

Data Export

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
1		Acetylene !'Fe" tubeRed HotA!AICI3CH3CIB Product B is			
2		Let A(1, 0) be a point on the circle $x^2 + y^2 = 1$. Through another point P(0, 2) chord is drawn to meet the circle at point B and C, then the locus of centroid of " ABC is $x^2 + y^2 + ax + by + c = 0$ then find th			- b +
3		If $I_n = \int_0^1 x^n [3 + [x]^6] dx, (n \in \mathbb{N})$, then find the value [Note: $[k]$ denotes greatest integer function less than or equal to k.]			
4		If the value of the definite integral $\int_0^1 (x^2 + 1) dx$ is $\frac{a}{b}$ where $a, b \in \mathbb{N}$, then the value of k^2 is			equal
5		Consider two circles C_1 and C_2 each with radius 2 and centres at (0, 0) and (2, 0) respectively. Let C_3 be another circle of radius 2 which pass through the centres of C_1 and C_2 and whose centre lies above x-axis. If the area of triangle formed by the three common tangents of the circles (C_1, C_2 and C_3 taken in pairs) which do not cross the interior of any of the three circle is $a + b\sqrt{c}$ (where $a \in \mathbb{N}$ and b, c are prime), find $(b - a)$			

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6

If incident ray is kept fixed but mirror turns through θ , by what angle the reflected ray will turn through?

, ' clo

7

Which among following is correct order of $-M$ strength?

8

Incorrect statement for given compound is :

9

How many isomers are possible by $C_3H_4Cl_2$

10

How many structure of C_6H_{10} can have 2 rings and have no alkyl substituent?

11

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A section of a particular device looks as shown in the figure. It has two thin rods made up of a material of uniform linear mass density λ . The smaller rod is parallel to Y axis and in XOY plane while the larger rod is parallel to Z-axis in XOZ plane. Their dimensions are shown in the figure.

The moment of inertia of the structure shown about the Y-axis is x . Find the value of x .

12

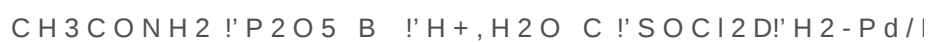
How many stereoisomers are possible for the following?

13

The given diagram shows four processes i.e., isochoric, isobaric, isothermal and adiabatic. The correct assignment of the processes, in the same order is given by :-

14

The end product in the reaction



15

The amount of heat needed to raise the temperature of 4 moles of rigid diatomic gas from 0°C to 50°C when no work is done is _____. (R is the universal gas constant).

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16

The correct relation between the degrees of freedom f and the ratio of specific heat γ is :

17

The rms speeds of the molecules of Hydrogen, Oxygen and Carbon dioxide at the same temperature are V_H , V_O and V_C respectively then :

18

A cylindrical container of volume $4.0 \times 10^{-3} \text{ m}^3$ contains one mole of hydrogen and two moles of carbon dioxide. Assume the temperature of the mixture is 400 K. The pressure of the mixture of gases is :

[Take gas constant as $8.3 \text{ J mol}^{-1} \text{ K}^{-1}$]

19

if the rms speed of oxygen molecules at 0°C is 160 m/s, find the rms speed of hydrogen molecules at 0°C .

20

A polygenic trait is controlled by 3 genes A, B and C. In a cross $AaBbCc \times AaBbCc$, the phenotypic ratio of the offsprings was observed as : $1 : 6 : x : 20 : x : 6 : 1$ what is the possible value of x ?

21

The minimum weight of tomatoes obtained from a plant is 20 straight g. The

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maximum weight of tomatoes obtained is 120 space straight g. What will be the weight of tomatoes obtained by crossing plants with genotype AAbb space cross times space aabb ?

22

Which of the following biphenyls is optically active?

23

! (ii) $\text{NH}_4\text{Cl}(\text{i})$ PhMgBr Product .

- (A) Products in this reaction will be stereoisomers
 - (B) Products in this reaction will be enantiomer
 - (C) Products in this reaction will be diastereomers
 - (D) Products in this reaction will be geometrical isomers
- Number of correct statements _____ ?

24

Identify the compounds A in the following reaction sequence:

$(\text{CH}_3)_2\text{C}=\text{O}$ $\xrightarrow{\text{NaCNHCl}}$ (A)

25

For three low density gases A, B, C pressure versus temperature graphs are plotted while keeping them at constant volume, as shown in the figure.

26

A sample of gas at temperature T is adiabatically expanded to double its

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volume. The work done by the gas in the process of moles = 1)

2) (G)

27

The pressure of a gas changes linearly with volume from A to B as shown in figure. If no heat is supplied to or extracted from the gas then change in the internal energy of the gas will be

28

A flask contains hydrogen and oxygen in the ratio of 2:1 by mass at temperature 27°C. The ratio of average kinetic energy per molecule of hydrogen and oxygen respectively is:

29

Match List I with List II

List I
List II

A.
Isothermal Process
I.
Work done by the gas decreases internal energy

B.
Adiabatic Process
II.
No change in internal energy

C.
Isochoric Process
III.
The heat absorbed goes partly to increase internal energy and

do work

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D.
Isobaric Process
IV.
No work is done on or by the gas

Choose the correct answer from the options given below :

30

Silver ions are added to solution with $[\text{Br}^-] = [\text{Cl}^-] = [\text{CO}_3^{2-}] = [\text{AsO}_4^{3-}] = 0.1 \text{ M}$.
Which compound will precipitate at lowest $[\text{Ag}^+]$

31

Taking $\text{Ba}(\text{OH})_2$ to be completely ionised. The pH of its 0.001 M solution is

32

The ionization constant of HCOOH is 1.8×10^{-4} . What is the percent ionization of a 0.1 M solution?

33

NH_4Cl is acidic, because;

34

Which relation is wrong

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35

If acetic acid is 1.0% ionised in its decinormal solution, the pH of its seminormal solution will be

36

Which of the following cannot have a conjugate base?

37

Match List I with List II and select the correct answer using the code given below the lists

List-I

List-II

[A]
pH of 0.1 M HA ($pK_a=5$) and 0.01 M NaA
(p)
4

[B]
pH of 0.1 M BOH ($pK_b=6$) and 0.1 M BCl
(q)
7

[C]
pH of 0.1 M salt of HA ($pK_a=5$) and BOH ($pK_b=7$)
(r)
6

[D]
pH of 500 litre of 0.2 M HNO_3 and 500 litre 0.2 M NaOH
(s)
8

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38

A solution saturated in lime has a pH of 12.4 Then the Ksp for Ca(OH)_2 is

39

Which will act as a buffer solution

40

100 mL of 1 M HCl is mixed with 50 mL of 2 M HCl. Hence, $[\text{H}_3\text{O}^+]$ is:

41

The solubility of AgCl in water at 25°C is 1.79×10^{-3} g/L. The Ksp. Of AgCl at 25°C is

42

Blue litmus turns red in which of the following mixture of acid and base?

43

What is the minimum pH when Fe(OH)_3 , starts precipitating from a solution containing 0.1M FeCl_3 ? Ksp of $\text{Fe(OH)}_3 = 8 \times 10^{-13}$ M³ (log 2 = 0.3)

44

S.No	QID	Q_Text	Link	Video or Script Link	Action
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50

Assertion: 6 molecules of CO_2 and 12 molecules of $\text{NADPH} + \text{H}^+$ and 18 ATP are used to form one hexose molecule.

Reason: Light reaction results in formation of ATP and NADPH_2 .

51

Assertion: Plants do not have specialised respiratory organs.

Reason: There is very little transport of gases from one plant part to another.

52

Some compounds are given :

(a) If total number of compounds which are soluble in aq. NaHCO_3 are P ?

(b) If total number of compounds soluble in aq. NaOH are Q ?

(c) If total number of compounds which react with NaNH_2 are R ?

(d) If total number of compounds liberates H_2 gas on reaction with Na metal are S ?

Then find the value $P + Q + R + S$?

53

How many of the following carbocations have stability greater than an isopropyl cation $(\text{CH}_3)_2\text{CH}^+$?

(1)

(2)

S.No	QID	Q_Text	Link	Video or Script Link	Action
		(3)			
		(4)			
		(5)			
		(6)			
		(7)			

54

What is the state of heart in the interval after end of second heart sound and before beginning of first heart sound again?

55

Erythroblastosis foetalis occurs when-

56

Read the following statements and find out the incorrect statements.

- All vertebrates and a few invertebrates have a closed circulatory system.
- Hypertension leads to heart disease and also affects vital organs like brain and lungs.
- CAD affects the vessels that supply blood to the skeletal muscles.
- In angina, a symptom of chronic chest pain appears when no enough oxygen is reaching the heart muscle.
- heart attack means the state of heart when it is not pumping blood effectively enough to meet the needs of the body.

57

Neural signals through parasympathetic neural signals (another component of ANS) can

S.No	QID	Q_Text	Link	Video or Script Link	Action
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- a. Increase the heart beat rate
- b. Decrease the heart beat rate
- c. Increase the strength of ventricular contraction
- d. Decrease the speed of conduction of action potential
- e. Increase cardiac output
- f. Decrease cardiac output

58

Assertion : The valves of the heart (i.e., semilunar and atrio-ventricular valves) prevent any backward flow.

Reason : The valves in the heart allows the flow of blood only in one direction, i.e. from the atria to the ventricles and from ventricles to the pulmonary artery or aorta.

59

Assertion : Heart failure is sometimes called congestive heart failure.

Reason : Congestion of the lungs is one the main symptom of this disease.

60

For safe blood transfusion-

61

Statement-1 : Observed colligative property of acetic acid dissolved in benzene is found greater than calculated colligative property.

Statement-2 : Acetic acid undergoes association to form dimer, when dissolved in benzene.

S.No	QID	Q_Text	Link	Video or Script Link	Action
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62

Statement-1 : Azeotropic mixture boils without any change in the composition.

Statement-2 : The vapour pressure of a liquid decreases on dissolving a non-volatile solute.

63

In the process of electroplating, m g of silver is deposited when 4 ampere of current flows for 2 min. The amount (in g) of silver deposited by 6 ampere of current flowing for 40 sec will be :

64

Select the correct statements about dry cell

65

A fuel cell involves combustion of the butane at 1 atm and 298 K



$$\Delta G^\circ = -2746 \text{ KJ/mol}$$

What is E° of a cell ?

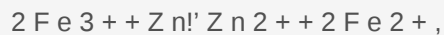
66

What is the sign of ΔG° and the value of K for the cell reaction

67

S.No	QID	Q_Text	Link	Video or Circuit Link	Action
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In the electrochemical reaction.



Increasing the concentration of Fe^{2+}

68

For the cell reaction, $\text{Mg(s)} + 2\text{Ag}^+(\text{aq}) \rightarrow \text{Mg}^{2+}(\text{aq}) + 2\text{Ag(s)}$ at 298 K. The value of E_{cell} , ΔG° and Q at Ag^+ : 0.001 M and 0.02 M respectively are :

lo is 3
entrat

69

If the solution of copper sulphate in which a copper rod is immersed, is diluted 100 times. What is the change in the reduction electrode potential?

70

Statement-1 : During the electrolysis of water, two faraday of charge will produce a total of 33.6 litre of gases at S.T.P. at electrodes

Statement-2 : Two faraday of charge will produce half mole of H_2 and one fourth mole of O_2 gas

71

Statement-1 : The cell potential of mercury cell is 1.35 V, which remains constant.

Statement-2 : In mercury cell, the electrolyte is a paste of KOH and ZnO.

72

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
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According to William Henry; the solubility of a gas in liquid depends on the pressure of the gas. If 'm' is the molality of the gas and 'P' is its pressure then which of the following plot is in accordance with the law?

73

Consider the following aqueous solutions and assume 100% ionization in electrolytes

(I) 0.1 m urea

(II) 0.04 m $\text{Al}_2(\text{SO}_4)_3$

(III) 0.05 m CaCl_2

(IV) 0.005 m NaCl

The correct statement regarding the above solutions is:

74

What weight of solute (molecular weight = 60) is required to dissolve in 180 g of water to reduce the vapour pressure to 45 the of pure water?

75

Total vapour pressure of mixture of 1 mol A ($P_{A0} = 150$ torr) and 2 mol B ($P_{B0} = 240$ torr) is 200 torr. In this case:

76

pH of a 0.1 M monobasic acid is measured to be 2. Its osmotic pressure at a given temperature T K is:

77

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
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6.8 g H₂O₂ is dissolved in 224 mL solution. This solution will be labelled as:

78

A rod have coefficient of linear expansion α , is floor and its temperature is increased by ΔT . The rod is

ooth
velope

79

A spherical black body with a radius of 12 cm radiates 450 W power at 500 K. If the radius were halved and the temperature doubled, the power radiated in watt would be

80

A black body is heated from 7°C to 287°C. The ratio of radiation emitted is :

81

A black body at 1500 K emits maximum energy of wavelength 20000 Å. If sun emits maximum energy of wavelength 5500 Å, what would be the temperature of sun.

82

Select chiral compound

83

S.No	QID	Q_Text	Link	Video or Script Link	Action
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Which of the following is / are incorrect decreasing order of acidic strength.

84

Which of the following is / are incorrect order of basic nature.

85

Assertion: Each molecule of ribulose-1, 5-bisphosphate fixes one molecule of CO_2 .

Reason: Three molecules of NADPH and two ATP are required for fixation of one molecule of CO_2 .

86

Assertion (A): 6 molecules of CO_2 and 12 molecules of $\text{NADPH}^+ + \text{H}^+$ and 18 ATP are used to form one hexose molecule.

Reason (R): Light reaction results in formation of ATP and NADPH_2 .

87

A concave spherical mirror has a radius of curvature of 50 cm. Find position of an object for which the real image is four times as large as the object

88

Match the column :

S.No	QID	Q_Text	Link	Video or Script Link	Action
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Column-I
(Atomic No.)

Column-II
(Group No.)

(i)

Z=65

(a)

IV A (14)

(ii)

Z=86

(b)

III B (3)

(iii)

Z=114

(c)

Zero (18)

(iv)

S.No	QID	Q_Text	Link	Video or Script Link	Action
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Z=120

(d)

II A(2)

89

Match the column :

Column-I

(type of elements)

Column-II

(outer electronic configuration)

(A)

Inert gas elements

(P)

ns1–2 to ns2np5

(B)

S.No	QID	Q_Text	Link	Video or Script Link	Action
		Representative elements			
		(Q)			
		$1s^2$ and ns^2np^6			
		(C)			
		Transition elements			
		(R)			
		$(n-2)f^{1-14}(n-1)d^{1-10}ns^2$			
		(D)			
		Inner transition elements			
		(S)			
		$(n-1)d^{1-10}ns^{1-2}$			

90

Mark the correct options.

91

Match the column :

S.No	QID	Q_Text	Link	Video or Script Link	Action
		Column-I			
		Column-II			
		(i)			
		CIF3			
		(a)			
		Non planar and non polar			
		(ii)			
		XeF4			
		(b)			
		Non planar & polar			
		(iii)			
		NF3			
		(c)			
		Planar and polar			
		(iv)			

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
		PCI6			
		(d)			
		Planar and non polar			

92

Match the column :

Column-I

Column-II

(A)

Ostwald process

(i)

In the manufacturing of NH₃

(B)

Deacon's process

S.No	QID	Q_Text	Link	Video or Script Link	Action
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(ii)

In the manufacturing of H_2SO_4

(C)

Contact process

(iii)

In the manufacturing of Cl_2

(D)

Haber process

(iv)

In the manufacturing of HNO_3

93

Match the column :

Column-I

(Reaction)

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
		Column-II (Type of reaction)			
		(A)			
		(p)			
		SN1			
		(B)			
		(q)			
		SN2			
		(C)			
		(r)			
		E1			
		(D)			
		(s)			

S.No	QID	Q_Text	Link	Video or Script Link	Action
		E2			

94

Match the column :

Column-I

(Reaction sequence)

Column-II

(Reagent required)

(A)

(p)

EtO^-

(B)

(q)

S.No	QID	Q_Text	Link	Video Script Link	Action
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EtBr

(C)

(r)

EtOH/H⁺

(D)

(s)

Et-Cl/Na ether

95

Match the column I & column II

Column-I

Column-II

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
		(A)			
		(p)			
		Free radical substitution reaction			
		(B)			
		$\text{Ph}-\text{CH}_2-\text{CH}=\text{CH}_2 \xrightarrow{\text{R}_2\text{O}_2, \text{HBr}}$			
		(q)			
		Nucleophilic substitution reaction			
		(C)			
		(r)			
		Free radical addition reaction			
		(D)			
		(s)			
		Electrophilic addition reaction			

S.No	QID	Q_Text	Link	Video Script Link	Action
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96

Match the column :

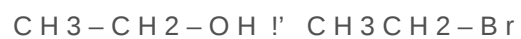
Column-I

(Reaction)

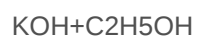
Column-II

(Reagent)

(A)



(p)



(B)

(q)



(C)

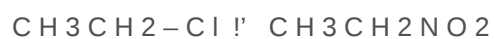
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(r)

NaBr+Conc. H₂SO₄

(D)



(s)

AgNO₂

97

Match the column :

Column-I

(Conversion)

Column-II

(Reagent)

(A)

S.No	QID	Q_Text	Link	Video or Circuit Link	Action
		1 - Butene !' 2 - Butanol			
	(p)				
		BH ₃ /THF, CH ₃ COOH			
	(B)				
		1 - Butene !' 1 - Butanol			
	(q)				
		HBr, aq KOH			
	(C)				
		propene !' propane			
	(r)				
		Alc KOH, HBr/R ₂ O ₂			
	(D)				
		2 - Bromopropane !' 1 - Bromopropane			
	(s)				
		HBr/H ₂ O ₂ , aq KOH			

S.No	QID	Q_Text	Link	Video or Script Link	Action
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Homeostasis is-

99

A Carnot's engine working between 27°C and 127°C takes up 800 J of heat from the reservoir in one cycle. What is the work done by the engine

100

The pressure and density of a monatomic gas $\gamma =$ from (P_1, d_1) to (P_2, d_2) . If $d_2/d_1 = 8$ then P_2/P_1 should be-

adiabatic

101

The molar specific heat of a gas at constant volume is $20 \text{ Joule mol}^{-1} \text{ K}^{-1}$. The value of γ for it will be-

102

An ideal gas at a pressure of 1 atmosphere and temperature of 27°C is compressed adiabatically until its pressure becomes 8 times the initial pressure, then the final temperature is $\gamma = 3/2$

103

Find the change in internal energy in joule when 10g of air is heated from 30°C to 40°C ($C_v = 0.172 \text{ kcal/kg K}$, $J = 4200 \text{ J/kcal}$)

104

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A gas undergoes a change of state during which 100 J of heat is supplied to it and it does 20 J of work. The system is brought back to its original state through a process during which 20 J of heat is released by the gas. What is the work done by the gas in the second process ?

105

A gas is expanded to double its volume by two different processes. One is isobaric and the other is isothermal. Let W_1 and W_2 be the respective work done, then find W_1 and W_2

106

During an adiabatic process, if the pressure of an ideal gas is proportional to the cube of its temperature, find γ

107

One mole of a monoatomic ideal gas undergoes a process in the P-V diagram. What is the specific heat for this process ?

3 in th

108

100 g of water is heated from 30°C to 50°C ignoring slight expansion of the water, the change in its internal energy is (specific heat of water is 4180J/Kg/K)

109

A diatomic ideal gas is used in a car engine as the working substance. Volume of the gas increases from V to $32V$ during the adiabatic expansion part of the cycle. The efficiency of the engine is-

S.No	QID	Q_Text	Link	Video Script Link	Action
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110

Match the column :

Column-I

(Compound)

Column-II

(Total No of stereoisomers)

(a)

(p)

8

(b)

(q)

6

(c)

S.No	QID	Q_Text	Link	Video Script Link	Action
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(r)

3

(d)

(s)

2

111

Match the column :

Column-I

(Compound)

Column-II

(Isomeric relationship)

(a)

S.No	QID	Q_Text	Link	Video or Script Link	Action
		(p)			
		Diastereomers			
		(b)			
		(q)			
		Enantiomers			
		(c)			
		(r)			
		Homomers			

112

Match the column :

Column-I
(Compound)

S.No	QID	Q_Text	Link	Video Script Link	Action
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Column-II

(No. of chiral carbon)

(a)

(p)

0

(b)

(q)

1

(c)

(r)

2

(d)

(s)

S.No	QID	Q_Text	Link	Video or Script Link	Action
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4

113

Match the column :

Column-I

(Compound)

Column-II

(Types of isomerism)

(a)

(p)

Metamerism

(b)

(q)

S.No	QID	Q_Text	Link	Video or Script Link	Action
		Chain isomerism			
		(c)			
		(r)			
		Ring chain isomerism			
		(d)			
		(s)			
		Functional isomerism			

114

Match the column :

Column-I

(Compound)

S.No	QID	Q_Text	Link	Video or Script Link	Action
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Column-II

(No. of Geometrical isomers)

(a)

1, 2–dichloroethene

(p)

6

(b)

ChlorobromoFluoroiodoethene

(q)

4

(c)

2, 4 – Hexadiene

(r)

3

(d)

2, 4– Heptadiene

(s)

2

S.No	QID	Q_Text	Link	Video or Script Link	Action
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115

Match the column :

Column-I

(Conformation of n-butane)

Column-II

(Property)

(a)

Fully eclipsed

(p)

Has two methyl –hydrogen interactions

(b)

Partially eclipsed

(q)

Dihedral angle between two methyl group is 60°

S.No	QID	Q_Text	Link	Video or Circuit Link	Action
		(c)			
		Gauche			
		(r)			
		Has least energy			
		(d)			
		Anti			
		(s)			
		Has one methyl–methyl interactions			

116

Match the column :

Column-I
(Organic compound)

Column-II
(effect of substituent)

S.No	QID	Q_Text	Link	Video or Script Link	Action
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(a)

(p)

+I and +H

(b)

(q)

−M and −I

(c)

(r)

+M and −I

(d)

(s)

+ I only

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117

Assertion: The NADP reductase enzyme is located on the stroma side of the membrane of thylakoid. Reason: During proton accumulation in lumen, there is a measurable decrease in pH in the stroma.

118

The crystal of a solid is square packing of identical spheres in each layer and spheres of one layer are placed just above the voids made by spheres in previous layer. The packing efficiency of such crystal (in %) is

[p = 3.15, 2=1.4]

119

One mole of an ideal gas ($\gamma = 7/5$) is adiabatically compressed so that temperature rises from 27°C to 35°C. The work done by the gas is (R = 8.47J/mol-K)

so th

120

3 moles of a monoatomic gas requires 60cal heat for 5°C rise of temperature at constant volume, then heat required for 5 moles of same gas under constant pressure for 10°C rise of temperature is (R = 2 cal/mole-k)

121

When 20J of work was done on a gas, 40J of heat energy was released. If the initial internal energy of the gas was 70J, what is the final internal energy?

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122

Match the following column-I with column-II-

Column-I
Column-II

a. Cuscuta
(i) Hygroscopic root

b. Rhizophora
(ii) Stilt root

c. Orchid
(iii) Haustorial root

d. Maize
(iv) Respiratory root

123

Total internal reflection can take place only if-

124

Assertion : Reaction of SO_2 and H_2S in the presence of Fe_2O_3 catalyst gives elemental sulphur

Reason : SO_2 is a reducing agent

125

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Assertion : Lyophilic sol is more stable than lyophobic sol.

Reason : Lyophilic sol have greater solvation energy then lyophobic sol.

126

An astronomical telescope has an objective of focal length 200 cm and an eyepiece of focal length 4.0 cm. The telescope is focussed to see an object 10 km from the objective. The final image is formed at infinity. Then the length of the tube is approximately equal to-

127

The locus of the point of intersection of two tangents to the parabola $y^2 = 4ax$ which with the tangent at the vertex form a triangle of constant area c^2 , is the curve $x^2(y^2 - 4ax) = \dots c^4$, then $\dots =$

128

Two particles are moving with velocity $\mathbf{v}' = i^{\wedge} - 2t j^{\wedge} + k^{\wedge}$ m/s and $\mathbf{v}'' = 4t i^{\wedge} + t j^{\wedge} + 3$ Time at which they are moving perpendicular to each other is _____ (sec.)

ively.

(Round off to nearest integer)

129

Assertion : Torque on a body can be zero even if there is a net force on it.
Reason : Torque and force on a body are always perpendicular.

130

The temperatures of the hot and the cold ends of a 20 cm long rod in thermal

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steady state are 100°C and 20°C , respectively, Temperature at the centre of the rod is

131

A cylinder is made up of two coaxial layers, one of radius R and the other of radius $2R$. The inner and outer portions are respectively made up of substances of thermal conductivities K and $2K$. Determine the effective thermal conductivity between the flat ends of the cylinder.

132

Two ends of a conducting rod of varying cross-section are maintained at 200°C and 0°C respectively. In steady state :

133

Equal masses of 3 liquids A, B and C have temperatures 10°C , 25°C and 40°C respectively. If A and B are mixed, the mixture has a temperature of 15°C . If B and C are mixed, the mixture has a temperature of 30°C . If A & C are mixed the temperature of the mixture is-

134

Three different substances have the specific heats in the ratio $1:2:3$ and the temperature increases in the ratio $3:2:1$ when the same heat is supplied to the three substances. The ratio of their masses is

135

50g of copper is heated to increase its temperature by 10°C . If the same quantity of heat is given to 10g of water, the rise in its temperature is ($S_{\text{Cu}} = 420\text{J/kg}^{\circ}\text{C}$ and $S_{\text{w}} = 4200\text{J/kg}^{\circ}\text{C}$)

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136

An irregular rod of same uniform material as shown in figure is conducting heat at a steady rate. The temperature gradient at various sections versus area of cross section graph will be:

137

Which acid base reaction is not feasible :-

138

Which of the following graphs shows the correct variation in intensity of heat radiations by black body and frequency at a fixed temperature?

139

A liquid in a beaker has temperature $\theta(t)$ at time t of surroundings, then according to Newton's law of cooling the correct graph between $\log_e(\theta - \theta_0)$ and t is

140

Two bodies have thermal capacities in the ratio 3:4 and the rates of loss of heat in the ratio 3:5. Their rates of cooling will be in the ratio of-

141

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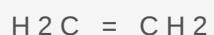
Three metal rods of same lengths and same area of cross - sections having conductivities 1, 2, 3 units are connected in series. Then their effective conductivity will be

142

The figure show the variation between the applied potential difference (V) and the photoelectric current (i), at two different intensities of light ($I_1 > I_2$). In which figure is the correct variation shown ?

143

Number of compounds which are more reactive than for electrophilic addition reaction.



144

Three rods of same dimensions have thermal conductivity 3K, 2K and K. They are arranged as shown in figure. Then the temperature of the junction in steady state is

145

Which law represents the pairing of electron in a sub-shell after each orbital is filled with one electron :

146

In a single slit diffraction pattern, if wave length of the light source decreases. Then width of the central fringe will be:

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147

For a given lens, the magnification was found to be twice when distance of object change from 0.2 m to 0.15 m. The focal length of the lens is-

148

The radiant power of a furnace of surface area of 0.6 m² is 34.2 KW. The temperature of the furnace is $\left[\tilde{A} = 5.7 \times 10^{-8} \text{ W m} \cdot \right]$

149

The set of quantum number $n=4, l=0, m=0$ and $s=+1/2$ correspond to the most loosely bound, ground state electron of which one of the following atoms.

150

Electrons will first enter into the set of quantum numbers

$n=5, l=0$ or $n=3, l=2$

151

A particle is moving on x-axis has potential energy $U=2-20x+5x^2$ joules along x axis. The particle is in equilibrium at :-

152

Assertion : Work done in moving a body over a closed loop is zero for every force in nature.

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Reason : Work done does not depend on nature of force.

153

Statement I: For a perfectly elastic collision, $e = 1$.
Statement II: Coefficient of restitution, $e = \frac{\text{velocity of separation}}{\text{velocity of approach}}$

154

Assertion : On a rainy day, it is difficult to drive a car or bus at high speed.
Reason : The value of coefficient of friction is lowered due to wetting of the surface.

155

Glomerular filtrate is almost similar to blood plasma except-

156

Assertion (A) : Normally urine is hypertonic to the blood.
Reason (R) : HCO_3^- is absorbed in DCT and collecting duct.

157

Consider following compounds.

(a) Number of compounds which are aromatic (x).

(b) Number of compounds which can evolve H_2 gas on reaction with Na metal (y).

S.No	QID	Q_Text	Link	Video or CRIPT Link	Action
158		#(c) Number of compounds which can evolve CO₂ gas on reaction with NaHCO₃ (z). Find the value of 2(x + y + z)			
159		Vapour density of metal chloride is 77. Find moles of molecules present in 154 gm of metal chloride			
160		Suppose that the graph of $y = f(x)$ is a line with slope 3 while the graph of $y = g(x)$ is a line with slope $\frac{1}{2}$, and the graph of $y = h(x)$ is a line with slope 2. If the line $y = g(h(f(h(g(g(x))))))$ has a slope m, then the value of 60 m is			
161		The equations $3x + 2y + 1 = 0$, $2x + 4y - 1 = 0$ and $3x^2 + 4xy + 4y^2 + 2x - 2y + 1 + \pm = 0$ will have a unique solution if $\pm$ equals			
162		If the algebraic sum of the perpendicular distances from the points A(0, - 2), B(2, 0) and C(1, 1) on a variable straight line is zero, then the line always passes through a fixed point P, which w.r.t. the			
163		If the parameters a, c, b ($c > 0$) are in G.P. and p be the length of the perpendicular from origin to the line of the family $xc^4 - (2ab - 1)ab + a^2b^2 + yc^2 + 2ab - 2ab - 10c = 0$, then maximum value of p is			

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Let ABC be a fixed triangle and P be variable point in the plane of triangle ABC. Suppose a, b, c are lengths of sides BC, CA, AB opposite to angles A, B, C respectively. If $a(PA)^2 + b(PB)^2 + c(PC)^2$ is minimum, then the point P with respect to "ABC", is

164

Let P be (4, 3) and a point R on $y = x$ and Q on x-axis such that minimum value of $PQ + QR + RP$ is d then find [d].

[Where [k] denotes greatest integer function less than or equal to k]

165

Triangle OAB has vertices A(0, 12), B(5, 0) and O(0, 0). There exist a line 'l' cutting AB and OA at M and N respectively, such that circles can be inscribed in "AMN" and quadrilateral OBMN. Also these two line l at the same point. If line l pass through (0,8), then the area of quadrilateral OBMN is mn where m and n are co-prime, then find the value of $m^{10} - 3n^{10}$.

ngent

166

Let points A, B, C lies on lines $y - x = 0$, $2x - y = 0$ and $y - 3x = 0$ respectively. Also AB passes through fixed point M(1,0) and BC passes through fixed point N(0, -1), then AC also passes through fixed point R(u, v). Find (u + v).

167

The radius of the circle S2 which intersects the circle S1 : $x^2 + y^2 = 4$ orthogonally and line $x = 1$ is the common chord of both the circles is

168

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The radius of the smallest circle which contains both the circles $x^2 + y^2 = 1$ and $(x - 1)^2 + (y - 2)^2 = 4$ is

169

In a triangle ABC with fixed base BC, the vertex A moves such that $\cos C - \cos B = \cos^2 A$. If a, b and c denote the lengths of sides of the triangle opposite to angles A, B and C, respectively, then which one of the following is correct?

170

The equations of perpendicular bisectors of two sides AB and AC of a triangle ABC are $x + y + 1 = 0$ and $x - y + 1 = 0$ respectively. If circumradius of "ABC" is 2 units, then the locus of vertex A is

171

The radius of the circle which touches the line $x + y = 0$ at $M(-1, 1)$ and cuts the circle $x^2 + y^2 + 6x - 4y + 18 = 0$ orthogonally, is

172

Which of the following is correct order of $-I$?

173

Assertion: Due to environment, the difference in shapes of leaves produced in air and those produced in water in buttercup represent the heterophyllous development.
Reason: The phenomenon of heterophylly is an example of plasticity.

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174

Locus of a point P(x, y) satisfying the equation $x^2 + y^2 + 24y + 144 = 13 - x^2 + y^2 - 10x + 25$, is

175

If pair of lines $(x-2)^2 - m_1 + m_2(x-2)(y+2) + m_1m_2(y+2)^2 = 0$ is tangent to the circle $(x-1)^2 + (y-1)^2 = 2$, then find the value of $\frac{1}{m_1} + \frac{1}{m_2}$

176

Let N denotes the number of values of x in $[0, \frac{\pi}{2}]$ such that $2\cos 2x = 1 - \cos 3x$ and R denotes the radius of the smallest circle which is passing through points of intersection of circle $x^2 + y^2 = 4$ and line $3x + 4y = 5$. Find the value of $(R^2 + N)$.

177

Number of compounds in which orbitals used for overlapping by central atom is equal to orbitals used by central atom for hybridisation.

$\text{PCl}_5, \text{XeO}_4, \text{H}_2\text{SO}_4, \text{POCl}_3, \text{IF}_5, \text{XeO}_6^{4-}, \text{ClO}_3^-$

178

Which of the following will not obey octet rule.

- (1) NCl_3
- (2) NH_3
- (3) CH_4
- (4) NO_2
- (5) NO

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- (6) PCl_3
- (7) CH_3Cl
- (8) CHCl_3
- (9) H_2O

179

$\text{d}_{xy} + \text{d}_{xy}$ will form σ bond if molecular axis is

180

Which of the following compound has more than

181

When a plane mirror is placed horizontally on a level ground at a distance of 30m from the foot of a tower, the top of the tower and its image in the mirror subtend an angle of 90° at the eye. The height of the tower will be

182

The wavelength of maximum energy released during an atomic explosion was 2.93×10^{-10} m. Given that Wien's constant is 2.93×10^{-3} mK, the maximum temperature attained must be of the order of-

183

Bateson used term coupling and repulsion for linkage. Choose the correct coupling and repulsion combination-

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184

Two bodies of same shape, same size and same radiating power have emissivities 0.2 and 0.8. The ratio of their temperature is

185

A rod of length 1 m having cross-sectional area 0.75m^2 conducts heat at 6000 Js^{-1} . Then the temperature difference across the rod is, if $K = 200\text{ Wm}^{-1}\text{ K}^{-1}$

186

Which one of the following is most stable carbocation :-

187

75 gm of copper is heated to increase its temperature by 10°C . If the same quantity of heat is given to 'm' gm of water, to have same rise in temperature is (specific heat of copper = $420\text{J/Kg}^\circ\text{C}$)

188

The densities of two substances are in the ratio 5:6 and the specific heats are in the ratio 3:5 respectively. The ratio of their thermal capacities per unit volume is

189

$\log 25 + \log 4 - \log 5$ is equal to

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190

Match List I and List II

List I
List II

A. Boyle's Law
E. $PV = Nk_B T$

B. Charles's law
F. $PT = \text{constant}$, at (constant volume)

C. Gay-Lussac's law
G. $V \propto T$ at (constant pressure)

D. Equation of state of an ideal gas
H. $PV = \text{constant}$

191

An object 5 cm tall is placed 1.6 m from a concave spherical mirror which has a radius of curvature of 20 cm. The size of the image is -

192

How many alkyl groups are possible from alkane C_5H_{12} .

193

How many of the following can be oxidised by $KMnO_4$?

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I–1, C2O4–2, H2S, SO42–, NO3–1, Br–1, SO2

194

Assertion: Rain is falling vertically with a certain. A boy holding an umbrella rides a bicycle in west to east direction and does not get wet.
Reason: The boy is holding his umbrella (at some angle with the vertical towards the west).

195

IUPAC name of $\text{H}_2[\text{PtCl}_6]$ is

196

Calculate the average total number of ions in sphalerite structure per unit cell if there is a Shottky defect of (1) anion per unit cell.

197

If expiratory reserve volume is 1100 ml residual volume is 1200 ml and tidal volume is 500 ml, what shall be the functional residual capacity-

198

Air filled in dead space is :

199

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.		During inspiration muscles of diaphragm			

200

Which part of thyroid cartilage in larynx is closed