# JEE EXPERT

## #StayHome#StaySafe

# CORONA KO STOP KARNA HAI

## AT LOCKDOWN, UNLOCK YOUR POTENTIAL

# Practice Test - 08

***Time : 3 hours*** ***Maximum Marks : 240***

- ***Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.***
- ***You are not allowed to leave the examination hall before end of the test.***
- Use ***Blue/Black Ball Point Pen only*** for writing particulars on ***Side-1*** and ***Side-2*** of the Answer Sheet. ***Use of pencil is strictly prohibited.***

## *Instructions*

***Note:***

**1.** The question paper contains 3 sections (Chemistry, Physics & Mathematics).

**2.** Each section is divided into two parts, **Part-A** and **Part-C**.

**3.** **Part – A** contains 16 questions which are further divided as follows:

- **Q. 1 – 7** are multiple choice questions. Each question has four choices (A), (B), (C) and (D), out of which **only one is correct**.
- **Q. 8 – 11** are multiple correct answer type questions. Each question has four choices (A), (B), (C) and (D), out of which **one or more answer(s) is/are correct**.
- **Q. 12 – 16** contains **two** sets of linked comprehension type questions. Each question has four choices (A), (B), (C) and (D) out of which only one is correct.

**4.** **Part – C** contains **7** questions **(Q. 1 – 7)**. The answer to each of the questions is a single – digit integer, ranging from 0 to 9. The appropriate bubbles against the respective question numbers in the ORS have to be darkened.

**Marking Scheme**

***1.*** For each question in the group **Q. 1 – 7** of **Part – A** you will be awarded **3 marks** if you have darkened only the bubble corresponding to the correct answer and **zero marks** if no bubble is darkened. In all other cases, **minus one (–1) mark** will be awarded.

***2.*** For each question in the group **Q. 8 – 11** of **Part – A** you will be awarded **4 marks** if you have darkened all the bubble(s) corresponding to the correct answer and **zero marks** if no bubble is darkened. No negative marks will be awarded in this section.

***3.*** For each question in the group **Q. 12 – 16** of **Part – A** you will be awarded **3 marks** if you have darkened only the bubble corresponding to the correct answer and **zero mark** if no bubble is darkened. In all other cases, **minus one (–1) mark** will be awarded.

***4.*** For each question in **Part – C,** you will be awarded **4 marks** if you have darkened the bubble corresponding to the correct answer and **zero mark** if no bubble is darkened. No negative marks will be awarded in this section.

***Name of the Candidate*** **:** ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

***Enrolment Number*** **:** ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

**Useful Data Chemistry**:

| | | | |
|---|---|---|---|
| Gas Constant | R | = | $8.314\ J\ K^{-1}\ mol^{-1}$ |
| | | = | $0.0821\ Lit\ atm\ K^{-1}\ mol^{-1}$ |
| | | = | $1.987 \approx 2\ Cal\ K^{-1}\ mol^{-1}$ |
| Avogadro's Number | $N_a$ | = | $6.023 \times 10^{23}$ |
| Planck's Constant | h | = | $6.626 \times 10^{-34}$ Js |
| | | = | $6.25 \times 10^{-27}$ erg.s |
| 1 Faraday | | = | 96500 Coulomb |
| 1 calorie | | = | 4.2 Joule |
| 1 amu | | = | $1.66 \times 10^{-27}$ kg |
| 1 eV | | = | $1.6 \times 10^{-19}$ J |

Atomic No : H=1, D=1, Li=3, Na=11, K=19, Rb=37, Cs=55, F=9, Ca=20, He=2, O=8, Au=79.

Atomic Masses: He=4, Mg=24, C=12, O=16, N=14, P=31, Br=80, Cu=63.5, Fe=56, Mn=55, Pb=207,
Au=197, Ag=108, F=19, H=2, Cl=35.5, Sn=118.6

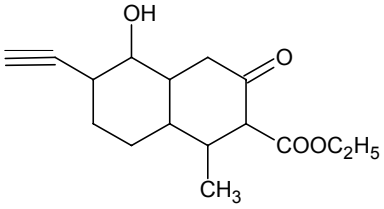
**Useful Data Physics**:

Acceleration due to gravity g = 10 $m/s^2$

# Section – I (Chemistry)

## PART – A

## Single Correct Choice Type

1. 


How many mole of $CH_3MgBr$ is required for complete reaction of one mole of the above compound?

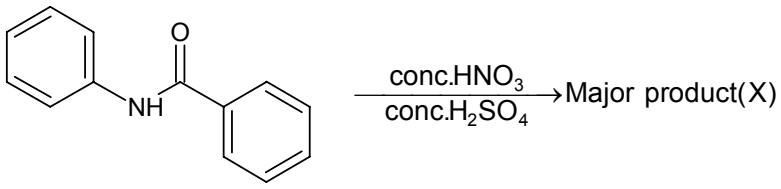
(A) 6 (B) 4

(C) 5 (D) 3

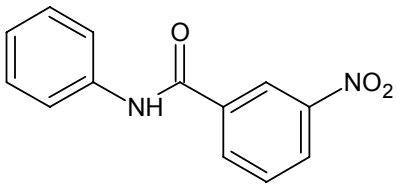
2. Equal volume and equal concentration(0.1M) of which of the following acids can oxidise maximum amount of phosphorus to $H_3PO_4$?

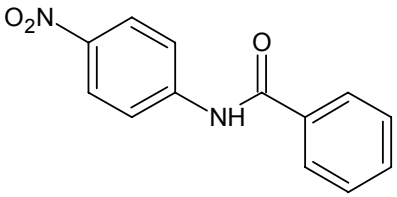
(A) $HNO_3$ (B) $H_2SO_4$

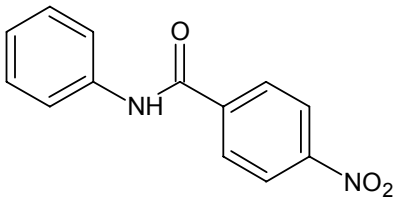
(C) $HClO_4$ (D) $H_2CO_3$

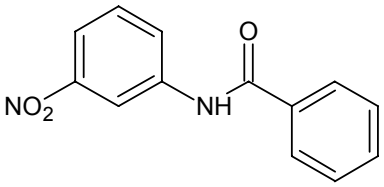
3. 


The structure of (X) is:

(A) 


(B) 


(C) 


(D) 


***Space for rough work***

4. The term anomer of glucose refers to
(A) isomers of glucose that differ in configuration at C-1 and C-4
(B) a mixture of (D)-glucose and (L)-glucose
(C) enantiomers of glucose
(D) isomers of glucose that differ in configuration at C-1

5. On being heated, a salt gives a gas which turns lime water milky and an acidified dichromate solution green. The salt may be
(A) sulphite (B) sulphate
(C) sulphide (D) Bisulphide

6. Which of the following reaction produces chlorine gas?
(A) $NaCl + H_2SO_4$ (B) $MnO_2 + HCl$
(C) $PbCl_2 + H_2S$ (D) All the above

7. The helical structure of protein is stabilized by
(A) dipeptide bonds (B) hydrogen bonds
(C) ether bonds (D) peptide bonds

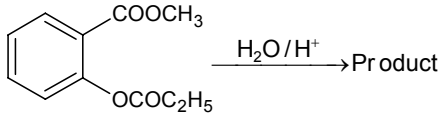
**Multiple Correct Choice Type**

8. Which of the following mixtures of ions in solution can be separated by using NaOH solution?
(A) $Fe^{3+}$ and $Pb^{2+}$ (B) $Pb^{2+}$ and $Sn^{2+}$
(C) $Zn^{2+}$ and $Sn^{2+}$ (D) $Al^{3+}$ and $Cu^{2+}$

9. Which of the following solution(s) bleach(es) colouring substances permanently?
(A) $HClO + H_2O$ (B) $SO_2 + H_2O$
(C) $Cl_2 + H_2O$ (D) All the above

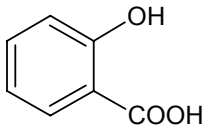
10. A mixture of $CH_3CHO$ and $C_2H_5OH$ can be separated by using
(A) Fehling's solution (B) Tollen's reagent
(C) Iodoform test (D) $NaHSO_3$

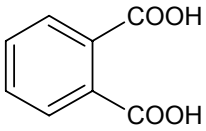
***Space for rough work***

11. 


Which of the following product(s) is/are formed in the above reaction?

(A) $CH_3OH$ (B) $C_2H_5OH$

(C) 


(D) 


**Comprehension Type**
**Paragraph for question Nos. 12 to 13**

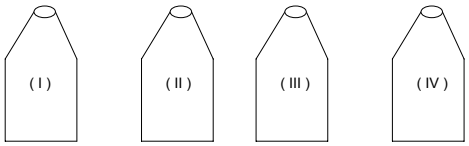
A mixture of nitrogen gas and water vapour is admitted to a flask which contains a solid drying agent. Immediately after admission, the pressure of the flask is 760 mm of Hg. After some hours the pressure reached a steady value of 745 mm of Hg.

12. What is the mole percentage of nitrogen in the original mixture?
(A) 84.06% (B) 98.03%
(C) 72.86% (D) 1.07%

13. If the experiment is carried out at 20°C and the drying agent increases its weight by 0.15g. What will be the volume of the flask?
(A) 12.52 L (B) 10.28 L
(C) 18.85 L (D) 18.02 L

***Space for rough work***

**Paragraph for Question Nos. 14 to 16**




Above four bottles contain the following chemicals which are not mentioned in order:
$FeSO_4$, $Na_2CO_3$, $Pb(NO_3)_2$ and HCl

Bottles (I), (II) and (III) contains colourless aqueous solutions and bottle (IV) contains a green solution. The following observations are made by mixing samples of the contents of the bottles.

(A) Bottle – I + Bottle – II $\rightarrow$ White precipitate
(B) Bottle – I + Bottle – IV $\rightarrow$ White precipitate
(C) Bottle – I + Bottle – III $\rightarrow$ White precipitate
(D) Bottle – II + Bottle – III $\rightarrow$ Colourless gas evolved

14. The precipitate formed in observation (a) becomes soluble in
(A) $AgNO_3$ solution (B) hot water
(C) $NH_4OH$ solution (D) All

15. Which gas is evolved in observation (d)?
(A) $SO_2$ (B) $CO_2$
(C) $Cl_2$ (D) $NO_2$

16. What is the formula of white precipitate formed in observation (b)?
(A) $PbSO_4$ (B) $PbCO_3$
(C) $PbCl_2$ (D) $FeCO_3$

## PART – C

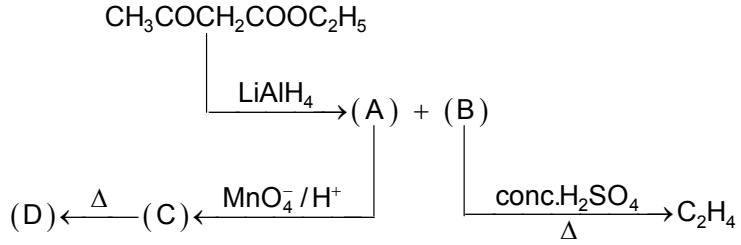
### Numerical Based

1. A one litre vessel contains 3 mole of gas A at TK and 120 mm of Hg. How many more moles of the same gas will be entered into the vessel at constant temperature so that the pressure will be 200 mm of Hg?

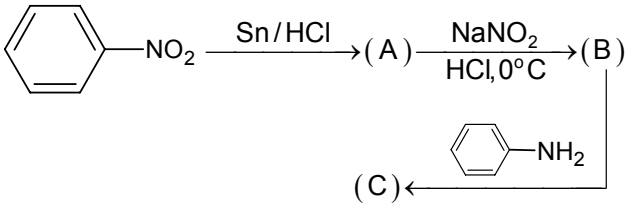
2. A white powder of solid (A) forms a light green solution with water, which on treatment with $K_3[Fe(CN)_6]$ gives a blue precipitate. On being strongly heated, (A) leaves a brown residue and forms a mixture of two gases. The mixture of gases turns acidified dichromate solution green and forms a white precipitate with $BaCl_2$ solution containing conc.HCl?
How many oxygen atoms are present in one molecule of compound(A)?

***Space for rough work***

3. 382g of a mixture of $CaCl_2$ and NaOH required 5 litre of 0.4M $Na_2SO_4$ for complete precipitation of $Ca^{2+}$ ions as $CaSO_4$. What molarity of 4 litre HCl solution is required for complete neutralization of the filtrate after filtration of $CaSO_4$ from the solution?

4. 

How many hydrogen atoms are present in one molecule of (D)?

5. 

How many $\pi$-bonds are present in one molecule of the organic product(C)?

6. When a crystalline compound(X) is heated with $K_2Cr_2O_7$ and conc.$H_2SO_4$, a reddish brown gas(A) is evolved. On passing (A) into caustic soda solution, a yellow solution (B) is formed. A yellow ppt. (C) is obtained when solution of (B) is neutralized with acetic acid and then treated with lead acetate solution. When (X) is heated with NaOH, a colourless gas is evolved which, when passed into a solution of $K_2[HgI_4]$, a reddish brown precipitate(D) is formed. How many atoms are present in one molecule of (X)?

7. 10 ml solution of $H_2O_2$ requires 143 ml of 0.1N $KMnO_4$ for complete reaction. The volume strength of $H_2O_2$ solution will be:

***Space for rough work***

# Section – II (Physics)

## PART – A

## Single Correct Choice Type

1. Two blocks A and B float in water. If A floats with $\frac{1}{4}$ of its volume immersed and B floats with $\frac{3}{5}$ of its volume immersed, then the ratio of their densities is

(A) $\frac{5}{12}$ (B) $\frac{7}{12}$

(C) $\frac{9}{12}$ (D) $\frac{11}{12}$

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

(A) 2 (B) 3/2

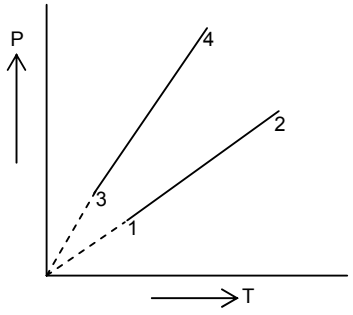
(C) 5/3 (D) 4/3

3. Two identical satellites A and B revolve round the earth in circular orbits at distance R and 3R from the surface of the earth (R = radius of the earth). The ratio of the linear momenta of A and B is

(A) 1:1 (B) $1:\sqrt{2}$

(C) $\sqrt{2}:1$ (D) 2 : 1

4. Pressure versus temperature graph of an ideal gas to equal number of moles of different volumes are plotted as shown in figure. Choose the correct alternative




(A) $V_1 = V_2 = V_3 = V_4$

(B) $V_4 > V_3 > V_2 > V_1$

(C) $V_1 = V_2; V_3 = V_4$ and $V_2 > V_3$

(D) $V_1 = V_2, V_3 = V_4$ and $V_2 < V_3$

***Space for rough work***

5. An emf of 15V is applied in a circuit containing 5 H inductance and 10 $\Omega$ resistance. The ratio of the currents at time t = $\infty$ and t = 1s is

(A) $\frac{e^{1/2}}{e^{1/2}-1}$ (B) $\frac{e^2}{e^2-1}$

(C) $1-e^{-1}$ (D) $e^{-1}$

6. A metal rod of resistance 20 $\Omega$ is fixed along a diameter of conducting ring of radius 0.1 m and lies on x – y plane. There is a magnetic field $\vec{B}=(50T)\hat{k}$. The ring rotates with an angular velocity $\omega$ = 20 rad/s about its axis. An external resistance of 10 $\Omega$ is connected across the centre of the ring and rim. The current through external resistance is

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$

(C) $\frac{1}{3}$ (D) 0

7. The acceleration of a charged particle moving in a magnetic field $\vec{B}=\hat{i}-\hat{j}+2\hat{k}$ at a given instant is $\vec{a}=-2\hat{i}+x\hat{j}-\hat{k}$. The value of x is

(A) 4 (B) -3

(C) -4 (D) none of these

**Multiple Correct Choice Type**

8. A cubical block of wood of edge 10cm and mass 0.92 kg floats on a tank of water with oil of rel. density 0.6 to a depth of 4 cm above water. When the block attains equilibrium with four of its sides edges vertical

(A) 1 cm of it will be above the free surface of oil

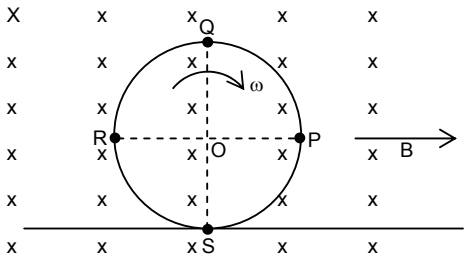
(B) 5 cm of it will be under water

(C) 2cm of it will be above the common surface of oil and water

(D) 8cm of it will be under water

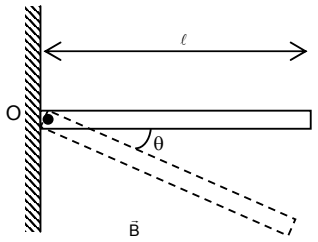
***Space for rough work***

9. A disc of radius R is rolling without sliding on a horizontal surface with a velocity of centre of mass v and angular velocity $\omega$ in a uniform magnetic field B which is perpendicular to the plane of the disc as shown in figure. O is the centre of the disc and P, Q , R and S are the four points on the disc




(A) Due to translation only , induced emf across PS = Bvr
(B) Due to rotation only, induced emf across QS = 0
(C) Due to translation only , induced emf across RO = 0
(D) Due to rotation only, induced emf across OQ = Bvr

10. A conducting rod of length l is hinged at point O. it is free to rotate in a vertical plane. There exists a uniform magnetic field $\vec{B}$ in horizontal direction. The rod is released from the position shown in figure. Potential difference between the two ends of the rod is proportional to




(A) $\ell^{3/2}$ (B) $\ell^2$
(C) $\sin\theta$ (D) $(\sin\theta)^{1/2}$

11. A satellite is orbiting the earth in a circular orbit of radius r. its
(A) kinetic energy varies as 1/r (B) angular momentum varies as 1/r
(C) linear momentum varies as 1/r (D) frequency of revolution varies as $(1/r^{3/2})$

**Comprehension Type**
**Paragraph for question Nos. 12 to 13**

We know that liquids under equilibrium exerts a force perpendicular to any surface in contact with it, such as a container wall or a body immersed in the liquid. We also know that a system under equilibrium will have a net external force zero and for every force there is equal and opposite force acting on different bodies.
Further, when we immerse a body fully or partially, inside a liquid, liquid exerts an upthrust on the body equal to the weight of the liquid displaced by the body.

12. If a body of density '$\sigma$' is completely submerged inside a liquid of density $\rho$ and floating. Then
(A) $\rho = \sigma$
(B) $\rho > \sigma$
(C) $\rho < \sigma$
(D) cannot be predicted from the above information

***Space for rough work***

13. A beaker filled with water kept on a weighing balance weighs $w_1$. Now an iron block of weight $w_2$ is suspended through a thread inside water. The weighing machine will now read 'w' given
(A) $w = w_1 + w_2$ (B) $w_1 < w < w_1 + w_2$
(C) $w > w_1 + w_2$ (D) $w + w_1$

**Paragraph for Question Nos. 14 to 16**

According to Stefan's Law, heat energy emitted/sec/area by a perfectly black body varies directly as the fourth power of its absolute temperature. The wavelength corresponding to which energy emitted is maximum varies inversely as the temperature of block body (Wien's Law). However, the rate of loss of heat of a liquid varies directly as the difference in temperatures of the liquid and the surroundings, provided this difference is small ($\approx 30^0$C). This is Newton's laws of cooling.

14 Temperature of a black body is made three times. The power radiated becomes
(A) 3 times (B) 9 times
(C) 27 times (D) 81 times

15. The wavelength corresponding to which energy radiated is maximum in the above case becomes n times, where n is
(A) $\frac{1}{3}$ (B) $\frac{1}{9}$
(C) $\frac{1}{27}$ (D) $\frac{1}{81}$

16. A liquid takes 5 minutes to cool from $60^0$C to $50^0$C, when temperature of surrounding is $30^0$C. How long will it take to cool from $50^0$C to $40^0$C? (nearly)
(A) 5 minute (B) 4 minute
(C) 9 minute (D) 10 minute

**PART – C**

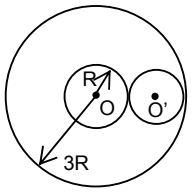
**Numerical Based**

1. An ornament weighing 5g in air, weighs only 4.6g in water. Assuming that some copper is mixed with gold to prepare that ornament find the amount of copper (in gm) in it. Specific gravity of gold and copper is 20 and 10 respectively

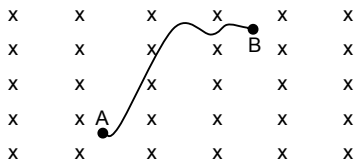
***Space for rough work***

2. A cylindrical vessel filled with water upto the height H becomes empty in times $t_0$ due to a small hole at the bottom of the vessel. If water is filled to a height 4H it will flow out in $nt_0$ time. Find n

3. A thick hollow sphere with inner radius R and outer radius 3 R has a uniform volume mass density $\rho$. It has a spherical cavity of radius R as shown. If gravitational field at the centre O′ of the cavity is $\frac{a}{3}\pi G\rho R$, then a =




4. The wire shown in the figure between points A and B carries a current of 10A. A uniform magnetic field of 10T exists in the region which is pointing into the plane in which, wire lies. The coordinates of A and B are (2,0) m and (0,2) m respectively and the length of the wire is 10m. If the magnitude of the force acting on the wire is $m \times 100\sqrt{2}$ N. Find value of m.




5. A mass of $6 \times 10^{24}$ kg is to be compressed in a sphere in such a way that the escape velocity from its surface is $3 \times 10^8$ m/sec. Find the radius of the sphere (in mm)

6 Two satellites $S_1$ and $S_2$ are to be set in the orbits of $\frac{R}{4}$ and $\frac{R}{6}$ above the earth's surface. They revolve around the earth in a coplanar circular orbit in the opposite sense. What will be the ratio of speed of projection from the earth's surface?

7 A conducting circular loop is placed in a uniform magnetic field of B = 0.02 tesla with its plane perpendicular to the field. The radius of the loop starts shrinking at a constant rate of $\frac{1}{\pi}$ cm / sec. Find the induced emf in the loop at the instant when its radius is 4 cm.

***Space for rough work***

# Section – III (Mathematics)

## PART – A

## Single Correct Choice Type

1. Sum of the roots of $x+1=2\log_2\left(2^x+3\right)-2\log_4\left(1980-2^{-x}\right)$ is

(A) $\log_2 11$ (B) $\log_4 11$

(C) $\log_4 3956$ (D) $\log_4 1980$

2. If there are $(2n+1)$ terms in an A.P then $\frac{\text{sum of odd positioned terms}}{\text{sum of even positioned terms}}$ =

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

(C) $\frac{n+1}{n}$ (D) $\frac{n}{n+1}$

3. The probability that a married man watches a certain T.V. show is 0.4 and the probability that a married woman watches the show is 0.5. The probability that a man watches the show, given that his wife does, is 0.7. Then the probability that a wife watches the show given that her husband does is

(A) ¾ (B) 7/8

(C) 1/2 (D) 5/8

4. Interior angles of a closed polygon, having sides less than 10 are in A.P. Then 3rd smallest angle is $130^\circ$ and common difference of angles is $5^\circ$, then number of sides in the polygon is

(A) 6 (B) 7

(C) 8 (D) 9

5. If f(z) = $\frac{1}{z}+\frac{1}{\bar{z}}$ and $\theta$ be the principal value of arg f(z), then $\theta$ =

(A) 0 (B) $\pi/6$

(C) $\pi/3$ (D) $\pi/2$

6. The number of values of the triplet $(a,b,c)$ for which $a\cos 2x+b\sin^2 x+c=0$ is satisfied by all $x\in R$, is

(A) 1 (B) 2

(C) 20 (D) infinite

***Space for rough work***

7. The integral part in the value of $\left(5+2\sqrt{6}\right)^n$ is

(A) an even number (B) a prime number
(C) a odd number (D) none of these

**Multiple Correct Choice Type**

8. If the equation $ax^2+bx+c=0$ (a>0) has two roots $\alpha$ and $\beta$ such that $\alpha<-2$ and $\beta>2$, then

(A) $b^2-4ac>0$ (B) c>0
(C) $a+|b|+c<0$ (D) $4a+2|b|+c<0$

9. If $C_r$'s denotes the combinatorial coefficients in the expansion of $(1+x)^n, n\in N$ then $C_0^2+3C_1^2+5C_2^2$……upto (n+1) terms, is equal to

(A) ${}^{2n}C_n+2n.{}^{2n-1}C_{n-1}$ (B) $(2n+1)^{2n-1}C_n$
(C) $2(n+1)^{2n-1}C_{n-1}$ (D) ${}^{2n-1}C_n+(n+1).{}^{2n-1}C_{n-1}$

10. Suppose m boys and m girls take their seats randomly around a circle. The probability of their sitting is $\left({}^{2m-1}C_m\right)^{-1}$ when

(A) no two boys sit together (B) no two girls sit together
(C) boys and girls sit alternatively (D) all the boys sit together

11. If in the expansion of $\left(\frac{1}{x}+x\tan x\right)^5$ the ratio of 4th term to the 2nd term is $\frac{2}{27}\pi^4$, then value of x can be

(A) $\frac{-\pi}{6}$ (B) $\frac{-\pi}{3}$
(C) $\frac{\pi}{3}$ (D) $\frac{\pi}{12}$

***Space for rough work***

**Comprehension Type**
**Paragraph for question Nos. 12 to 13**

A chess match between two grandmasters X and Y is won by whoever first wins a total of two games. X's chances of winning, drawing of losing any particular game are a,b,c respectively. The games are independent and a+b+c=1

12. The probability that X wins the match after (n+1) games $(n \geq 1)$ is

(A) $na^2b^{n-1}$ (B) $a^2\left(nb^{n-1}+n(n-1)b^{n-2}c\right)$

(C) $na^2bc^{n-1}$ (D) none of these

13. The probability that Y wins the match after the 4th game is

(A) $3bc^2(b+2a)\ 3bc^2(b+)$ (B) $bc^2(3b+a)$

(C) $2ac^2(b+c)$ (D) $abc(2a+3b)$

**Paragraph for Question Nos. 14 to 16**

Concept of arithmetic mean of $m^{th}$ power: Let a,b>0, $a \neq b$, let $m \in R$, then

$\frac{a^m+b^m}{2} > \left(\frac{a+b}{2}\right)^m$ if $-\infty < m < 0 \cup 1 < m < \infty$ and

$\frac{a^m+b^m}{2} = \left(\frac{a+b}{2}\right)^m$ if $m \in \{0,1\}$ and

$\frac{a^m+b^m}{2} < \left(\frac{a+b}{2}\right)^m$ if $m \in (0,1)$. Now answer the following questions

14. If a,b,c $\in R^+$ and a,b,c are not all equal such that a+b+c = 1 then $\frac{b^2+c^2}{1-a}+\frac{c^2+a^2}{1-b}+\frac{a^2+b^2}{1-c}$ lies in interval(select the best option)

(A) $\left(\frac{3}{2},\infty\right)$ (B) $(1,\infty)$

(C) $(0,\infty)$ (D) none of these

***Space for rough work***

15. If $a,b \in R^+, a \neq b$ and a+b=1 and if $A = \left(a + \frac{1}{a}\right)^2 + \left(b + \frac{1}{b}\right)^2$, then

(A) A>8 (B) A<8

(C) $A > \frac{25}{2}$ (D) $A < \frac{25}{2}$

16. If $a,b,c \in R^+$ and are in harmonic progression and if $\lambda = \frac{a^n + c^n}{b^n} \forall n \notin [0,1], n \in R^+$, then the correct statement is $(a,b,c$ are all unequal$)$

(A) $\lambda > 2$ (B) $\lambda < 2$

(C) $\lambda = 2$ (D) none of these

## PART – C

### Numerical Based

1. If n is a perfect number then sum of reciprocals of all the divisors of n is _____.

2. If the equation $\sec\theta + \text{cosec}\theta = c$ has two real roots between o and $2\pi$ then the least integer which $c^2$ cannot exceed is equal to _____.

3. The probability of a bomb hitting a bridge is ½ and two direct hits are needed to destroy it. Then the least number of bombs required, so that the probability of the bridge being destroyed is greater than 0.9, _____.

4. If $f(n) = \sum_{r=1}^{n} \left[ r^2 \left( {}^nC_r - {}^nC_{r-1} \right) + (2r+1)\left( {}^nC_r \right) \right]$, then f(30) is equal to $30(k+30)$ then k =

5. A locker can be opened by dialing a fixed three-digit code (between 000 and 999). A stranger, who does not know the code, tries to open the locker by dialing three digits at random. If p is the probability that the stranger succeeds at the kth trial, then the value of 1000p is equal to _____.
(Assume that the stranger does not repeat unsuccessful combinations)

6. Total number of seven letter words formed by using the letters of the word "SUCCESS" such that no two C and no two S are together, is 24k then k =_____.

7. If $|z| \leq 4$ then maximum value of $|iz + 3 - 4i|$ is _____.

***Space for rough work***

# ANSWER KEY

## Section – I (Chemistry)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | **C** | 2. | **B** | 3. | **B** | 4. | **D** |
| 5. | **A** | 6. | **B** | 7. | **B** | 8. | **AD** |
| 9. | **AC** | 10. | **D** | 11. | **AC** | 12. | **B** |
| 13. | **B** | 14. | **D** | 15. | **B** | **16.** | **A** |
| 1. | **2** | 2. | **4** | 3. | **1** | 4. | **6** |
| 5. | **7** | 6. | **6** | 7. | **8** | | |

## Section – II (Physics)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | **A** | 2. | **B** | 3. | **C** | 4. | **C** |
| 5. | **B** | 6. | **C** | 7. | **C** | 8. | **CD** |
| 9. | **ABC** | 10. | **AD** | 11 | **ACD** | 12. | **D** |
| 13. | **B** | 14. | **D** | 15. | **A** | 16. | **C** |
| 1. | **3** | 2. | **2** | 3 | **7** | 4 | **2** |
| 5 | **9** | 6 | **1** | 7. | **8** | | |

## Section – III (Mathematics)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | **A** | 2. | **C** | 3. | **B** | 4. | **D** |
| 5. | **A** | 6. | **D** | 7. | **C** | 8. | **ACD** |
| 9. | **AC** | 10. | **ABC** | 11. | **BC** | 12. | **B** |
| 13. | **A** | 14. | **B** | 15. | **C** | 16. | **A** |
| 1. | **2** | 2. | **8** | 3. | **8** | 4. | **2** |
| 5. | **1** | 6. | **4** | 7. | **9** | | |