UNWAL PACIFIC
Foundation | IIT-JEE | Medical | Repeater

SOLUTIONS

Joint Entrance Exam | IITJEE-2023

24th JAN 2023 | Evening Shift

PHYSICS

SECTION – 1

1.(1) Truth Table

A	B	Output
1	1	0
1	0	1
0	1	1
0	0	1

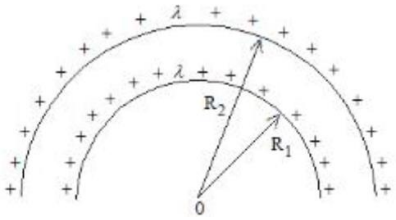
If either of the switch in opened, bulb will glow

If both are closed, bulb will be short and it will not glow.

2.(2) Charge at smaller half ring

Charge at larger half ring

Potential at centre



3.(3)

4.(4) Fact Based

5.(1)

Same KE

6.(1) B_{inside}

Solenoid

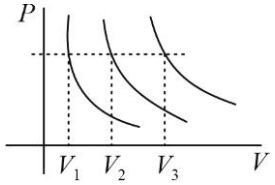
7.(4) Spring force will provide centripetal acceleration

;

8.(1) For an isothermal process P v/s V graph is a rectangular hyperbola.

For same *n*

if V increases, T also increases



9.(3) Statement II is incorrect.
It is not same at same height and depth

10.(4) Motional EMF Question

{Basic Formula}

11.(2) Using Keplers laws

12.(2)

;

13.(4)

$g_{\text{at height}} < g_{\text{at surface}}$
A is incorrect.

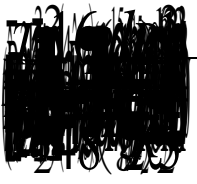
14.(3) Area above time axis m
Area below time axis
Distance

Displacement Ratio

15.(2) Different lights have different foci due to different
This is known as chromatic aberration.

16.(1)

17.(4)

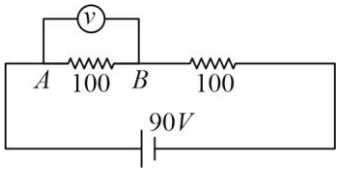


;

;

18.(4) ;

19.(1) Voltmeter and Resistance in parallel



$(R_{eq})_{circuit}$

I in circuit

20.(4) Both A and R are correct steel is more elastic.

SECTION – 2

21.(54) Using lens maker formula

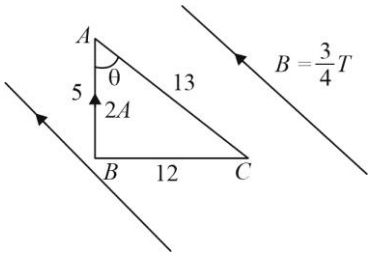
{In air}

{In water}

Dividing both we get:

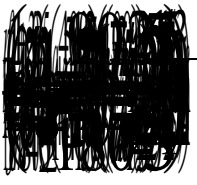
change

22.(9) Force on wire



23.(1) **;**

Diving we get



24.(6) No. of atoms in 120 gm

Total energy

25.(32) Let d be density of material

;

26.(100) ;

27.(44) ;

; {Volume Remains Constant}

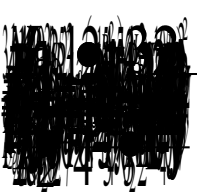
;

28.(7) At constant velocity, force = 0

29.(3) Inductors will behave like wires

30.(105)

Now



CHEMISTRY

SECTION – 1

1.(3)

Number of unpaired electron(s) in HOMO

Number of unpaired electron(s) in HOMO

Number of unpaired electron(s) in HOMO = 2

Number of electron(s) in HOMO = 1

2.(1) Electronic configuration of element having 55 protons in its unipositive state is

Number of s electrons = 10

3.(1)

4.(3) Crystal field model successfully explains structure, stability, magnetic property and colour of metal complex but could not explain the order of spectrochemical series.

5.(4) For alkaline earth metals, value of standard potential.

Standard potential for	Be	Mg	Ca	Sr	Ba	Ra
	–1.97	–2.36	–2.84	–2.89	–2.92	–2.92

Be has very large value of enthalpy of atomization compared to hydration energy of

6.(2)

In above reaction is itself getting oxidized and reducing HOCl.

7.(1)

Ag is first oxidized to and then reduced to Ag.

8.(4) **(A)**

Property	Lithium Li	Sodium Na	Potassium K	Rubidium Rb	Caesium Cs	Francium Fr
Standard potentials for	–3.04	–2.714	–2.925	–2.930	–2.927	–

(B) CsI is less soluble in water

(C) is unstable to heat

(D) When alkali metal is dissolved in concentration liquid ammonia, solution of colour changes to bronze and become diamagnetic.

(E) All alkali metal hydrides are ionic

9.(3) Order of acidic strength is

'a' will undergo deprotonation fastest.

10.(4) are good oxidizing agent.

11.(4)

Norethindrone	–	Antifertility drug
Meprobomate	–	Transquilizer
Seldane	–	Antihistamine
Ampicillin	–	Antibiotic

12.(1)

Firstly, there will be increase in conductance due to formation of more conducting species PhCOONa than benzoic acid. After equivalence point, more conducting species will be responsible for Sharpe increase in conductance.

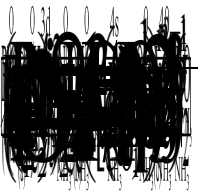
13.(3) Electronic configuration of

acts as strong field ligand when central atom is in +3 oxidation state.

Hybridization

Compound is diamagnetic.

14.(4)



15.(4)

16.(3)

17.(2) Benzene is more stable due to aromatic nature in which delocalized electron cloud is more strongly attracted by nuclei.

18.(3)

19.(4) Pure aniline is colourless.

20.(3) Fact based.

SECTION – 2

21.(85) Calcium lactate is salt of weak acid and strong base.

22.(314)

…… (i)

…… (ii)

From (i) and (ii), we get

23.(5) Mass percent
Mole fraction
Molarity
ppm
Molality

24.(3) **(A)**

(B) Planck's hypothesis implies that radiation of frequency can be generated only if an oscillator of that frequency has acquired the minimum energy required to start oscillation. Thus atoms in black body acts as SHM.

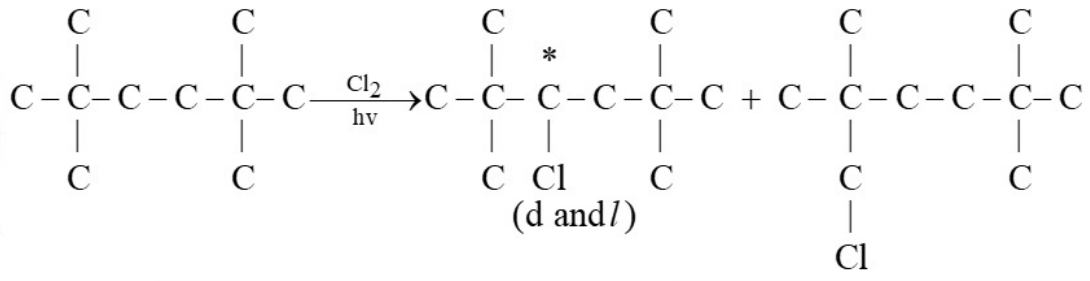
(C) As the temperature increases the maximum intensity of emission moves to shorter wavelength.

(D) The wavelength corresponding to maximum intensity is inversely proportional to absolute temperature.

But

(E) If the oscillating atom releases an energy E into the surroundings, then radiation of frequency will be detected.

25.(3)



26.(2) **(A)** At point 'b', liquification starts.

(B) At point 'c', all gas is present in liquid state.

(C) Between b and c, both liquid and gaseous state coexist.

(D)

As volume is decreased, pressure of increases and according to Le chat principle, reaction will go forward hence amount liquid increases.

27.(620) [isobaric process]

[isochoric process]

[isothermal process]

28.(8)

V Valine
P Proline

29.(8)

Number of bonds = 4 Number of bonds = 4

Total number of bonds

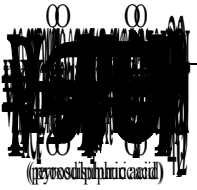
30.(2) **(a)** It is not specific in nature

(b) Enthalpy of adsorption is low

(c) It decreases with increase in temperature

(d) It results into multimolecular layer

(e) No appreciable activation energy required



MATHEMATICS

SECTION – 1

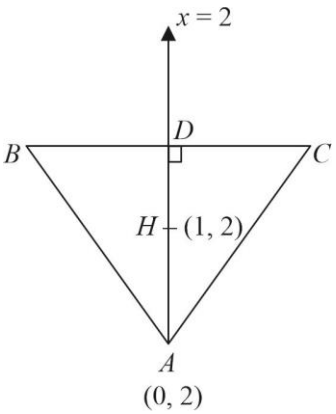
1.(4)

= 1011

2.(2)

3.(2) Since vertex A lies on *y*-axis

Equation of CH



Then

Point on passes

Length of tangent, CP

4.(1) No. of square matrix =

5.(1) Plane P

and

Distance of point (–8, –4, 4)
From plane

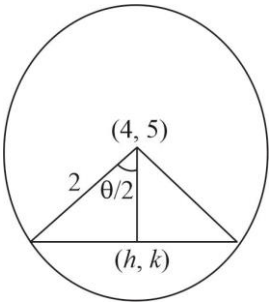
6.(2)

Passes through (1, 1)

Put $x = e$

7.(3)

8.(3)



locus of mid-point of chord

9.(1)

10.(2) and

11.(3) All 5! 5digit numbers.

and 4 digits numbers are greater than 7000.

12.(3) at .

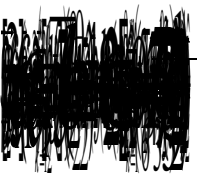
Also, for any .

where

as

Hence,

Analyzing graph of $[x - 5]$ and $[2x + 2]$ in $(-8, -6)$, or using properties of GIF,



13.(2) Put

To get

14.(2) DRs of the line:

Any point on it:

Since, line joining this point to (1,9,7) is to given line, we get: $k = 1$

15.(3)

and solve for by using the fact that given system of equation has infinitely many solutions.

16.(2) Using we get final answer as , where .

17.(3)

Sum of 6 numbers = 57

18.(4) Let

No real solution.

19.(2)

= coefficient. of in

20.(4)

SECTION – 2

21.(27)

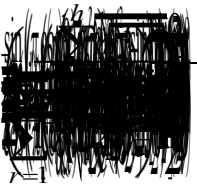
At

22.(2)

23.(5)

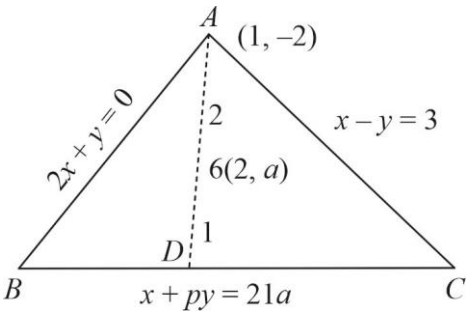
24.(405)

Now, In



Coefficient of = 405

25.(122)



Let B

…(i)

and

…(ii)

From (i) and (ii)

$b = -a$ and $c = 5 + a$

Now satisfy

and in BC to get $p = 11$ and $a = 3$

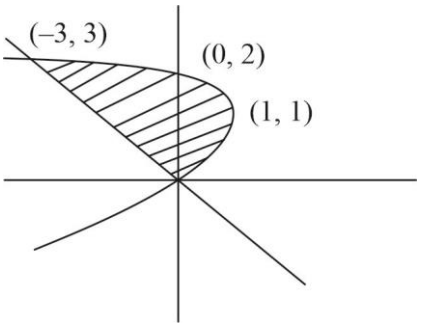
26.(13)

13 elements must be added to R such that it is an equivalence relation.

27.(384)

Square = 384

28.(36)



29.(8)

Now …(i)

…(ii)

From (i) and (ii)

= 8

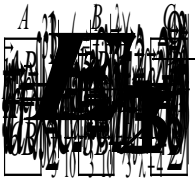
30.(432)

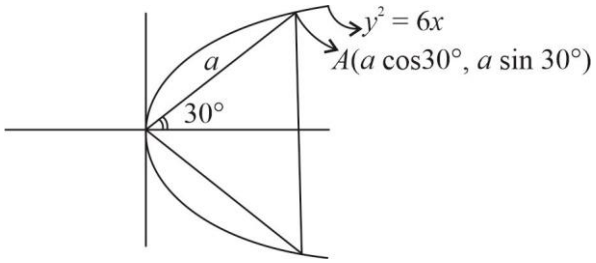
Let *A* be the event of getting a red ball.

Let be the event of selecting urn A.

Let be the event of selecting urn B.

Let be the event of selecting urn *C.*




$y^2 = 6x$
$A(a\cos 30°, a\sin 30°)$
a
$30°$