UNWAL PACIFIC
Foundation | IIT-JEE | Medical | Repeater

SOLUTIONS

Joint Entrance Exam | IITJEE-2023

24th JAN 2023 | Morning Shift

PHYSICS

SECTION - 1

1.(4) In medium, . . . (i)

In air, ...(ii)

From (i) and (ii) we get

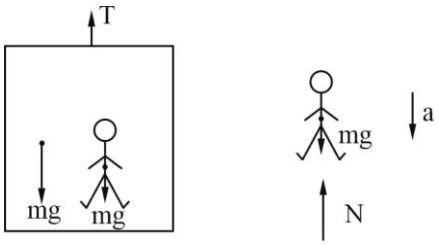
2.(4)

Given

So, = 4320 J

3.(3) For constant velocity of lift

For lift accelerating down,



4.(2)

5.(3) Lets, .

At

and at t = 0.5 sec, B = 0T

K = 1

6.(3)

7.(3) Photo diode a p-n junction diode that operates under reverse bias.

For a p-n junction diode, current is more in forward bias than reverse bias.

8.(1) For vertical projection,

For horizontal projection

9.(1)

and

So,

10.(2) Modulation Index

From the given graph,

and

so,

11.(4) Due to a current carrying circular loop

and , where $x = r$

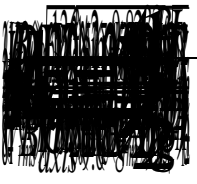
So,

12.(3) **A** : Stoping potential depends on work function of metal and frequency of incident light.

B : Saturation current increases with increase in intensity of incident light (as number of incident photons per second also increases)

C : Maximum kinetic energy of a photoelectron depends on work function of metal and frequency of incident light.

D : Photo electric effect cannot be explained using wave theory of light.

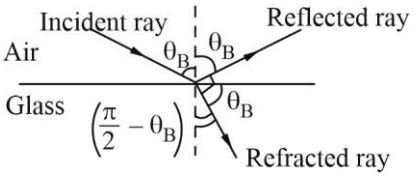


13.(4)

. . . (i)

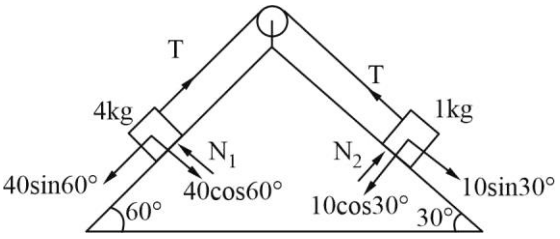
. . . (ii)

14.(2)



For light propagating from air to glass

15.(1)



. . . (i)

. . . .(ii)

Solving (i) and (ii) we get

16.(3)

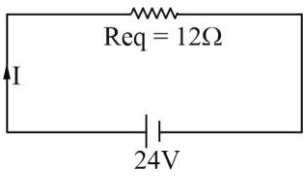
Comparing with

And

17.(1)

And,

18.(2) For the circuit given the following equivalent circuit can be used.



Since and are in parallel

and

19.(2)

20.(3) **. . . .(i)**

Let

Here …(ii)

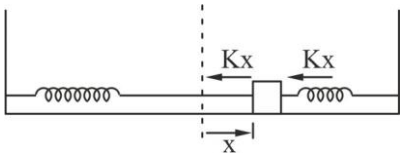
From (i) and (ii) we get $W = 8N$

SECTION – 2

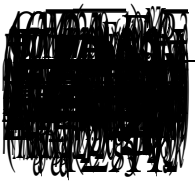
21.(40)

And

22.(5)



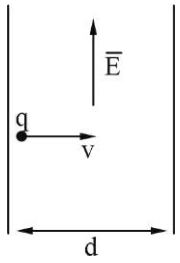
23.(11) Nuclear Density



24.(10) Q factor

Bandwidth

25.(2)



26.(110)

27.(12)

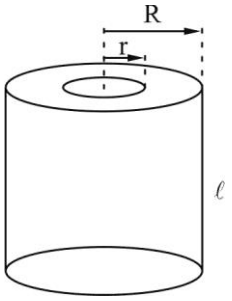
28.(1)

. . . (i)

And . . . .(ii)

Solving (i) & (ii) we get $a = 1$, $b = 2$

29.(2) Resistance



30.(120)

Plano concave lens forms virtual image of the object at its focus i.e. 40 cm to the left of the plano concave lens.

Hence object distance from plano convex lens,

(to the right of plano convex lens)

Hence image distance from plano concave lens = 80 + 40 = 120 cm

CHEMISTRY

SECTION - 1

1.(1) Based upon polarization of an ion by cation correct orders of covalent nature in bonding are

KF < KI (Larger anion can be easily polarize than smaller anion)

LiF > KF (smaller cation is more polarizing than larger cation)

(Metal ion is more polarizing in higher valency state)

(Pseudo noble gas configuration cation is more polarizing than noble gas cation of comparable size)

2.(4) Nucleophilicity:

Leaving group tendency:

(Slower reaction)

(Faster reaction) (Based on nucleophicity of)

(Faster reaction) (Based on leaving group tendency of)

3.(4) Correct matching are:

(A) Chlorophyll

(B) Soda ash

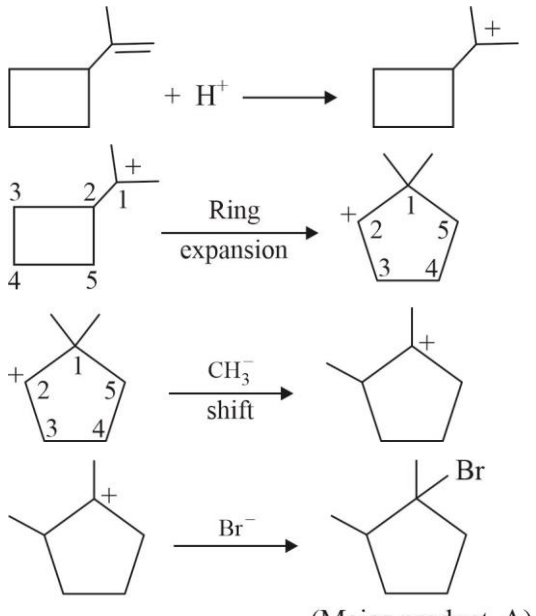
(C) Dentistry, ornamental work

(D) Used in white washing

4.(3) Hydrogen bonding is effective in solid state (ice) of as compared to its liquid state. By addition of some soluble impurity to water hydrogen bonding among molecules decrease. Hence correct decreasing order of hydrogen bonding is B > A > C.

5.(1)

6.(4)



(Major product, A)

7.(1) 3 unpaired

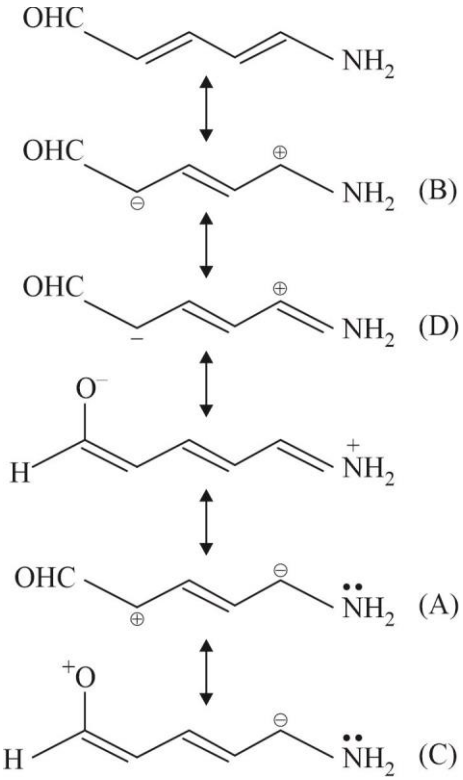
2 unpaired

4 unpaired

5 unpaired

As the calculated magnetic moment is 3.87 BM, the metal ion has 3 unpaired electrons. Correct answer to the questions is

8.(4)



Based upon rules governing stability of resonating structures the correct increasing order of stability is C < A < B < D. Out of the given options 4 is closest to the correct order.

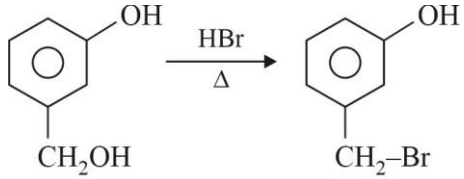
9.(1) Noradrenaline is a neurotransmitter. Low levels of noradrenaline causes depression in human. Correct option is 1.

10.(4) Due to lesser number of freely moving particles the compounds which can form colloids in a given solvent has lower values of their colligative properties as compared to compounds which do not form colloids and stays as true solution, under identical values of concentration. Zeta potential is the electrical potential difference between layers of opposite charges around a colloidal particle. Hence correct option is 4.

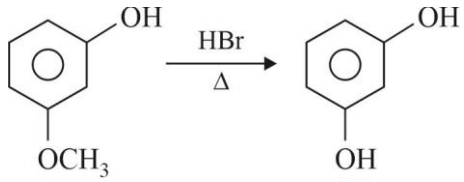
11.(4) As

(or)

12.(1)



(A)



(B)

13.(2) Correct matchings are:

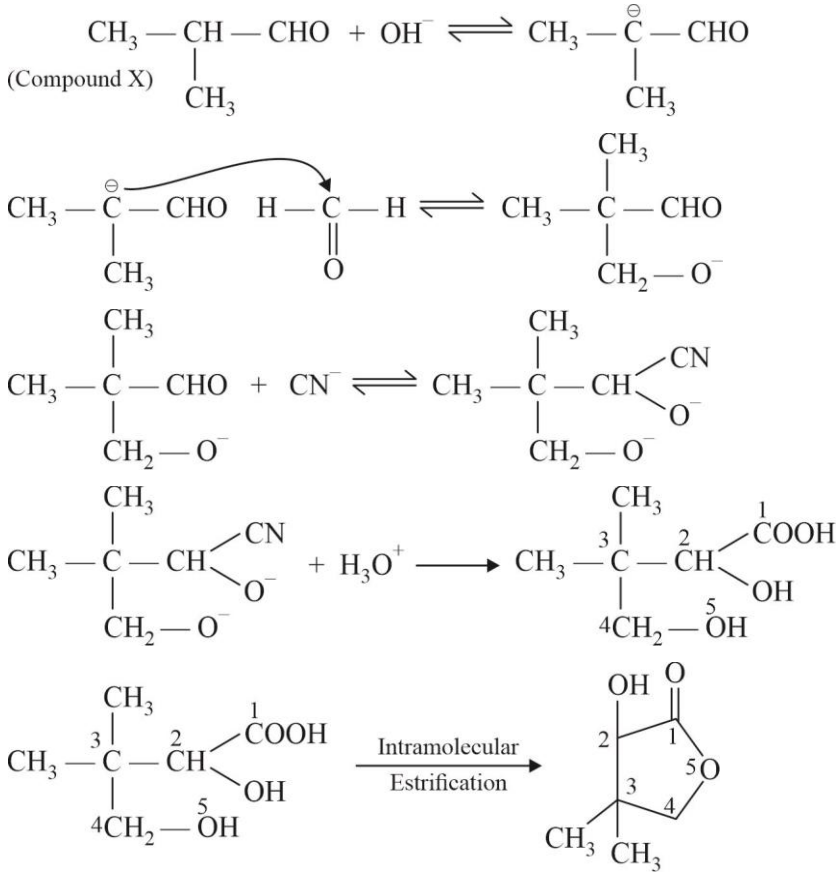
(A) Reverberatory furnace (IV) copper

(B) Electrolytic cell (II) Aluminium

(C) Blast furnace (I) pig iron

(D) Zone refining furnace (III) silicon

14.(1)

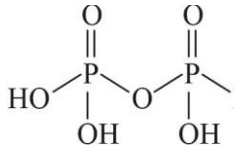


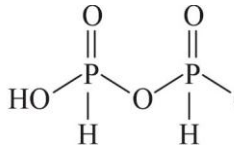
15.(1) For a binary solution of non-volatile solute in a volatile solvent, vapour pressure of the solution is less than that of pure solvent, and at freezing point only the solvent molecules solidify.

16.(3)

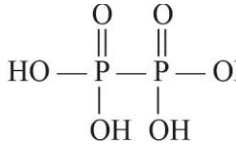
17.(2) Freons are chlorofluorocarbon compounds.

18.(2) Oxo-acid of phosphorus having P-H bonds can act as reducing agent for

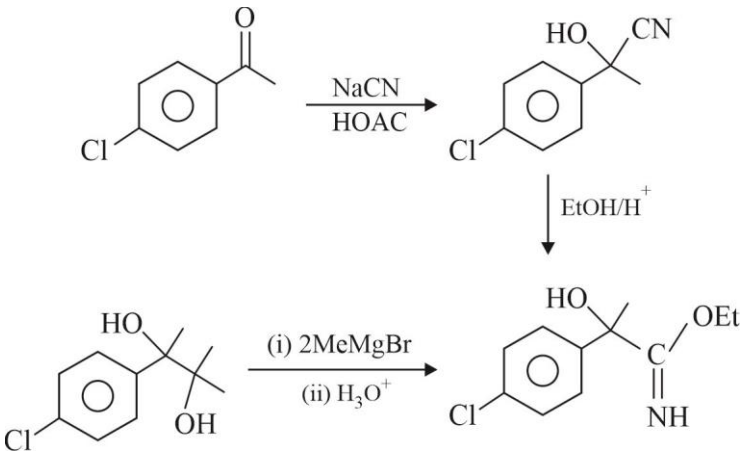
$H_4P_2O_7$:  , No P–H bond

$H_4P_2O_5$:  , Two P–H bonds

$(HPO_3)_n$: Poly meta phosphoric acid , No P–H bond

$H_4P_2O_6$:  , No P–H bond

19.(3)

20.(4) 

(Major product, R)

SECTION – 2

21.(492) Paschen series:

as

first line :

Second line :

22.(917)

as

23.(2) Using for spontaneous process.

spontaneous

spontaneous

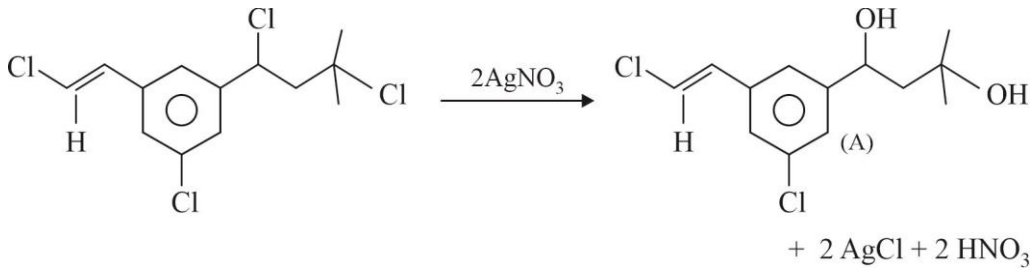
Non spontaneous

Non spontaneous

24.(180) Molarity of NaOH in the stock solution

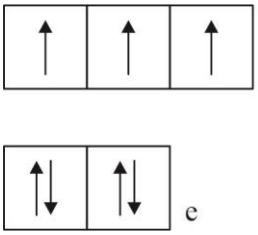
Using

25.(2)



26.(10) For an acidic buffer mixture of and

27.(7) has configuration



unpaired electron = 3

28.(25) M.F of uracil

% of

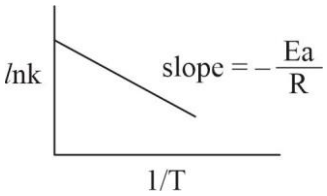
29.(3) As : larger the value of smaller is the value of rate constant K

(Statement A is correct)

As : Higher is the value of higher will be the value of temperature coefficient (statement B is correct)

As

is higher at lower value of T. (Statement C is correct)



(Statement D is correct)

30.(4)

+ ve charge = + 186
–ve charge = – 200

Number of got converted into

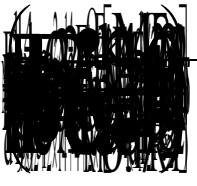
Remaining

Hence 1 mole of has only 0.79 moles of

n-factor of is 0.79 and

% of in original lattice

Hence all the four given statements are correct.



MATHEMATICS

SECTION - 1

1.(1)

2.(3) dot with

Dot with

3.(2)

Take common

4.(3)

GCD of a and $a = a$

but

and

But

So not transitive

5.(2)

I.F.

RHS

RHS

6.(4)

are solutions.

Or

But

So

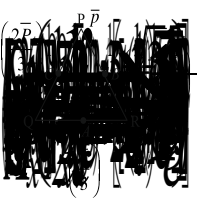
So only 1 solution

7.(1)

,

8.(1) For answer we can take

For proper solution



Area of

9.(1) is cont. and diff at $x = 0$

does not exist

So is NOT continuous at

10.(1) Equation of line

Point on line

It lies on

Point of intersection is

Dist.

11.(4)

Consider

Required value = Coefficient of in

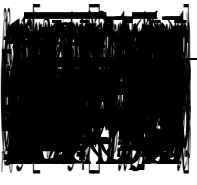
12.(1)

Pre multiplying both side by

Post multiplying both side by

Taking inverse on both side

X & B are inverse of each other



13.(1) If does not imply

Let sample space have infinite cardinality and A is an event with finite (but non-zero) outcomes
e.g. Sample space = Set of Natural numbers
A = A Natural number is chosen then probability of getting 3

Similarly, does not imply A = Sample space

Here, we can take 'A' as complement of Set A taken in Statement 1.
Both statement false.

14.(1)

For unique solution

(for , are same, Q for are same)

Favorable values of N for which given system of equations has unique
Solution = {1, 4, 5, 6}

Required probability

Sum of possible values of N = 1 + 4 + 5 + 6 = 16 required answer = 4 + 16 = 20

15.(2) (p, q, r (+ve) tangents)

are in A.P.

Common difference

Taking log on both side

Similarly,

&

Also,

&

16.(2) Let & and
Distance of point P from plane containing A, B and C

units

17.(1) Equation of tangent to the curve of slope *m*.

This line cuts the curve at and

and

Mid point M of A & B is

Locus of

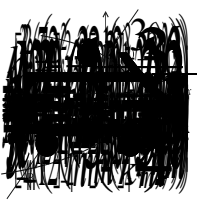
Locus is

It is a parabola whose directrix is

18.(1)

A & B are points of intersection of parabola and line

Area enclosed



19.(2)

P	$\sim P$	Q	$\sim Q$					
T	F	T	F	F	F	F	F	T
T	F	*F*	T	T	F	T	F	F
F	T	*T*	F	T	T	T	F	F
F	T	*F*	T	T	F	T	T	T

Option 1	Option 2	Option 3	Option 4
F	T	T	T
F	F	T	F
F	F	F	T
T	T	T	T

20.(4)

SECTION - 2

21.(1012)

Put to get

22.(546)

23.(22)

= 22

24.(7) Equation of tangent at

Now using , we get

25.(12)

26.(60)

27.(5) Let

E

Product of roots

Roots can't have opposite signs

Also for set S, we're only considering integral solutions of E and

Hence, only 2 cases arise

Roots are $y = 0$ and i.e.

OR

Highest value of when and OR

28.(2) Apply king rule to solve

29.(14) Shortest distance is projection of line segment

Where

and

30.(118)

Equation of circle

Equation of ellipse

Finding abscissa of points of intersection

Since, the largest circle touches ellipse, the above quadratic equation has repeated root.