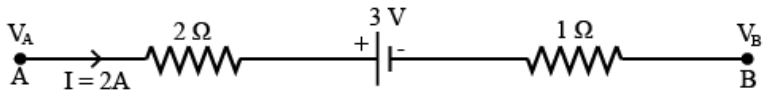
C $\frac{1}{k} = \frac{1}{k_1} + \frac{1}{k_2} + \frac{1}{k_3} + \frac{3}{2k_4}$

D $k = k_1 + k_2 + k_3 + 3k_4$

Answer: B

Question 17

The potential difference $(V_A - V_B)$ between the points A and in the given figure is:



A +3 V

B +6 V

C +9 V

D -3 V

Answer: C

Question 18

A filament bulb (500 W, 100 V) is to be used in a 230 V main supply. Whena resistance R is connected in series, it works perfectly and the bulb consumes 500 W. Thevalue of R is:

A 46Ω

B 26Ω

C 13Ω

D 230Ω

Answer: B

Question 19

A long wire carrying a steady currentis bent into a circular loop of one turn. The magnetic field at the centre of the loop is B It is then bent into a circular coil of n turns. The magnetic field at the centre of this coil of n turns will be

A n^2B

B $2nB$

C $2n^2B$

D nB

Answer: A

Question 20

A bar magnetis hung by a thin cotton thread in a uniform horizontal magnetic field and is in equilibrium state. The energy required to rotate it by 60^0 is W. Now the torque required to keep the magnet in this new position is

A $\sqrt{3}W$

B $\frac{\sqrt{3}W}{2}$

C $\frac{2W}{\sqrt{3}}$

D $\frac{W}{\sqrt{3}}$

Answer: A

Question 21

An electron is moving in a circular path under the influence of a transverse magnetic field of $3.57 \times 10^{-2}T$. If the value of $\frac{e}{m}$ is $1.76 \times 10^{11}\frac{c}{kg}$, the frequency of revolution of the electron is

A 100 MHz

B 62.8 MHz

C 6.28 MHz

D 1 GHz

Answer: D

Question 22

Which of the following combinations should be selected for better tuning of an L-C-R circuit used for communication?

A $R = 25\Omega, L = 2.5H, C = 45\mu F$

B $R = 15\Omega, L = 3.5H, C = 30\mu F$

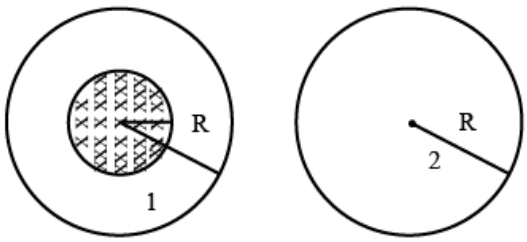
C $R = 25\Omega, L = 1.5H, C = 45\mu F$

D $R = 20\Omega, L = 1.5H, C = 35\mu F$

Answer: B

Question 23

A uniform magnetic field is restricted within a region of radius r. The magnetic field changes with time at a rate $\frac{\overrightarrow{dB}}{dt}$. Loop 1 of radius $R > r$ encloses the region r and loop 2 of radius R is outside the region of magnetic field as shown in the figure below. Then the e.m.f. generated is



A $-\frac{\overrightarrow{dB}}{dt}\pi r^2$ in loop 1 and $-\frac{\overrightarrow{dB}}{dt}\pi r^2$ in loop 2

B $-\frac{\overrightarrow{dB}}{dt}\pi R^2$ in loop 1 and Zero in loop 2

C $-\frac{\overrightarrow{dB}}{dt}\pi r^2$ in loop 1 and Zero in loop 2

D zero in loop 1 and zero in loop 2

Answer: C

Question 24

The potential differences across the resistance, capacitance and inductance are 80 V, 40 V and 100 V respectively in an L-C-R circuit. The power factor of this circuit is

A 0.5

B 0.8

C 1.0

D 0.4

Answer: B

Question 25

A 100Ω resistance and a capacitor of 100Ω reactance are connected in series across a 220 V source. When the capacitor is 50% charged, the peak value of the displacement current is

A $11A$

B $4.4A$

C $11\sqrt{2}A$

D $2.2A$

Answer: D

Question 26

Two identical glass $(\mu g = \frac{3}{2})$ equiconvex lenses of focal length f each are kept in contact. The space between the two lenses is filled with water $(\mu_w = \frac{4}{3})$. The focal length of the combination is

A f

B $\frac{4f}{3}$

C $\frac{3f}{4}$

D $\frac{f}{3}$

Answer: C

Question 27

An air bubble in a glass slab with refractive index 1.5 (near normal incidence) is 5 cm deep when viewed from one surface and 3cm deep when viewed from the opposite face. The thickness (in cm) of the slab is

A 10

B 12

C 16

D 8

Answer: B

Question 28

The interference pattern is obtained with two coherent light sources of intensity ratio n. In the interference pattern, the ratio $\frac{I_{max}-I_{min}}{I_{max}+I_{min}}$ will be

A $\frac{2\sqrt{n}}{n+1}$

B $\frac{\sqrt{n}}{(n+1)^2}$

C $\frac{2\sqrt{n}}{(n+1)^2}$

D $\frac{\sqrt{n}}{n+1}$

Answer: A

Question 29

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 powerof the correcting lens, the person has to use, will be

A concave, −0.25 diopter

B concave, −0.2 diopter

C convex, +0.15 diopter

D convex, +2.25 diopter

Answer: A

Question 30

A linear aperture whose width is 0.02 cm is placed immediately in front of a lens of focal length 60cm. The aperture is illuminated normally by a parallel beam of wavelength 5×10^{-5} cm. The distance of the first dark band of the diffraction pattern from the centre of the screen is

A 0.25 cm

B 0.20 cm

C 0.15 cm

D 0.10 cm

Answer: C

Question 31

Electrons of mass m with de-Broglie wave length λ fall on the target in an X-ray tube. The cutoff wavelength (λ_0) of the emitted X-ray is

A $\lambda_0 = \frac{2h}{mc}$

B $\lambda_0 = \frac{2m^2c^2\lambda^2}{h^2}$

C $\lambda_0 = \lambda$

D $\lambda_0 = \frac{2mc\lambda^2}{h}$

Answer: D

Question 32

Photons with energy 5eV are incident on a cathode C in a photoelectric cell. The maximum energy of emitted photoelectrons is 2 eV. When photons of energy 6 eV are incident on C, no photoelectrons will reach the anode A, if the stopping potential of A relative to C is

A +4 V

B -1 V

C -3 V

D +3 V

Answer: C

Question 33

If an electron in a hydrogen atom jumps from the 3rd orbit to the 2nd orbit, it emits a photon of wavelength λ. When it jumps from the 4th orbit to the 3rd orbit, the corresponding wavelength of the photon will be

A $\frac{9}{16}\lambda$

B $\frac{20}{7}\lambda$

C $\frac{20}{13}\lambda$

D $\frac{16}{25}\lambda$

Answer: B

Question 34

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

A 30

B 45

C 60

D 15

Answer: C

Question 35

For CE transistor amplifier, the audio signal voltage across the collector resistance of $2k\Omega$ is 4 V. If the current amplification factor of the transistor is 100 and the base resistance is $1k\Omega$, then the input signal voltage is

A 20 mV

B 30 mV

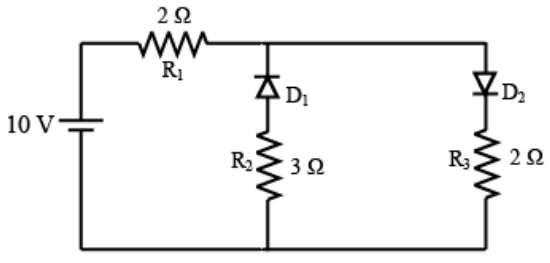
C 15 mV

D 10 mV

Answer: A

Question 36

The given circuit has two ideal diodes connected as shown in the figure below. The current flowing through the resistance R_1, will be



A 10.0 A

B 1.43 A

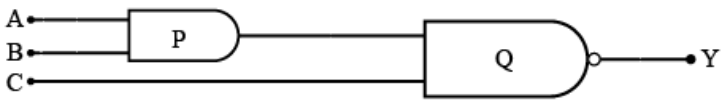
C 3.13 A

D 2.5 A

Answer: D

Question 37

What is the output Y in the following circuit, when all the three inputs A, B, C are first 0 and then 1?



A 0, 0

B 1, 0

C 1, 1

D 0, 1

Answer: B

Question 38

Planck's constant (h), speed of light in vacuum (c) and Newton's gravitational constant (G) are three fundamental constants. Which of the following combinations of these has the dimension of length ?

A $\sqrt{\frac{hG}{c^{\frac{5}{2}}}}$

B $\sqrt{\frac{hc}{G}}$

C $\sqrt{\frac{Gc^{\frac{3}{2}}}{h}}$

D $\sqrt{\frac{hG}{c^{\frac{3}{2}}}}$

Answer: D

Question 39

Two cars P and Q start from a point at the same time in a straight line and their positions are represented by $x_P(t) = at + bt^2$ **and** $x_Q(t) = ft - t^2$**. At what time do the cars have the same velocity?**

A $\frac{a+f}{2(b-1)}$

B $\frac{a+f}{2(1+b)}$

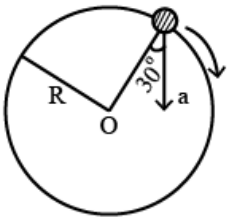
C $\frac{f-a}{2(1+b)}$

D $\frac{a-f}{1+b}$

Answer: C

Question 40

In the given figure, $a = 15 \frac{m}{s^2}$ represents the total acceleration of a particle moving in the clockwise direction in a circle of radius R=2.5 m at a given instant of time. The speed of the particle is



A $5.0 \frac{m}{s}$

B $5.7 \frac{m}{s}$

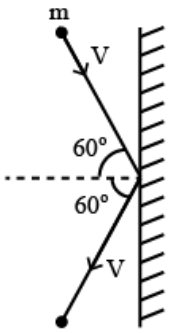
C $6.2 \frac{m}{s}$

D $4.5 \frac{m}{s}$

Answer: B

Question 41

A rigid ball of mass strikes a rigid wall at 60^0 and gets reflected without loss of speed as shown in the figure below. The value of impulse imparted by the wall on the ball will be



A $2mV$

B $\frac{mV}{2}$

C $\frac{mV}{3}$

D mV

Answer: D

Question 42

A bullet of mass 10g moving horizontally with a velocity of $400ms^{-1}$ strikes a wooden block of mass 2 kg which is suspended by a light inextensible string of length 5 m. As a result, the centre of gravity of the block is found to rise a vertical distance of 10 cm. The speed of the bullet after it emerges out horizontally from the block will be

A $80ms^{-1}$

B $120ms^{-1}$

C $160ms^{-1}$

D $100ms^{-1}$

Answer: B

Question 43

Two identical balls A and B having velocities of $0.5\frac{m}{s}$ and $-0.3\frac{m}{s}$ respectively collide elastically in one dimension. The velocities of B and A after the collision respectively will be

A $0.5\frac{m}{s}$ and $-0.3\frac{m}{s}$

B $-0.3\frac{m}{s}$ and $0.5\frac{m}{s}$

C $0.3\frac{m}{s}$ and $0.5\frac{m}{s}$

D $-0.5\frac{m}{s}$ and $0.3\frac{m}{s}$

Answer: A

Question 44

A particle moves from a point $(-2\hat{i}+5\hat{j})$ to $(4\hat{j}+3\hat{k})$ when a force of $(4\hat{i}+3\hat{j})N$ is applied. How much work has been done by the force?

A 11 J

B 5 J

C 2 J

D 8 J

Answer: B

Question 45

Two rotating bodies A and B of masses m and 2m with moments of inertia I_A and $I_B(I_B > I_A)$ have equal kinetic energy of rotation. If L_A ans L_B be their angular momenta respectively, then

A $L_A = 2L_B$

B $L_B > L_A$

C $L_A > L_B$

D $L_A = \frac{L_B}{2}$

Answer: B

Biology

Instructions

For the following questions answer them individually

Question 46

A non-proteinaceous enzyme is

A ribozyme

B ligase

C deoxyribonuclease

D lysozyme

Answer: A

Question 47

Select the mismatch.

A Large central vacuoles—Animal cells

B Protists—Eukaryotes

C Methanogens—Prokaryotes

D Gas vacuoles—Green bacteria

Answer: A

Question 48

Select the wrong statement.

A Pili and fimbriae are mainly involved in motility of bacterial cells.

B Cyanobacteria lack flagellated cells.

C Mycoplasma is a wall-less microorganism.

D Bacterial cell wall is made up of peptidoglycan.

Answer: A

Question 49

A cell organelle containing hydrolytic enzymes is

A microsome

B ribosome

C mesosome

D lysosome

Answer: D

Question 50

During cell growth, DNA synthesis takes place in

A G_1 Phase

B G_2 Phase

C M Phase

D S Phase

Answer: D

Question 51

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

A Fructose 1,6-bisphosphate

B Pyruvic acid

C Acetyl CoA

D Glucose-6-phosphate

Answer: C

Question 52

A few drops of sap werecollected by cutting across a plant stem by a suitable method. The sap was tested chemically. Which one of the following test results indicates that it is phloem sap?

A Alkaline

B Low refractive index

C Absence of sugar

D Acidic

Answer: A

Question 53

You are given a tissue with its potential for differentiation in an artificial culture. Which of the following pairs of hormones would you add to the medium to secure shoots as well as roots?

A Auxin and cytokinin

B Auxin and abscisic acid

C Gibberellin and abscisic acid

D IAA and gibberellin

Answer: A

Question 54

Phytochrome is a

A glycoprotein

B lipoprotein

C chromoprotein

D flavoprotein

Answer: C

Question 55

Whichis essential for the growth of root tip?

A Fe

B Ca

C Mn

D Zn

Answer: B

Question 56

The process which makes major difference between C_3 and C_4 plants is

A Calvin cycle

B photorespiration

C respiration

D glycolysis

Answer: B

Question 57

Which oneof the following statements is no correct?

A Microscopic, motile asexual reproductive structures are called zoospores.

B In potato, banana and ginger, the plantlets arise from the internodes present in the modified stem.

C Water hyacinth, growing in the standing water, drains oxygen from water that leads to the death offishes.

D Offspring produced by the asexual reproduction are called clone.

Answer: B

Question 58

Which one of the following generates new genetic combinations leading to variation?

A Parthenogenesis

B Sexual reproduction

C Nucellar polyembryony

D Vegetative reproduction

Answer: B

Question 59

Match Column—I with Column—II and select the correct option using the codes given below:

Column - I	**Column - II**
a. Pistils fused together	(i) Gametogenesis
b. Formation of gametes	(ii) Pistillate
c. Hyphae of higher Ascomycetes	(iii) Syncarpous
d. Unisexual female floer	(iv) Dikaryotic

A (ii), (i), (iv), (iii)

B (i), (ii), (iv), (iii)

C (iii), (i), (iv), (ii)

D (iv), (iii), (i), (ii)

Answer: C

Question 60

In majority of angiosperms

A there are numerous antipodal cells

B reduction division occurs in the megaspore mother cells

C a small central cell is present in the embryo sac

D egg has a filiform apparatus

Answer: B

Question 61

Pollination in water hyacinth and water lily is broughtabout by the agency of

A insects and wind

B birds

C bats

D water

Answer: A

Question 62

The ovule of an angiosperm is technically equivalent to

A megasporophyll

B megaspore mother cell

C megaspore

D megasporangium

Answer: D

Question 63

Taylor conducted the experiments to prove semiconservative mode of chromosome replication on

A Vicia faba

B Drosophila melanogaster

C E. coli

D Vinca rosea

Answer: A

Question 64

The mechanism that causes a gene to move from one linkage groupto anotheris called

A duplication

B translocation

C crossing-over

D inversion

Answer: B

Question 65

The equivalent of a structural gene is

A cistron

B operon

C recon

D muton

Answer: A

Question 66

A true breeding plant is

A produced due to cross-pollination among unrelated plants

B near homozygous and produces offspring of its own kind

C always homozygous recessive in its genetic constitution

D one that is able to breed on its own

Answer: B

Question 67

Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria?

A 18 S rRNA

B 23 S rRNA

C 5.8 S rRNA

D 5 S rRNA

Answer: B

Question 68

Stirred-tank bioreactors have been designed for

A addition of preservatives to the product

B availability of oxygen throughout the process

C ensuring anaerobic conditions in the culture vessel

D purification of product

Answer: B

Question 69

A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using

A Taq polymerase

B polymerase III

C ligase

D Eco RI

Answer: C

Question 70

Whichof the following is not a component of downstream processing?

A Purification

B Preservation

C Expression

D Separation

Answer: C

Question 71

Which of the following restriction enzymes produces blunt ends

A Eco RV

B Xho I

C Hind III

D Sal I

Answer: A

Question 72

Which kind of therapy wasgiven in 1990 toa four-year-old girl with adenosine deaminase (ADA) deficiency?

A Chemotherapy

B Immunotherapy

C Radiation theraphy

D Gene theraphy

Answer: D

Question 73

How many hot spots of biodiversity in the world have been identified till date by Norman Myers?

A 25

B 34

C 43

D 17

Answer: B

Question 74

The primary producers of the deep-sea hydrothermal vent ecosystem are

A chemosynthetic bacteria

B blue-green algae

C coral reefs

D green algae

Answer: A

Question 75

Which of the following is correct for r-selected species?

A Large number of progeny with large size

B Small number of progeny with small size

C Small number of progeny with large size

D Large number of progeny with small size

Answer: D

Question 76

If '+' sign is assigned to beneficial interaction, '-' sign to detrimental and '0' sign to neutral interaction, then the population interaction represented by '+' '-' refers to

A amensalism

B commensalism

C parasitism

D mutualism

Answer: C

Question 77

Which of the following is correctly matched?

A Age pyramid—Biome

B Parthenium hysterophorus—Threat to biodiversity

C Stratification—Population

D Aerenchyma—Opuntia

Answer: B

Question 78

Red List contains data or information on

A plants whose products are in international trade

B threatened species

C marine vertebrates only

D all economically important plants

Answer: B

Question 79

Which one of the following is wrong for fungi?

A All fungi possess a purely cellulosic cell wall.

B They are heterotrophic.

C They are both unicellular and multicellular.

D They are eukaryotic.

Answer: A

Question 80

Methanogens belong to

A Archaebacteria

B Dinoflagellates

C Slime moulds

D Eubacteria

Answer: A

Question 81

Select the wrong statement.

A 'Diatomaceous earth' is formed by the cell walls of diatoms.

B Diatoms are chief producers in the oceans.

C Diatoms are microscopic and float passively in water.

D The walls of diatoms are easily destructible.

Answer: D

Question 82

The label of a herbarium sheet does not carry information on

A name of collector

B local names

C height of the plant

D date of collection

Answer: C

Question 83

Conifers are adapted to tolerate extreme environmental conditions because of

A superficial stomata

B thick cuticle

C presence of vessels

D broad hardy leaves

Answer: B

Question 84

Which one of the following statements is wrong ?

A Align is obtained from red algae, and carrageenan from brown algae.

B Agar-agar is obtained from Gelidium and Gracilaria.

C Laminaria and Sargassum are used as food.

D Algae increase the level of dissolved oxygen in the immediate environment.

Answer: A

Question 85

The term 'polyadelphous'is related to

A androecium

B corolla

C calyx

D gynoecium

Answer: A

Question 86

How many plants among Indigofera, Sesbania, Salvia, Allium, Aloe, mustard, groundnut, radish, gram and turnip have stamens with different lengths in their flowers?

A Four

B Five

C Six

D Three

Answer: A

Question 87

Radial symmetry is found in the flowers of

A Trifolium

B Pisum

C Cassia

D Brassica

Answer: D

Question 88

Free-central placentation is found in

A Argemone

B Brassica

C Citrus

D Dianthus

Answer: D

Question 89

Cortex is the region found between

A pericycle and endodermis

B endodermis and pith

C endodermis and vascular bundle

D epidermis andstele

Answer: D

Question 90

The balloon-shapedstructurescalled tyloses

A characterize the sapwood

B are extensions of xylem parenchyma cells into vessels

C are linked to the ascent of sap through xylem vessels

D originate in the lumen of vessels

Answer: B

Question 91

Match the stages of meiosis in Column–Ito their characteristic features in Column–II and select the correct option using the codes given below :

Column - I	Column - II
a. Pachytene	(i) Pairing of homologous chromosomes
b. Metaphase I	(ii) Terminalization of chiasmata
c. Diakinesis	(iii) Crossing-over takes place
d. Zygotene	(iv) Chromosomes align at equatorial plate

A (i), (iv), (ii), (iii)

B (ii), (iv), (iii), (i)

C (iv), (iii), (ii), (i)

D (iii), (iv), (ii), (i)

Answer: D

Question 92

Which hormones' do stimulate' the production of pancreatic juice and bicarbonate?

A Gastrin and insulin

B Cholecystokinin and secretin

C Insulin and glucagon

D Angiotensin and epinephrine

Answer: B

Question 93

The partial pressure of oxygen in the alveoli of the lungs is

A more than that in the blood

B less than that in the blood

C less than that of carbon dioxide

D equal to that in the blood

Answer: A

Question 94

Choose the correct statement.

A Meissner's corpuscles are thermo-receptors

B Photoreceptors in the human eye are depolarized during darkness and become hyperpolarized in response to the light stimulus.

C Receptors do not produce graded potentials.

D Nociceptors respond to changes in pressure.

Answer: B

Question 95

Grave's disease is caused due to

A hypersecretion of thyroid gland

B hyposecretion of adrenal gland

C hypersecretion of adrenal gland

D hyposecretion of thyroid gland

Answer: A

Question 96

Namethe ion responsible for unmasking of active sites for myosin for cross-bridge activity during muscle contraction.

A Magnesium

B Sodium

C Potassium

D Calcium

Answer: D

Question 97

Name the blood cells, whose reduction in numbercan causeclotting disorder, leading to excessive loss of blood from the body.

A Leucocytes

B Neutrophils

C Thrombocytes

D Erythrocytes

Answer: C

Question 98

Name a peptide hormone which acts mainly on hepatocytes, adipocytes and enhances cellular glucose uptake and utilization.

A Glucagon

B Secretin

C Gastrin

D Insulin

Answer: D

Question 99

Osteoporosis, an age-related disease of skeletal system, may occur due to

A high concentration of Ca^{++} and Na^{+}

B decreased level of estrogen

C accumulation of uric acid leading to inflammation of joints

D immune disorder affecting neuro muscular junction leading to fatigue

Answer: B

Question 100

Serum differs from blood in

A lacking albumins

B lacking clotting factors

C lacking antibodies

D lacking globulins

Answer: B

Question 101

Lungs do not collapse between breaths and some air always remains in the lungs which can never be expelled because

A there is a negative intrapleural pressure pulling at the lung walls

B there is a positive intrapleural pressure

C pressure in the lungsis higher than the atmospheric pressure

D there is a negative pressure in the lungs

Answer: A

Question 102

The posterior pituitary gland is not a 'true' endocrine gland because

A it only stores and releases hormones

B it is under the regulation of hypothalamus

C it secretes enzymes

D it is provided with a duct

Answer: A

Question 103

The part of nephron involved in active reabsorption of sodium is

A proximal convoluted tubule

B Bowman's capsule

C descending limb of Henle's loop

D distal convoluted tubule

Answer: A

Question 104

Which of the following is hormone releasing IUD?

A Multiload 375

B Lippes loop

C Cu7

D LNG-20

Answer: D

Question 105

Which ofthe following is incorrect regarding vasectomy?

A No sperm occurs in epididymis

B Vasa deferentia is cut and tied

C Irreversible sterility

D No sperm occurs in seminal fluid

Answer: A

Question 106

Embryo with more than 16 blastomeres formed due to in vitro fertilization is transferred into

A fallopian, tube

B fimbriae

C cervix

D uterus

Answer: D

Question 107

Which of the following depicts the correct pathway of transport of sperms?

A Rete testis → Epididymis → Efferent ductules → Vas deferens

B Rete testis → Vas deferens → Efferent ductules → Epididymis

C Efferent ductules → Rete testis → Vas deferens → Epididymis

D Rete testis → Efferent ductules → Epididymis → Vas deferens

Answer: D

Question 108

Match Column—I with Column—II and select the correct option using the codes following is hormonegiven below :

Column - I	Column - II
a. Mons pubis	(i) Embryo formation
b. Antrum	(ii) Sperm
c. Trophectoderm	(iii) Female external genitalia
d. Nebenkern	(iv) Graafian follicle

A (iii), (iv), (i), (ii)

B (iii), (i), (iv), (ii)

C (i),, (iv), (iii), (ii)

D (iii), (iv), (ii), (i)

Answer: A

Question 109

Several hormones like hCG, hPL, estrogen, progesterone are produced by

A Placenta

B fallopian tube

C pituitary

D ovary

Answer: A

Question 110

If a colour-blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour-blind is

A 0.5

B 0.75

C 1

D 0

Answer: D

Question 111

Genetic drift operates in

A large isolated population

B non-reproductive population

C slow reproductive population

D small isolated population

Answer: D

Question 112

In Hardy-Weinberg equation, the frequency of heterozygous individual is represented by

A $2pq$

B pq

C q^2

D p^2

Answer: A

Question 113

The chronological order of human evolution from early to the recent is

A Ramapithecus $\rightarrow$ Australopithecus $\rightarrow$ Homo habilis $\rightarrow$ Homo erectus

B Ramapithecus $\rightarrow$ Homo habilis $\rightarrow$ Australopithecus $\rightarrow$ Homo erectus

C Australopithecus $\rightarrow$ Homo habilis $\rightarrow$ Ramapithecus $\rightarrow$ Homo erectus

D Australopithecus $\rightarrow$ Ramapithecus $\rightarrow$ Homo habilis $\rightarrow$ Homo erectus

Answer: A

Question 114

Which of the following is the correct sequence of events in the origin oflife?
i. Formation of protobionts
ii. Synthesis of organic monomers
iii. Synthesis of organic polymers
iv. Formation of DNA-based genetic systems

A I, III, II, IV

B II, III, I, IV

C II, III, IV, I

D I, II, III, IV

Answer: B

Question 115

A molecule that can act as a genetic material mustfulfill the traits given below, except

A it should be able to generate its replica

B it should be unstablestructurally and chemically

C it should provide the scope for slow changes that are required for evolution

D it should be able to expressitself in the form of 'Mendelian characters'

Answer: B

Question 116

DNA-dependent RNA polymerase catalyzes transcription on one strand of the DNA which is called the

A coding strand

B alpha strand

C antistrand

D template strand

Answer: D

Question 117

Interspecific hybridization is the mating of

A two different related species

B superior males and females of different breeds

C more closely related individuals within same breed for 4-6 generations

D animals within same breed without having common ancestors

Answer: A

Question 118

Which of the following is correct regarding AIDS causative agent HIV?

A HIV is enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase.

B HIV is unenveloped retrovirus.

C HIV does not escape but attacks the acquired immune response.

D HIV is enveloped virus containing one molecule of single-stranded RNA and one molecule of reverse transcriptase.

Answer: A

Question 119

Among the following edible fishes, which one is a marine fish having rich source of omega-3 fatty acids?

A Mangur

B Mrigala

C Mackerel

D Mystus

Answer: C

Question 120

Match Column—I with Column—II and select the correct option using the codes given below :

Column - I	**Column - II**
a. Critic acid	(i) Trichoderma
b. Cyclosporin	(ii) Clostridium
c. Statins	(iii) Aspergillus
d. Butyric acid	(iv) Monascus

A (iii), (i), (iv), (ii)

B (i), (iv), (ii), (iii)

C (iii), (iv), (i), (ii)

D (iii), (i), (ii), (iv)

Answer: A

Question 121

Biochemical Oxygen Demand (BOD) may not be a good indexfor pollution for water bodies receiving effluents from

A dairy industry

B petroleum industry

C sugar industry

D domestic sewage

Answer: B

Question 122

The principle of competitive exclusion was stated by

A G.F.Gause

B MacArthur

C Verhulst and Pearl

D C. Darwin

Answer: A

Question 123

Which of the following National Parks is home to the famous musk deer or hangul?

A Bandhavgarh National Park, Madhya Pradesh

B Eaglenest Wildlife Sanctuary, Arunachal Pradesh

C Dachigam National Park, Jammu & Kashmir

D Keibul Lamjao National Park, Manipur

Answer: C

Question 124

A lake which is rich in organic waste may result in

A drying of the lake due to algal bloom

B increased population of fish due to lots of nutrients

C mortality of fish due to lack of oxygen

D increased population of aquatic organisms due to minerals

Answer: C

Question 125

The highest DDT concentration in aquatic food chain shall occur in

A seagull

B crab

C eel

D phytoplankton

Answer: A

Question 126

Which of the following sets of diseases is caused by bacteria?

A Typhoid and smallpox

B Tetanus and mumps

C Herpes and influenza

D Cholera and tetanus

Answer: D

Question 127

Match Column—I with Column—II for housefly classification and select the correct option using the codes given below :

Column - I	Column - II
a. Family	(i) Diptera
b. Order	(ii) Arthropoda
c. Class	(iii) Muscidae
d. Phylum	(iv) Insecta

A (iii), (ii), (iv), (i)

B (iv), (iii), (ii)„ (i)

C (iv), (ii), (i), (iii)

D (iii), (i), (iv), (ii)

Answer: D

Question 128

Choose the correct statement.

A All cyclostomesdo not possess jaws and paired fins.

B All reptiles have a three-chambered heart.

C All Pisces have gills covered by an operculum.

D All mammals are viviparous

Answer: A

Question 129

Study the four statements (A-D) given below and select the two correct ones outof them :
A. Definition of biological species was given by Ernst Mayr.
B. Photoperiod does not affect reproduction in plants.
C. Binomial nomenclature system was given by R. H. Whittaker.
D. In unicellular organisms, reproduction is synonymous with growth
The two correct statements are

A C and D

B A and D

C A and B

D B and C

Answer: B

Question 130

In male cockroaches, sperms are stored in which part of the reproductive system?

A Mushroom glands

B Testes

C Vas deferens

D Seminal vesicles

Answer: D

Question 131

Smooth muscles are

A voluntary, multinucleate, cylindrical

B involuntary, cylindrical, striated

C voluntary, spindle-shaped, uninucleate

D involuntary, fusiform, non-striated

Answer: D

Question 132

Oxidative phosphorylation is

A oxidation of phosphate group in ATP

B addition of phosphate group to ATP

C formation of ATP by energy released from electrons removed during substrate oxidation

D formation of ATP by transfer of phosphate group from a substrate to ADP

Answer: C

Question 133

Whichof the followingis the least likely to be involved in stabilizing the three-dimensional folding of most proteins?

A Electrostatic interaction

B Hydrophobic interaction

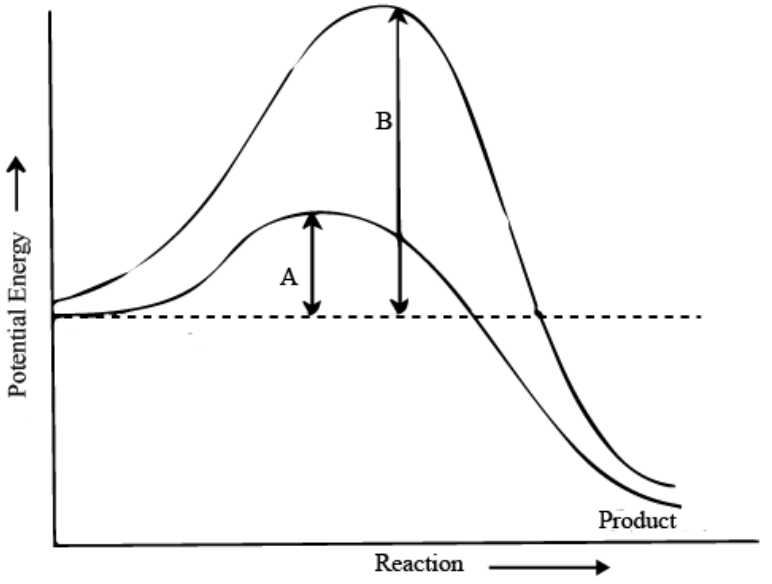
C Ester bonds

D Hydrogen bonds

Answer: C

Question 134

Which of the following describes the given graph correctly?



A Exothermic reaction with energy A in presence of enzyme and B in absence of enzyme

B Endothermic reaction with energy A in absence of enzyme and B in presence of enzyme

C Exothermic reaction with energy A in absence of enzyme and B in presence of enzyme

D Endothermic reaction with energy A in presence of enzyme and B in absence of enzyme

Answer: A

Question 135

When cell has stalled DNA replication fork, which checkpoint should be predominantly activated?

A $\overset{G_2}{M}$

B M

C Both $\overset{G_2}{M}$ and M

D $\overset{G_1}{S}$

Answer: A

Chemistry

Instructions
For the following questions answer them individually

Question 136

Which one of the following is incorrect for ideal solution?

A $\triangle U_{mix} = 0$

B $\triangle P = P_{obs} - P_{calculated by Raoult's law} = 0$

C $\triangle G_{mix} = 0$

D $\triangle H_{mix} = 0$

Answer: C

Question 137

The solubility of AgCl(s) with solubility product 1.6×10^{-10} in $0.1 M Nacl$ solution would be

A $1.6 \times 10^{-9} M$

B $1.6 \times 10^{-11} M$

C zero

D $1.26 \times 10^{-5} M$

Answer: A

Question 138

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 9g, the atomic weights of X and Y are

A 60, 40

B 20, 30

C 30, 20

D 40, 30

Answer: D

Question 139

The number of electrons delivered at the cathode during electrolysis by a current of lampere in 60 seconds is (charge on electron $= 1.60 \times 10^{-19}$ C)

A 6×10^{20}

B 3.75×10^{20}

C 7.48×10^{23}

D 6×10^{23}

Answer: B

Question 140

Boric acid is an acid because its molecule

A gives up a proton

B accepts OH^- from water releasing proton

C combines with proton from water molecule

D contains replaceable H^+ ion

Answer: B

Question 141

AlF_3 **is soluble in HF only in presence of KF.It is due to the formation of**

A $K_3[AlF_6]$

B AlH_3

C $K[AlF_3H]$

D $K_3[AlF_3H_3]$

Answer: A

Question 142

Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because

A zinc has lower melting point than iron

B zinc has lower negative electrode potential than Iron

C zinc has higher negative electrode potential than Iron

D Zinc is lighter than iron

Answer: C

Question 143

The suspension of slaked lime in water is known as

A Quick lime

B milk of lime

C Aqueous solution of slaked lime

D lime water

Answer: B

Question 144

The hybridizations of atomic orbitals of nitrogen in $NO_2^+, NO_3^- and NH_4^+$ **respectively are**

A $SP^2, SP^3 and SP$

B $SP, SP^2 and SP^3$

C $SP^2, SP and SP^3$

D $SP, SP^3 and SP^2$

Answer: B

Question 145

Which of the following fluro-compounds is most likely to behave as Lewis base?

A PF_3

B CF_4

C SiF_4

D BF_3

Answer: A

Question 146

Which of the following pair of ions is isoelectronic and isotructural?

A Clo_3^-, CO_3^{2-}

B SO_3^{2-}, Clo_3^-

C SO_3^{2-}, NO_3^-

D CO_3^{2-}, NO_3^-

Answer: E

Question 147

In context with berylium,Which one of the following statements is incorrect?

A It forms Be_2C.

B Its salts rarely hydrolyze.

C Its hydride is electron deficient

D It is rendered passive by nitric acid.

Answer: B

Question 148

Hot concentrated sulphuric acid is a moderately strong oxidizing agent. Which of the following reactions does not show oxidizing behaviour?

A $3S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

B $C + 2H_2SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$

C $CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$

D $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$

Answer: C

Question 149

Which of the following pairs of d orbitals will have electron density along the axes?

A d_{xz}, d_{yz}

B $d_{x^2}, d_{x^2-y^2}$

C $d_{xy}, d_{x^2-y^2}$

D d_{x^2}, d_{xz}

Answer: B

Question 150

The correct geometry and hybridization for XeF_4 are

A trigonal bipyramidal , SP_3d

B planar triangular , SP_3d^3

C square planar, SP_3d^2

D octahedral, SP_3d^2

Answer: C

Question 151

Among the following ,which one is a wrong statement ?

A $p\pi - d\pi$ bonds are present in SO_2

B SeF_4 and CH_4 have same shape

C I_3^+ has bent geometry

D PH_5 and $BiCl_5$ do not exist.

Answer: B

Question 152

The correct increasing order of trans-effect of the following species is

A $CN^- > C_6H_5^- > BR^- > NH_3$

B $BR^- > CN^- > NH_3 > C_6H_5^-$

C $CN^- > BR^- > C_6H_5^- > NH_3$

D $NH_3 > CN^- > BR^- > C_6H_5^-$

Answer: A

Question 153

Which of the following statements related to lanthanos is incorrect?

A The basicity decreases as the ionic radius decreases from Pr to Lu

B All the lanthanos are much more reactive than aluminium.

C $Ce(+4)$solutions are widely used as oxidizing agent in volumetric analysis.

D Europium shows +2 oxidation state

Answer: B

Question 154

Jahn-Teller effect is mot observed in high moderately strong oxidizing agent. Which of spin complexes of

A d^8

B d^4

C d^9

D d^7

Answer: A

Question 155

Which of the following can be used as the halide component for Friedel-Crafts reaction?

A Bromobenzene

B Chloroethene

C Isopropyl Chloride

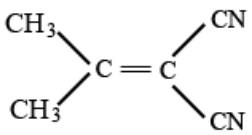
D Chlorobenzene

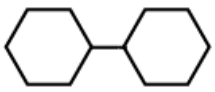
Answer: C

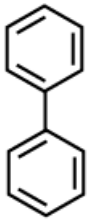
Question 156

In which of the following molecules ,all atoms are coplanar?

A 

B 

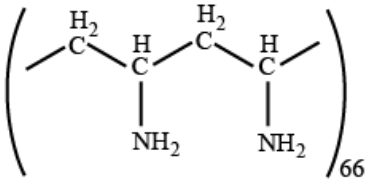
C 

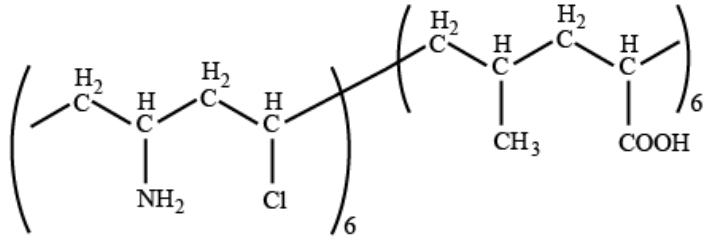
D 

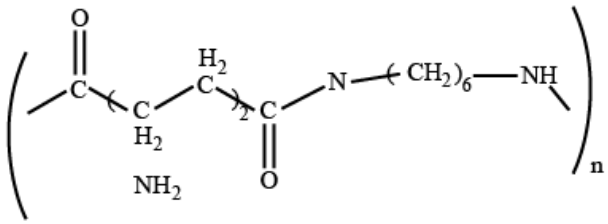
Answer: D

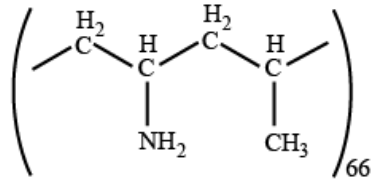
Question 157

Which of the following structure represents nylon 6,6 POlymer?

A 

B 

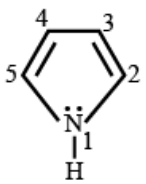
C 

D 

Answer: C

Question 158

In the phyrrole



the electron density maximum on

A 3 and 4

B 2 and 4

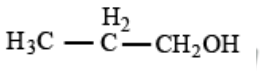
C 2 and 5

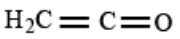
D 2 and 3

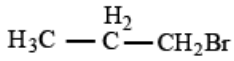
Answer: B

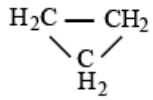
Question 159

Which of the following compounds shall not produce propene by reaction with HBr followed by elimination or direct only elimination reaction?

A 

B 

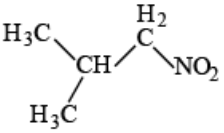
C 

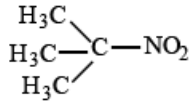
D 

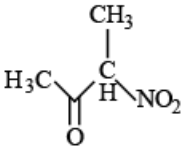
Answer: B

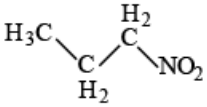
Question 160

Which one of the following nitro-compounds does not react with nitrous acid?

A 

B 

C 

D 

Answer: B

Question 161

The central dogma of molecular genetics States that the genetic information flows from

A DNA → Carbohydrates → Proteins

B DNA → RNA → Proteins

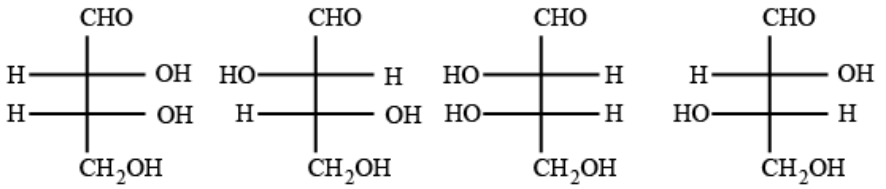
C DNA → RNA → Carbohydrates

D Amino acids → Proteins → DNA

Answer: B

Question 162

The correct corresponding order of names of four aldoses with configuration given below:



A D-threose, D-erythrose, L-threose, L-erythrose

B L-erythrose, L-threose, D-erythrose, D-threose

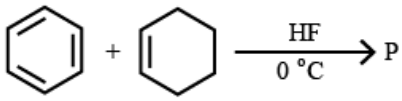
C D-erythrose, D-threose, L-erythrose, L-threose

D L-erythrose, L-threose, _L-erythrose, D-threose

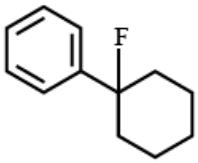
Answer: C

Question 163

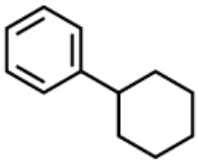
In the given reaction



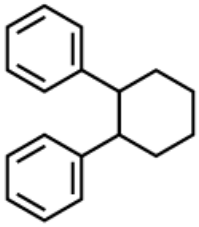
A



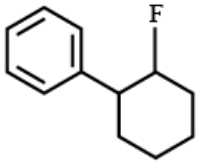
B



C



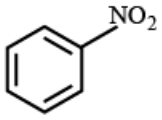
D

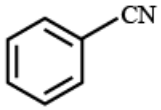


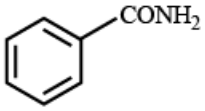
Answer: B

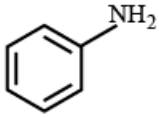
Question 164

A given nitrogen-containing aromatic compound reacts with Sn/HCl, followed by HNO_2, to give an unstable compound B. B, on treatment with phenol, forms a beautiful coloured compound C with the molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is

A 

B 

C 

D 

Answer: A

Question 165

Consider the reaction
$CH_3CH_2CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$
This reaction will be the fastest in

A methanol

B N, N'-dimethylformamide (DMF)

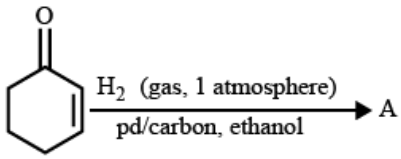
C water

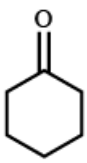
D ethanol

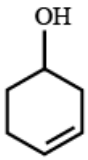
Answer: B

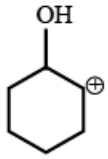
Question 166

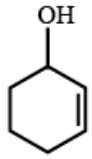
The correct structure of the product A formed in the reaction



A 

B 

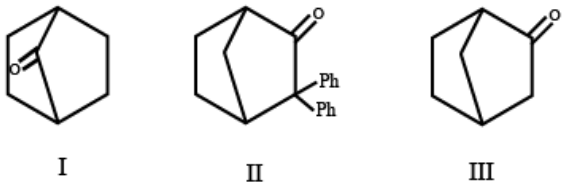
C 

D 

Answer: A

Question 167

Which among the given molecules can exhibit tautomerism?



A Both I and III

B Both I and II

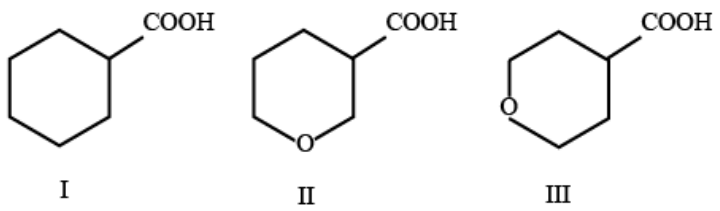
C Both II and III

D III only

Answer: D

Question 168

The correct order of strengths of the carboxylic acids



A II > III > I

B III > II > I

C II > I > III

D I > II > III

Answer: A

Question 169

The compound that will react most readily with gaseous bromine has the formula

A C_2H_2

B C_4H_{10}

C C_2H_4

D C_3H_6

Answer: D

Question 170

Which one of the following compounds shows the presence of intramolecular hydrogen bond?

A HCN

B Cellulose

C Concentrated acetic acid

D H_2O_2

Answer: B

Question 171

The molar conductivity of a $0.5mol/dm^3$ **solution of** $AgNO_3$**, with electrolytic conductivity of** $5.76 \times 10^{-3}Scm^{-1}$ **at 298 K is**

A 11.52 Scm^2/mol

B 0.086 Scm^2/mol

C 28.8 Scm^2/mol

D 2.88 Scm^2/mol

Answer: A

Question 172

The decomposition of phosphine (PH_3) **on tungsten at low pressure is a first-order reaction. It is because the**

A rate is inversely proportional to the surface coverage

B rate is independent of the surface coverage

C rate of decomposition is very slow

D rate is proportional to the surface coverage

Answer: D

Question 173

The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2S_3 are given below:
I. $(NaCl) = 52$
II. $(BaCl_2) = 0.69$
III. $(MgSO_4) = 0.22$
The correct order of their coagulating power is

A II > I > III

B III > II > I

C III > I > II

D I > II > III

Answer: B

Question 174

During the electrolysis of molten sodium chloride, the time required to produce 0.10 mol of chlorine gas using a current of 3 amperesis

A 110 minutes

B 220 minutes

C 330 minutes

D 55 minutes

Answer: A

Question 175

How manyelectrons canfit in the érbital for which n = 3 and l = 1?

A 6

B 10

C 14

D 2

Answer: D

Question 176

For a sample of perfect gas when its pressure is changed isothermally from p_i to pf, the entropy change is given by

A $\triangle s = nR \ln \left(\frac{p_i}{p_f} \right)$

B $\triangle s = nRT \ln \left(\frac{p_f}{p_i} \right)$

C $\triangle s = RT \ln \left(\frac{p_i}{p_f} \right)$

D $\triangle s = nR \ln \left(\frac{p_f}{p_i} \right)$

Answer: A

Question 177

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

A 1

B 2

C 3

D 0

Answer: C

Question 178

The percentage of pyridine (C_5H_5N) that forms pyridinium ion $(C_5H_5N^+H)$ in a 0.10 M aqueous pyridine solution (K_b for $C_5H_5N = 1.7 \times 10^{-9}$) is

A 0.013%

B 0.77%

C 1.6%

D 0.0060%

Answer: A

Question 179

In calcium fluoride, having the fluorite structure, the coordination numbers for calcium ion (Ca^{2+}) and fluoride ion (F^-) are

A 6 and 6

B 8 and 4

C 4 and 8

D 4 and 2

Answer: B

Question 180

If the E°_{cell} for a given reaction has a negative value, which of the following gives the correct relationships for the values of $\triangle G^\circ$ and K_{eq}?

A $\triangle G^\circ > 0; K_{eq} > 1$

B $\triangle G^\circ < 0; K_{eq} > 1$

C $\triangle G^\circ < 0; K_{eq} < 1$

D $\triangle G^\circ > 0; K_{eq} < 1$

Answer: D