SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

EAMCET | **EAMCET_DPP - 4** | **Date: 09-04-2020**

Time: 3 Hours

MATHS-A

SYLLABUS: Inverse trigonometric functions

1. $\tan\left[\frac{1}{2}\cos^{-1}\left(\frac{\sqrt{5}}{3}\right)\right]$

1) $\frac{3+\sqrt{5}}{2}$ 2) $\frac{3-\sqrt{5}}{2}$ 3) $\frac{4+\sqrt{5}}{2}$ 4) $\frac{4-\sqrt{5}}{2}$

2. **Range of** $\sin^{-1}x+\cos^{-1}x+\tan^{-1}x$ **is**

1) $\left(0,\frac{\pi}{2}\right)$ 2) $(0,\pi]$ 3) $\left[\frac{\pi}{4},\frac{3\pi}{4}\right]$ 4) $[0,\pi]$

3. **If** $\cos^{-1}\sqrt{P}+\cos^{-1}\sqrt{1-P}+\cos^{-1}\sqrt{1-q}=\frac{3\pi}{4}$ **then q =**

1) $\frac{1}{\sqrt{2}}$ 2) 1 3) $\frac{1}{2}$ 4) $\frac{1}{3}$

4. $\sum_{1}^{\infty}\tan^{-1}\left(\frac{1}{1+n+n^2}\right)=$

1) π 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{4}$

5. $2\cos^{-1}x=\sin^{-1}\left(2x\sqrt{1-x^2}\right)$ **is valid for all values of x satisfying**

1) $0\le x\le\frac{1}{\sqrt{2}}$ 2) $\frac{\sqrt{3}}{2}\le x\le 1$ 3) $\frac{1}{\sqrt{2}}\le x\le 1$ 4) $-1\le x\le 1$

6. $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$ **then** $x^{100}+y^{100}+z^{100}-\frac{9}{x^{101}+y^{101}+z^{101}}=$

1) 0 2) 1 3) 2 4) 3

7. **If** $x>0,y>0,z>0$, $xy+yz+zx<1$ **and if** $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\pi$ **then** $x+y+z=$

1) xyz 2) $3xyz$ 3) $\sqrt{xyz}$ 4) 0

8. $\left(\tan^{-1}x\right)^2+\left(\cot^{-1}x\right)^2=\frac{5\pi^2}{8}\Rightarrow x=$

1) -1 2) 1 3) 0 4) $\pi\sqrt{\frac{5}{8}}$

9. $\sin^{-1}\frac{4}{5}+2\tan^{-1}\frac{1}{3}=$

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{2}$ 4) 0

10. $\cos\left(\cot^{-1}\left(\frac{1}{2}\right)\right)=\cot\left(\cos^{-1}x\right)$ **then a value of x is**

1) $\frac{1}{\sqrt{6}}$ 2) $\frac{-1}{\sqrt{12}}$ 3) $\frac{2}{\sqrt{6}}$ 4) $\frac{-2}{\sqrt{6}}$

11. **The value of x which satisfies** $\sin\left(\cot^{-1}x\right)=\cos\left(\tan^{-1}(1+x)\right)$ **is**

1) $\frac{-1}{2}$ 2) $\frac{1}{2}$ 3) -1 4) 1

12. $\sin^{-1}\frac{\sqrt{3}}{2}+\sin\sqrt{\frac{2}{3}}=$

1) $\sin^{-1}\frac{\sqrt{3}+\sqrt{2}}{2\sqrt{3}}$ 2) $\pi-\sin^{-1}\left(\frac{\sqrt{3}+\sqrt{2}}{2\sqrt{3}}\right)$

3) $-\pi-\sin^{-1}\left(\frac{\sqrt{3}+\sqrt{2}}{2\sqrt{3}}\right)$ 4) $\pi+\sin^{-1}\left(\frac{\sqrt{3}+\sqrt{2}}{2\sqrt{3}}\right)$

13. $\sec\left(\tan^{-1}\frac{y}{2}\right)=$

1) $\sqrt{\frac{4+y^2}{2}}$ 2) $\sqrt{\frac{4-y^2}{2}}$ 3) $\frac{\sqrt{4+y^2}}{2}$ 4) $\frac{\sqrt{4-y^2}}{2}$

14. **Suppose** $s_a(x)=\sec^{-1}\left(\frac{x}{a}\right)+\sec^{-1}(a)$ **for** $a\neq 0$**. If** $s_a(x)=s_b(x)$ **for** $a\neq b$ **then x =**

1) 1 2) $\pm ab$ 3) ab 4) $-ab$

15. **For** $a>0$**. If** $f(x)=ax+b$ **is an onto function from** $[-1,1]$ **to** $[0,2]$**, then** $\cot\left[\tan^{-1}\frac{1}{7}+\tan^{-1}\frac{1}{8}+\tan^{-1}\frac{1}{5}\right]=$

1) $f(-1)$ 2) $f(1)$ 3) $f(0)$ 4) $f(2)$

16. **If** $\cos^{-1}x+\cos^{-1}y+\cos^{-1}z=3\pi$ **then**

1) $x+y+z-3=0$ 2) $x+y+z+3=0$ 3) $x+2y+3z-5=0$ 4) $x-y-z=0$

17. **If** α **and** β **are the roots of the quadratic equation** $3x^2-16x+5=0$ **then** $\tan^{-1}\alpha+\tan^{-1}\beta-\tan^{-1}\left(\frac{\alpha+\beta}{1-\alpha\beta}\right)=$

1) 0 2) π 3) $\frac{\pi}{2}$ 4) $-\pi$

18. $2\tan^{-1}\frac{1}{5}+\sec^{-1}\frac{5\sqrt{2}}{7}+2\tan^{-1}\frac{1}{8}=$

1) $\frac{\pi}{6}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{8}$

19. **The value of** $\cot\left(\sum_{n=1}^{19}\cot^{-1}\left(1+\sum_{p=1}^{n}2p\right)\right)$ **is**

1) $\frac{19}{20}$ 2) $\frac{20}{19}$ 3) $\frac{19}{21}$ 4) $\frac{21}{19}$

20. **If** $\sin^{-1}\left(\frac{3}{x}\right)+\sin^{-1}\left(\frac{y}{x}\right)=\frac{\pi}{2}$ **then x=**

1) 3 2) 5 3) 7 4) 11

MATHS-B

SYLLABUS: Straight lines

21. **If the line** $3x+4y+7=0$ **is denoted by L, then the points** $(2,-5),(-5,-2)$**.**

1) lie on L
2) lie on same side of L
3) lie on opposite sides of L
4) equidistant from L

22. **The condition that the three different lines $ax+by+c=0, bx+cy+a=0$, $cx+ay+b=0$ to be concurrent is**

1) $a=b=c$ 2) $a+b+c=0$ 3) $a+b+c\neq 0$ 4) $a+b=c$

23. **If x_1, x_2, x_3 as y_1, y_2, y_3 are in G.P with same common ratio, then the points $P(x_1, y_1), Q(x_2, y_2), R(x_3, y_3)$**

1) They lie on a straight line 2) are concurrent
3) They form a triangle 4) lie on a circle

24. **The line segment joining the points (1, 2) and (K, 1) is divided by the line $3x+4y-7=0$ in the ratio 4:9, then the value of K is**

1) -2 2) -3 3) 2 4) 3

25. **All the lines whose sum of reciprocals of intercepts is 'K', will be concurrent at the point**

1) (K, K) 2) $(-K, -K)$ 3) $\left(\frac{1}{K}, \frac{1}{K}\right)$ 4) $\left(\frac{-1}{K}, \frac{-1}{K}\right)$

26. **The orthocenter of the triangle formed by the lines $x+y+1=0, x-y-1=0$, $3x+4y+5=0$ is**

1) $(0,0)$ 2) $(1,1)$ 3) $(0,-1)$ 4) $(-1,0)$

27. **The circumcentre of the triangle formed by the lines x=1, y=1 and $x+y=1$ is**

1) $(1,1)$ 2) $(-1,-1)$ 3) $\left(\frac{1}{2}, \frac{1}{2}\right)$ 4) $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

28. **The base of an equilateral triangle is x+y=2 and the vertex is the point $(2,-1)$. The equations of to the remaining sides are**

1) $y+1=\left(2\pm\sqrt{3}\right)(x+2)$ 2) $y-1=\left(2\pm\sqrt{3}\right)(x-2)$
3) $y+1=\left(\sqrt{3}\pm 1\right)(x-2)$ 4) $y+1=\left(2\pm\sqrt{3}\right)(x-2)$

29. **The number of integral values of 'm' for which the x-coordinate of the point of intersection of the lines $3x+4y=9, y=mx+1$ is an integer is**

1) 0 2) 1 3) 2 4) 4

30. **If the foot of the perpendicular from $(-4,5)$ to the straight line $3x+4y-18=0$ is (α, β) then the value of $\sqrt{\alpha^2+\beta^2-\beta}$ is**

1) 0 2) 1 3) -4 4) 4

31. **If the image of $\left(\frac{-7}{5}, \frac{-6}{5}\right)$ in a line is (1, 2) then the equation of the line is**

1) $3x-y=0$ 2) $4x-y=0$ 3) $3x+4y=1$ 4) $4x+3y=1$

32. **The image of the line $x+y-2=0$ in the y-axis is**

1) $x-y+2=0$ 2) $y-x+2=0$ 3) $x+y+2=0$ 4) $x+y-2=0$

33. **The angle between the line joining the points $(1,-2), (3,2)$ and the line $x+2y-7=0$ is**

1) π 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{6}$

34. **The value of K(>0) such that the angle between the lines $4x-y+7=0$ and $Kx-5y-9=0$ is 45^0 is**

1) 3 2) 5 3) $\frac{5}{3}$ 4) $\frac{25}{3}$

35. **The acute angle bisector between the lines $3x-4y-5=0, 5x+12y-26=0$ is**

1) $7x-56y+32=0$ 2) $9x-3y+13=0$ 3) $4x-112y+65=0$ 4) $7x-13y+9=0$

36. **If θ is the obtuse angle between the lines $8x+y-4=0$ and $4x+7y+5=0$, then $\tan\theta =$**

1) $\frac{-4}{3}$ 2) $\frac{4}{3}$ 3) $\frac{-3}{4}$ 4) $\frac{-3}{5}$

37. If a, b, c form a geometric progression with common ratio 'r', then the sum of the ordinates of the points of intersection of the line $ax+by+c=0$ and the curve $x+2y^2=0$ is

1) $\frac{r}{2}$ 2) $\frac{-r}{2}$ 3) $\frac{r^2}{2}$ 4) r

38. Interval of 'α' for which (α,α^2) and $(0,0)$ lies on same side of $3x+y-10=0$

1) $(2,5)$ 2) $(-2,5)$ 3) $(-5,2)$ 4) $(-\infty,-5)\cup(2,\infty)$

39. Sum of the possible values of 'λ' for which the three straight lines $x+y=1, \lambda x+2y=3$ and $\lambda^2 x+4y+9=0$ are concurrent is

1) – 13 2) – 14 3) 14 4) 16

40. The area of the quadrilateral formed by the lines $ax\pm by\pm c=0$ is

1) $\frac{2c^2}{|ab^2|}$ 2) $\frac{2c^2}{|ab|}$ 3) $\left|\frac{2c}{a^2b}\right|$ 4) $\left|\frac{2c}{ab^2}\right|$

PHYSICS

SYLLABUS: Laws of motion : Newton's laws, apparent weight in a lift, law of conservation of linear momentum, impulse

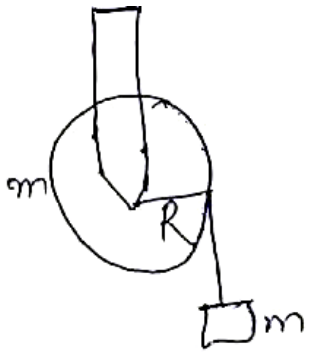
41. A player stops a foot ball weighing 0.5 kg wich comes flying towards him with a velocity of 10m/s. If the impact casts for $\frac{1}{50}th$ sec, and the ball bounces back with a velocity of 15 m/s, then the average force involved is

1) 250 N 2) 1250 N 3) 500 N 4) 625 N

42. A 500 kg racket is set for vertical firing. The exhaust speed is 800 m/s. To give an initial upward acceleration of 20 m/s^2, the amount of gas ejected per second to supply the needed thrust will be (take g= 10 ms^{-2})

1) 127.5 kg/s 2) 137.5 kg/s 3) 155.5 kg/s 4) 187.5 kg/s

43. A mass 'm' is supported by a mass less string wound around a uniform hollow cylinder of mass 'm' and radius 'R'. If string does not slip on the cylinder, with what acceleration will the mass release?

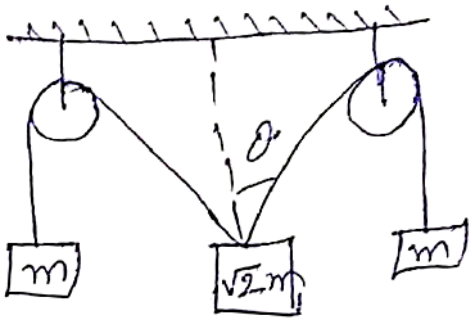


1) $\frac{2g}{3}$ 2) $\frac{g}{2}$ 3) $\frac{5g}{6}$ 4) g

44. A satellite in a force free space sweeps stationary interplanetary dust at a rate $\frac{dM}{dt}=\alpha V$ .The acceleration of satellite is ?

1) $\frac{-2\alpha V^2}{M}$ 2) $\frac{-\alpha V^2}{M}$ 3) $\frac{-\alpha V^2}{2M}$ 4) $-\alpha V^2$

45. The pulleys and strings shown in the figure are smooth and mass less. For system to remain in equilibrium, the angle θ should be



1) 0^0 2) 30^0 3) 45^0 4) 60^0

46. A monkey is decending from the branch of a tree with constant acceleration. If the breaking strength is 75% of the weight of the monkey, the minimum acceleration with wich monkey can slide down without breaking the branch is

1) g 2) $\frac{3g}{4}$ 3) $\frac{g}{4}$ 4) $\frac{g}{2}$

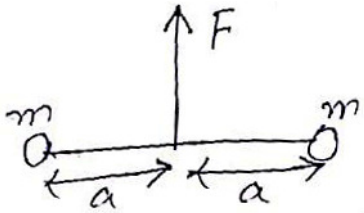
47. A car having a mass of 1000 kg is moving at a speed of 30 m/s. Breaks are applied to bring the car to rest. If the frictional force between the tyres and the road surface is 5000 newtons, the car will come to rest in

1) 5 seconds 2) 10 seconds 3) 12 seconds 4) 6 seconds

48. A block of mass 'm' is resting on a smooth horizontal surface. One end of a uniform rope of mass m/3 is fixed to the block, which is pulled in the horizontal direction by applying force F at the other end. The tension in the middle of the rope is

1) $\frac{8}{7}F$ 2) $\frac{1}{7}F$ 3) $\frac{1}{8}F$ 4) $\frac{7}{8}F$

49. Two particles of mass m each are tied at the ends of a light string of length 2a. The whole system is kept on a friction less horizontal surface with the string held tight so that each mass is at a distance 'a' from the centre P as shown



Now the midpoint of the string is pulled vertically upwards with a small but constant force F. As a result, the particles move towards each other on the surface. The magnitude of acceleration when they are separation becomes 2x is

1) $\frac{F}{2m}\frac{a}{\sqrt{a^2-x^2}}$ 2) $\frac{F}{2m}\frac{x}{\sqrt{a^2-x^2}}$ 3) $\frac{F}{2m}\frac{x}{a}$ 4) $\frac{F}{2m}\frac{\sqrt{a^2-x^2}}{x}$

50. Tension in the cable supporting an elevator is equal to the weight of the elevator. From this, we can concluded that the elevator is going up or down with a

1) uniform velocity 2) uniform acceleration 3) variable acceleration 4) either 1 and 3

51. A block of mass m is connected to another block of mass M by a spring of force constant K. The blocks are kept on a smooth surface. Initially the blocks are at rest and the spring is unscratched. Then a constant force F acting on the block of mass M to pull it. Find the force on mass m.

1) $\frac{MF}{m+M}$ 2) $\frac{mF}{M}$ 3) $\frac{(M+m)F}{m}$ 4) $\frac{mF}{m+M}$

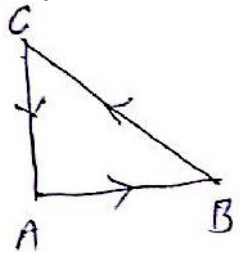
52. A particle tied to a string describes a vertical circular motion of radius r. If it has a velocity $\sqrt{3gr}$ at highest point, then the ratio of tensions in the string at heighest and lowest points is

1) 4:3 2) 5:4 3) 1:4 4) 3:2

53. A ball of mass 10 gm moving perpendicular to the plane of wall strikes it and rebounds in the same line with the same velocity. If the impulse experienced by the ball is 0.54 NS, the velocity of ball is

1) 27 ms^{-1} 2) 3.7 ms^{-1} 3) 54 ms^{-1} 4) 37 ms^{-1}

54. Three forces starts acting simultaneously on a particle moving with velocity $\bar{v}$, there forces are represented in magnitude and direction by the three sides of triangle ABC. The particle will now move with velocity.



1) less than $\bar{v}$ 2) greater than $\bar{v}$

3) $|\bar{v}|$ in the direction of the largest force BC 4) $\bar{v}$, remains unchanged

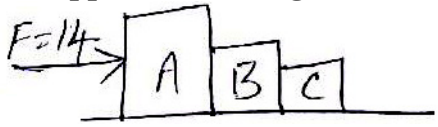
55. A bullet is fired from a gun. The force on bullet is given by $F = 600 - 2\times10^5 t$. Where F and t are in S.I. unit. The force on bullet becomes zero as soon as it leaves the barrel. What is the average impulse on the bullet

1) 1.8 N- S 2) Zero 3) 9 N –S 4) 0.9 N –S

56. A stationary body of mass 3 kg explodes into three equal pieces. Two of the pieces fly off in two mutually perpendicular directions, one with a velocity of $3\bar{i}\ ms^{-1}$ and other with a velocity of $4\bar{j}\ ms^{-1}$. If the explosion occurs in $10^{-4} S$, the average force acting on the third piece in Newton's is

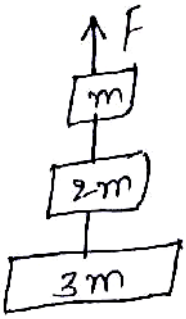
1) $\left(3\bar{i}+4\bar{j}\right)\times10^{-4}$ 2) $\left(3\bar{i}-4\bar{j}\right)\times10^{-4}$ 3) $\left(3\bar{i}-4\bar{j}\right)\times10^{4}$ 4) $-\left(3\bar{i}+4\bar{j}\right)\times10^{4}$

57. Three blocks A, B and C of masses 4kg, 2kg and 1kg are in contact on a frictionless surface, as shown. If a force of 14N is applied on the 4kg block, then the contact force between A and B is



1) 8N 2) 18 N 3) 2 N 4) 6 N

58. Three blocks with masses m_1 2m and 3m are connected by strings, as shown. By applying an upward force F on block m, the masses move upward at constant speed v. What is the net force on the block of mass 2m?

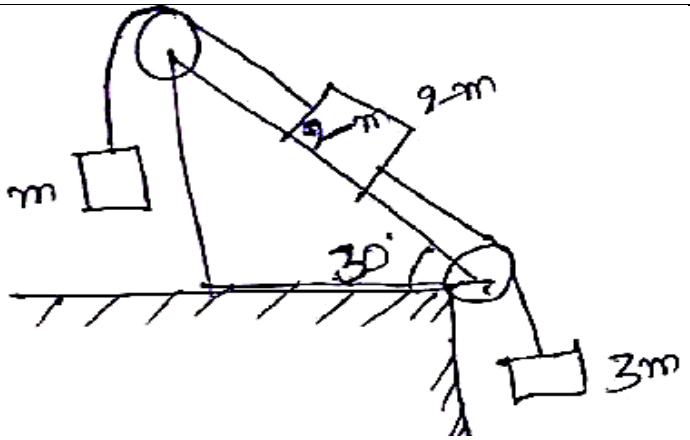


1) 3 mg 2) 6 mg 3) zero 4) 2 mg

59. Sand is being dropped on a conveyer belt at the rate of M kg/s. The force necessary to keep the belt moving with a constant velocity of V ms^{-1} will be

1) $\frac{MV}{2}N$ 2) zero 3) MVN 4) 2 MVN

60. Three masses are connected as shown in figure. Then find the acceleration of the system



1) $g\ ms^{-2}$ 2) $\frac{g}{2}ms^{-2}$ 3) $\frac{g}{3}ms^{-2}$ 4) $\frac{g}{4}ms^{-2}$

CHEMISTRY

SYLLABUS: Chemical bonding

61. An ionic compound M^+X^- is most likely to be formed from A and B when
1) Electro negativity of X is low 2) Ionisation energy of M is low
3) Ionisation energy of B is low 4) Electron gain enthalpy of B is low

62. NF_3 and BF_3 are both covalent compounds, but NF_3 is polar whereas BF_3 is non- polar this due to the reason.
1) BF_3 is planar but NF_3 is pyramidal
2) B-F bonds are non- Polar, while N – F are polar
3) B is metal while nitrogen is a gas in uncombined state
4) Atomic size of boron is larger then that of nitrogen

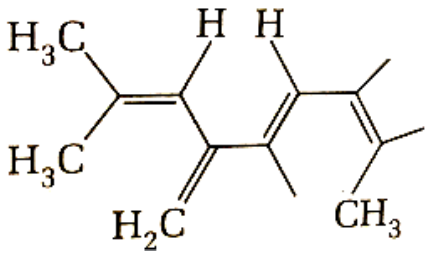
63. The formal charge of the O- atoms in the ion.
$:\ddot{O}=N=\ddot{O}:$ **is**
1) – 2 2) – 1 3) 0 4) +1

64. The covalent bond length is shortest in which of the following bonds?
1) $C-O$ 2) $C-C$ 3) $C\equiv N$ 4) $O-H$

65. Which of the following molecules has the maximum dipole moment?
1) CO_2 2) CH_4 3) NH_3 4) NF_3

66. The compound containing coordinate bond is
1) SO_3 2) SO_2 3) H_2SO_4 4) All of these

67. The total number of π bond electrons in the following structure is



1) 4 2) 8 3) 12 4) 16

68. The hybridization of atomic orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are
1) sp, sp^3 and sp^2 2) sp^2, sp^3 and sp 3) sp, sp^2 and sp^3 4) sp^2, sp and sp^3

69. Which of the following pairs is isostructural
1) BCl_3 and $BrCl_3$ 2) NH_3 and NO_3^- 3) NF_3 and BF_3 4) BF_4^- and NH_4^+

70. Predict the correct order among the following
1) lone pair – lone pair > bond pair – bond pair > lone pair – bond pair
2) bond pair – bond pair > long pair – bond pair > lone pair – lone pair
3) lone pair – bond pair > bond pair - bond pair > lone pair – long pair
4) lone pair – lone pair > long pair – bond pair > bond pair – bond pair

71. The pair of species with the same bond order is

1) O_2^{2-}, B_2 2) O_2^+, NO^+ 3) NO, CO 4) N_2, O_2

72. Which of the following order of energies of molecules orbitals of N_2 is correct?

1) $(\pi 2P_y) < (\sigma 2P_z) < (\pi 2P_x) = (\pi 2P_y)$ 2) $(\pi 2P_y) > (\sigma 2P_z) > (\pi 2P_x) = (\pi 2P_y)$

3) $(\pi 2P_y) < (\sigma 2P_z) > (\pi 2P_x) = (\pi 2P_y)$ 4) $(\pi 2P_y) > (\sigma 2P_z) < (\pi 2P_x) = (\pi 2P_y)$

73. The boiling point of ethanol is higher then that of dimethyl ethyl due to presence of

1) hydrogen bonding in ethanol 2) hydrogen bonding in dimethyl ether

3) CH_3 group in tethanol 4) CH_3 group in dimethyl ether

74. Among the following the species having square planar geometry for central atom are

I) XeF_4 **II)** SF_4 **III)** $[NiCl_4]^{2-}$ **IV)** $[Pt\ Cl_4]^{2-}$

1) I and IV 2) I and II 3) II and III 4) III and IV

75. Bond energy is least in

1) F_2 2) O_2 3) N_2 4) HF

76. Which among the following are having diamagnetic property?

1) B_2 2) N_2 3) O_2 4) C_2

77. Number of bonding electron pairs and number of lone pairs of electrons in ClF_3, SF_4, BrF_5 respectively are

1) 3,2 ; 4, 2; 5, 2 2) 3,1; 4, 2; 5, 2 3) 3, 1; 4, 2; 5, 1 4) 3,2; 4, 1;5, 1

78. Hybridisation of oxygen in diethyl ether is

1) sp 2) sp^2 3) sp^3 4) sp^3d

79. Which one of the following molecules contain both ionic and covalent bonds?

1) CH_2Cl_2 2) K_2SO_4 3) $BeCl_2$ 4) SO_2

80. What is the crystal structure of $CsCl$?

1) Body centered cubic 2) Face centered cubic

3) Tetrahedral 4) Octahedral

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