SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

SR EAMCET | **EAMCET DPP-5** | **Date: 11-00-2020**

Time: 3 Hours | **Max. Marks:**

MATHEMATICS-A

SYLLABUS : Properties of Triangles (On Circumradius)

1. **The area (in square units) of ΔABC if $\angle A=76^0$ $\angle B=45^0$ and $a=2(\sqrt{3}+1)$**

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

2. **In a ΔABC, if 3a=b+c, then** $\cot\frac{B}{2}\cot\frac{C}{2}=$

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

3. **In ΔABC, if the median AD drawn through A is perpendicular to the side AC then**

$3\cos A\cos C+2a^2=$

1) C^2 2) $2C^2$ 3) $2C^2$ 4) $4C^2$

4. **Let Δ denote the area of a ΔABC . If α,β,γ are the lengths of the altitudes of the ΔABC, then**

$\alpha^{-2}+\beta^{-2}+\gamma^{-2}=$

1) $\frac{4}{\Delta}(\tan A+\tan B+\tan C)$ 2) $\frac{1}{\Delta}(\cot A+\cot B+\cot C)$

3) $\frac{\Delta^2}{2}(\tan A+\tan B+\tan C)$ 4) $\frac{\Delta^2}{4}(\cot A+\cot B+\cot C)$

5. **In a ΔABC, if** $\cos A+\cos B+\sin A\sin B\sin C=1$ **then** $\sin A+\sin B+\sin C=$

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

6. **In a ΔABC, if the medians AD and BE are such that AD=4,** $\angle DAB=\frac{\pi}{6}$ **AND** $\angle ABE=\frac{\pi}{3}$ **then the area of ΔABC (in square units)**

1) $\frac{16}{3\sqrt{3}}$ 2) $\frac{48}{3\sqrt{3}}$ 3) $\frac{64}{3\sqrt{3}}$ 4) $\frac{32}{3\sqrt{3}}$

7. **In any triangle, if the angles are in the ratio 1:2:3 then their corresponding sides are in the ratio**

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

8. **Two ships leave a port from a point at the same time. One goes with a velocity of 3kmph along North-East making an angle of 45^0 with East direction and the other travels with a an angle of 15^0 with East direction. Then the difference between the ships at the end of two hours is**

1) $2\sqrt{13}$ 2) $\sqrt{13}$ 3) 5   4) 10

9. **In a ΔABC, if a=5, b=6, c=7 then the length of the median through B is**

1) $2\sqrt{7}$ 2) $2\sqrt{6}$ 3) $\sqrt{7}$ 4) $\sqrt{6}$

10. **In ΔABC, if a=5 and** $\tan\left(\frac{A-B}{2}\right)=\frac{1}{4}\tan\left(\frac{A+B}{2}\right)$ **then** $\sqrt{a^2-b^2}=$

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

11. **In a ΔABC , if A=2B and the sides opposite to the angles A,B,C are** $\alpha+1$, $\alpha-1$ **and** α **respectively then** α **=**

1) 3   2) 4   3) 5   4) 6

12. **In a ΔABC, sinA and sinB satisfy** $C^2X^2-C(a+b)x+ab=0$ **then**

1) The triangle is acute angled   2) $\sin C=\frac{\sqrt{3}}{2}$

3) The triangle is obtuse angled   4) $\sin A+\cos A=\frac{a+b}{c}$

13. **In a ΔABC,** $a^4+b^4+c^4=2b^2c^2+2a^2b^2$ **then B=**

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

14. **In a ΔABC, if** $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}=0$ **then** $\cos A\cos B+\cos B\cos C+\cos C\cos A=$

1) -1   **2)** $\frac{3}{4}$ **3)** $\frac{9}{4}$ **4) -1**

15. **In** ΔABC, **if** $\frac{s-a}{11}=\frac{s-b}{11}=\frac{s-c}{11}$ **then** $\tan^2\left(\frac{A}{2}\right)+\tan^2\left(\frac{c}{2}\right)=$

1) $\frac{290}{429}$ 2) $\frac{290}{143}$ 3) $\frac{143}{33}$ 4) $\frac{113}{33}$

16. **In** ΔABC, **if A=60^0 and B=105^0 then** $\frac{2R^2(b-c)\sin A\sin B\sin C}{(b+c)(s-a\cos C-c\cos A)(s-a\cos B-c\cos A)}=$

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

17. **In ΔABC, if a=2, b=** $\sqrt{6}$ **and c=** $\sqrt{3}+1$**, then** $\sin^2 C-\sin^2 A=$

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

18. **In a ΔABC,** $a^3\cos(B-C)+B^3\cos(C-A)+C^3\cos(A-B)=$

1) abc **2) a+b+c** **3) 2abc** **4) 3abc**

19. **Consider the following statements:**

I) **In ΔABC, if c=6, and** $\cos C=-\frac{11}{25}$ **and** $R=\frac{25}{2\sqrt{14}}$

II) In ΔABC, if a=3, b=4, c=6 then ΔABC is acute angled triangle.

Which of the above statements is/are true?

1) Only I **2) Only II** **3) Both I and II** **4) Neither I, Nor II**

20. **The angles of a ΔABC are in an A.P. The larger side A,B satisfy the relation** $\frac{\sqrt{3}}{2}<\frac{b}{a}<1$**, then the possible values of the smallest side are**

1) $\frac{a\pm\sqrt{4b^2-3a^2}}{2a}$ **2)** $\frac{a\pm\sqrt{4b^2-3a^2}}{2b}$ **3)** $\frac{a\pm\sqrt{4b^2-3a^2}}{2c}$ **4)** $\frac{a\pm\sqrt{4b^2-3a^2}}{2}$

MATHEMATICS-B

SYLLABUS : Pair of Straight Lines

1. **The separate equations of the lines** $6x^2+5xy-6y^2=0$ **are**

1) $2x-3y=0, 3x+2y=o$ 2) $2x+3y=0, 3x-2y=o$

3) $2x-3y=0, 3x-2y=o$ 4) $2x+3y=0, 3x+2y=o$

2. **The range of 'a' so that** $a^2x^2+2xy+4y^2=o$ **represents district lines**

1) $a>\frac{1}{2}(or)a<-\frac{1}{2}$ 2) $-\frac{1}{2}\le a\le\frac{1}{2}$

3) $-\frac{1}{2}<a<\frac{1}{2}$ 4) $a\ge\frac{1}{2}(or)a<-\frac{1}{2}$

3. **If** $\frac{x}{a}+\frac{y}{b}=1$ **intersects** $5x^2+5y^2+5\alpha y-9\alpha b=0$ **at P and Q:** $\angle POQ=\frac{\pi}{2}$ **then the relation between a and b is**

1) a=b 2) a=2b(or) b=2a 3) a=3b(or)b=3a 4) a+b=5

4. **If the pair lines which joins the origin to the point of intersection of** $ax^2+2hxy+by^2+2gx=0$**,** $a_1x^2+2h_1xy+b_1y^2+2g_1x=0$ **are at right angles then**

1) $\frac{g}{g_1}=\frac{a_1+b_1}{a+b}$ 2) $\frac{g}{g_1}=\frac{a+b}{a_1+b_1}$ 3) $\frac{h}{h_1}=\frac{a+b}{a_1+b_1}$ 4) $\frac{h}{h_1}=\frac{a_1+b_1}{a+b}$

5. **If S and P are respectively the sum and the product of the slopes of the lines** $3x^2-2xy-15y^2=0$ **then S:P**

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

6. **If the slope of one of the lines represented by** $ax^2-bxy-y^2=0$ **is the square of the other**

1)-27 (or) 8 2) -3 (or) 2 3) -64 (or) 27 4) -4 (or) 3

7. If the coordinate axes are the bisections of the angles between the pair of lines $ax^2 - bhxy - by^2 = 0$, **where** $h^2 > ab$ **and** $a \neq b$ **then**

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

8. The pair of lines $(a-b)(x^2-y^2)+4hxy=0, h(x^2-y^2)-(a-b)xy=0$ **are**

1) Parallel 2) Perpendicular 3) Equally inclined
4) Such that one pair bisects the angles between the other

9. If a, h, b in A.P, then the triangular area formed by the pair of lines $ax^2+2hxy+by^2=0$ **and the line** $x-y=-2$ **is, in square units**

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

10. If the pair of straight lines given by $Ax^2+2Hxy+By^2=0$ $(4^2 > AB)$ **forms an equilateral triangle with line** $ax+by+c=0$ then $(A+3B)(3A+B)=$

1) 4^2 2) -4^2 3) $2H^2$ 4) $4H^2$

11. The distance from a point (α,β) to a pair of lines passing through the origin is d , Then the equation to the pair of lines is

1) $(\alpha x-\beta y)^2 = d^2(x^2+y^2)$ 2) $(\alpha x+\beta y)^2 = d^2(x^2+y^2)$
3) $(\beta x-\alpha y)^2 = d^2(x^2+y^2)$ 4) $(\beta x+\alpha y)^2 = d^2(x^2+y^2)$

12. The orthocenter of the triangle formed by the lines $x+y=1$ **and is** $2y^2-xy-6x^2=0$

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

13. If the equation $ax^3+3bx^2y+3cxy^2+dy^3=0 (a,b,c,d \neq 0)$ **represents three coinsides lines then**

1) a=d 2) b=c 3) $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}$ 4) ac=bd

14. The line $x+y=1$ meets the lines represented by the equation $y^3-xy^2-14x^2y+24x^3=0$ at the points A,B,C. If O IS the POI of the lines represented by the given equation then $OA^2+OB^2+OC^2=$

1) $\frac{22}{9}$ 2) $\frac{85}{72}$ 3) $\frac{181}{72}$ 4) $\frac{221}{72}$

15. If P_1, P_2 denotes the lengths of the perpendicular from the point (2,3) on the lines given by $15x^2+31xy+14y^2=0$ **then if** $P_1 > P_2$, $P_1^2+\frac{1}{72}-P_2^2+\frac{1}{13}=$

1) -2 2) 0 3) 2 4) None of the above

16. If the slope of one of the lines is twice the slope of the other in the pair of straight lines $ax^2+2hxy+by^2=0$ **then** $8h^2=$

1) -9ab 2) 9ab 3) 7ab 4) – 7ab

17. A line passing through the point P(2,3) meet the lines represented by $x^2-2xy-y^2=0$ **at the points A and B such that PA.PB=17, the equation of the line is**

1) $x=2$ 2) $y=3$ 3) $3x-2y=0$ 4) None of the above

18. If a slope of one of the lines represented by $ax^2+2hxy+by^2=0$ **is nth power of the other then prove that** $(ab^n)^{\frac{1}{n+1}}+(a^nb)^{\frac{1}{n+1}}=$

1) 2h 2) -2+h 3) -2h 4) – (2+h)

19. If $2x^2-5xy+2y^2=0$ **represents two sides of a triangle and centroid of the triangle is (2,3) then midpoint of third side is**

1) (3, 2) 2) (3,-2) 3) $\left(3,\frac{9}{2}\right)$ 4) $\left(\frac{9}{2},3\right)$

20. If one of the lines given by $ax^2+2hxy+by^2=0$ passes through (2,3) and the other passes through (4,5) then a+2h+b=

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

PHYSICS

MOTION ON HORIZONTAL AND INCLINEDPLANES

1. A body of mass 2 kg is placed on a horizontal surface having coefficient of kinetic friction 0.4 and coefficient of static friction 0.5. If a horizontal force of 2.5N is applied on the body. The frictional force acting on the body will be ($g=10ms^{-2}$)

1) 8N 2) 10N 3) 20N 4) 2.5N

2. A block of mass m is placed on a smooth wedge of inclination Q. The whole system is accelerated horizontally so that the block does not slip down. The force exerted by the wedge on the block is

1) $\frac{mg}{\sin\theta}$ 2) $\frac{mg}{\cos\theta}$ 3) mgcosθ 4) mgsinθ

3. A body slides down on a rough inclined plane of angle of inclination 30^0 and taxes time twice as great as the time taken in slipping down a similar frictionless plane. The coefficient of friction between the body and the plane is

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

4. A marble block of mass 2kg lying on ice when given a velocity of 6m/s is stopped by friction is loss. Then the coefficient of friction is $\left(g=10m/s^2\right)$

1) 0.02 2) 0.03 3) 0.06 4) 0.01

5. A vehicle of mass m is moving on a rough horizontal road with momentum P. If the coefficient of friction between the tyres and the road be μ, then the stopping distance is

1) $\frac{p}{2\mu mg}$ 2) $\frac{p^2}{2\mu mg}$ 3) $\frac{p^2}{2\mu m^2 g}$ 4) $\frac{p}{2\mu m^2 g}$

6. An engine of one metric ton is going up an inclined plane, 1 in 2 at the rate of 36 kmph. If the coefficient of friction is $\frac{1}{\sqrt{3}}$, the power of engine is

1) 9.8W 2) 98W 3) 980W 4) 98KW

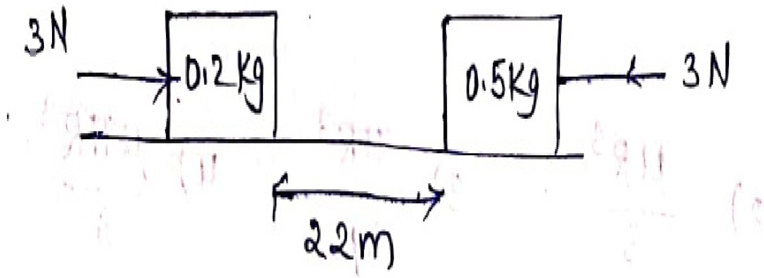
7. A body of mass 2kg slides down with an acceleration of 3 m/s^2 on a rough inclined plane having a slope of 30^0. The external force required to take the same body up the plane with the same acceleration will be ($g=10ms^{-2}$)

1)14N 2)20N 3)6N 4) 4N

8. A heavy uniform chain lies on a horizontal table top, If the coefficient of friction between the chain and the table surface is 0.2.What is the maximum fraction of the length of the chain that can hang down the table.

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

9. Two blocks of masses 0.2kg and 0.5kg which are placed 22m apart on a rough horizontal surface $(\mu=0.5)$ are acted upon by two forces of magnitude 3N each as shown in figure, at time t=0.Then the time t at which they collide each other is



1) 1S 2) $\sqrt{2}S$ 3) 2S 4) None

10. A block of mass 5kg rests on a horizontal surface. If a force 2.5N applied on the body changes its velocity to 8m/s in 2sec, then the frictional force acting on the body is

1) 3N 2) 5N 3) 4N 4) 2N

11. A body of 6kg rests in limiting equilibrium on an inclined plane whose slope is 30°. If the plane is raised to a slope of 60^0, the force in kg weight along the plane required to support it is $\left(g = 10m/s^2\right)$

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

12. A body of 5 kg rests on a rough horizontal surface of coefficient of friction 0.2. The body is pulled through a distance of 10m by a horizontal force of 25N. The kinetic energy acquired by the body is $\left(g = 10m/s^2\right)$

1) 250J 2) 200J 3) 150J 4) 100J

13. Sand is pilled up a horizontal ground in the form of a regular cone of a fixed base radius R. The coefficient of a static friction between sand and layers is m. The maximum value of sand that can be pilled up, without the sand slipping on the surface is

1) $\frac{\mu R^3}{3\pi}$ 2) $\frac{\mu R^3}{3}$

3) $\frac{\pi R^3}{3\mu}$ 4) $\frac{\mu \pi R^3}{3}$

14. A body is released from the top of a smooth inclined plane of inclination θ. It reaches the bottom with velocity V. If the angle of inclination is doubled for the same length of plane, what will be the velocity of the body on reacting the ground.

1) V 2) 2V 3) $(2\cos\theta)^{1/2} V$ 4) $(2\sin\theta)^{1/2} V$

15. A body is sliding down on a rough inclined plane. The coefficient of friction between the body and the plane is 0.5. The ratio of the net forced required for the body to slide down and the normal reaction on the body is 1:2. Then the angle of the inclined plane is

1) 15^0 2) 30^0 3) 45^0 4) 60^0

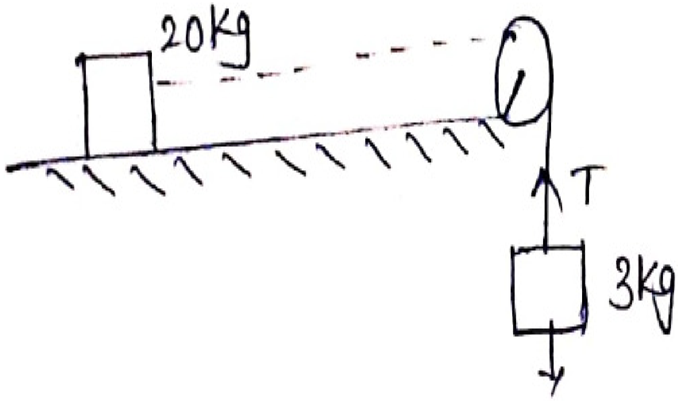
16. The horizontal acceleration that should be given to a smooth inclined plane of angle $\sin^{-1}\left(\frac{1}{l}\right)$ **to keep on object stationary on the plane, relative to the inclined plane is**

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

17. An ice block of mass 10kg is moving on a rough horizontal surface through a distance of 42m. If 10gm of ice melts due to friction, the coefficient of friction between the block and the surface $\left(g = 10m/s^2; J = 4.2J/cal; l_{ice} = cal/gm\right)$ **is**

1) 0.2 2) 0.3 3) 0.8 4) 0.9

18. **A body of mass 20kg is moving on a rough horizontal plane. A block of mass 3kg is connected to the 20kg mass by a string of negligible mass through a smooth pulley as shown in the figure. The tension in the string is 27N. The coefficient of kinetic friction between the heavier mass and the surface is ($g = 10ms^{-2}$)**

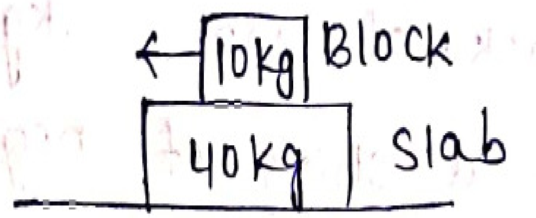


1) 0.025 2) 0.035 3) 0.35 4) n0.25

19. **Two blocks of masses 2kg and 1kg are in contact with each other on a frictionless table. When a horizontal force of 3.0N is applied to the block of mass 2kg the value of the force of contact between the two blocks is**

1) 4N 2) 3N 3) 2N 4) 1N

20. **A 40kg slab rests on a frictionless floor. A 10kg block rests on top of the slab. The coefficient of static friction between the block and the slab is 0.6 while the kinetic coefficient of friction is 0.4. The 10kg block is acted upon by a horizontal force of 100N. If = $g = 9.8m/s^2$, the resulting acceleration of the slab will be**



1) $0.98m/s^2$ 2) $1.47m/s^2$ 3) $1.52m/s^2$ 4) $6.1m/s^2$

CHEMISTRY

SYLLABUS: **Stoichiometry**

1. **The following sets of quantum numbers represent four electrons in an atom**
i) n=4, l=1 ii) n=4, l=0 iii) n=3, l=2, iv) n=3, l=0
the sequence representing increasing order of energy is

1) iv < ii < iii < i 2) ii < iv < i < iii 3) i < iii < ii < iv 4) iii < i < iv < ii

1. **Which of the following pairs can be cited as an example to illustrate the law of multiple proportions**

1) Na_2O, K_2O 2) CaO, MgO 3) Al_2O_3, Cr_2O_3 4) CO, CO_2

2. **Calculate the molality of 1 litre solution of 93%** H_2SO_4 **by w/v** [$d_{H_2SO_4}$ =1.84g/cc]

1)3.71 2) 8.5 3) 12.4 4) 10.42

3. **Number of atoms in 4.25g of NH_3 is**

1) 6.023×10^{23} 2) $4\times6.023\times10^{23}$ 3) 1.7×10^{24} 4) $4.5\times6.023\times10^{23}$

4. The oxidation states of bromine atoms in Br_3O_8

1) +6, +4, +6 2) +6, +6, +5 3) +5, +5, +6 4) +5, 0, +6

5. In the reaction $ClO_3^- + 6H^+ + 6e^- \rightarrow Cl^- + 3H_2O$ .The equivalent weight of ClO_3^- is

1) Formula weight/6 2) Formula weight/3 3) Formula weight/4 4) Formula weight/5

6. Which has the maximum number of molecules among the following?

1) 8g H_2 2) 64g SO_2 3) 44g CO_2 4) 48g O_3

7. Number of atoms of oxygen present in 10.6g of Na_2CO_3 will be

1) 1.806×10^{23} 2) 6.02×10^{23} 3) 31.80×10^{23} 4) 12.04×10^{22}

8. The empirical formula of a compound is CH_2O . If the molecular weight of the compound is 180, the molecular formula is

1) $C_6H_{12}O_6$ 2) $C_3H_6O_3$ 3) $C_4H_8O_2$ 4) $C_5H_{10}O_5$

9. In how many of the following compounds of sulphur, the oxidation state of sulphur atom is +6?

$H_2S_2O_8$, H_2SO_5, H_2SO_3, H_2SO_4, $H_2S_2O_7$, SO_2Cl_2, $SOCl_2$

1) 3 2)5 3)4 4) 6

10. 2.76g of silver carbonate on strong ignition leaves a residue weighing?

1) 2.48g 2) 2.16g 3)2.32g 4) 2.84g

11. A carbon compound contains 12.8% of carbon, 2.1% of hydrogen and 85.1% of bromine. The molecular weight of the compound is 187.9. Calculate the molecular formula of the Compound. (Atomic wts: H=1.008, C=12.0, Br=79.9)

1) CH_3Br 2) CH_2Br_2 3) $C_2H_4Br_2$ 4) $C_2H_3Br_3$

12. Chlorine is passed into dilute, cold KOH solution. What are oxidation numbers of chlorine in the products formed?

1) -1, +5 2) -1, +3 3) +1, +7 4) +1,-1

13. Maximum oxidation state is present in

1) CrO_2Cl_2 and MnO_4^- 2) MnO_2

3) $\left[Fe(CN)_6\right]^{3-}$ and $\left[CO(CN)_6\right]^{3-}$ 4) MnO

14. How many moles of $MnO_4^{\ominus}$ ion will react with 1 mol of ferrous oxalate in acidic medium?

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

15. The volume of the strength of 1.5N H_2O_2 solution is

1) 4.8 2) 8.4 3) 3.0 4) 8.0

16. Oxidation number and covalency of sulphur in S_8 molecule are respectively

1) 6 and 8 2) 0 and 8 3) 0 and 2 4) 6 and 2

17. The total number of valence electrons in 4.2 grams of nitride ion is

1) 1.4 N_0 2) 2.4 N_0 3) 3.2 N_0 4) 4.2 N_0

18. The total number of electrons present in 18ml water (density 1g/ml) is

1) 6.023×10^{23} 2) 6.023×10^{24} 3) 6.023×10^{25} 4) 6.023×10^{21}

19. The value of n in the following equation if balanced

$Cr_2O_7^{-2} + 14H^+ + nFe^{+2} \rightarrow 2Cr^{+3} + nFe^{+3} + 7H_2O$

1) 2 2) 3 3) 7 4) 6

20. $XCu + YHNO_3 \rightarrow Cu(NO_3)_2 + ZNO + H_2O$ **. Then X,Y and Z in the balanced chemical equation are respectively.**

1) 3, 2, 2 2) 3, 2, 8 3) 3, 8, 2 4) 2, 8, 3

SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

EAMCET **DPP -5** **Date: 11-04-2020**

Time: 3 Hours

KEY-SHEET

MATHS-A

1) **4**	2) **2**	3) **2**	4) **2**	5) **2**	6) **4**	7) **2**	8) **1**	9) **1**	10) **3**
11) **3**	12) **4**	13) **1**	14) **2**	15) **1**	16) **3**	17) **3**	18) **4**	19) **1**	20) **4**

MATHS-B

1) **2**	2) **3**	3) **2**	4) **2**	5) **2**	6) **1**	7) **2**	8) **4**	9) **3**	10) **4**
11) **3**	12) **1**	13) **3**	14) **4**	15) **3**	16) **2**	17) **2**	18) **3**	19) **3**	20) **2**

PHYSICS

1) **4**	2) **2**	3) **1**	4) **3**	5) **3**	6) **4**	7) **2**	8) **1**	9) **3**	10) **2**
11) **2**	12) **3**	13) **4**	14) **3**	15) **3**	16) **1**	17) **3**	18) **2**	19) **4**	20) **1**

CHEMISTRY

1) **4**	2) **4**	3) **1**	4) **1**	5) **1**	6) **1**	7) **1**	8) **1**	9) **2**	10) **2**
11) **3**	12) **4**	13) **1**	14) **3**	15) **2**	16) **3**	17) **2**	18) **2**	19) **4**	20) **3**

HINTS & SOLUTIONS

MATHS-A

1. $A = 75^0, B = 45^0, a = 2\left(\sqrt{3}+1\right)$

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\Rightarrow b = \frac{2\left(\sqrt{3}+1\right)}{\frac{\left(\sqrt{3}+1\right)}{2\sqrt{2}}} = \frac{1}{\sqrt{2}} = 4$$

$$\therefore \text{ Area } = \frac{1}{2}ab\sin C$$

$$= \frac{1}{2}2\left(\sqrt{3}+1\right).4\sin 60^0$$

$$= 4\left(\sqrt{3}+1\right)\frac{\sqrt{3}}{2} = 2\left(3+\sqrt{3}\right)$$

2. $3a = b + c \Rightarrow 4a = 25 \Rightarrow s = 2a$

$$\cot\frac{B}{2}\cot\frac{C}{2} = \sqrt{\frac{S(s-b)}{(s-a)(s-b)}}$$

$$= \frac{s}{s-a} = 2$$

3. $\cos c = \dfrac{b}{a/2} = \dfrac{a^2+b^2-c^2}{2ab}$

$\Rightarrow ab^2 = a^2+b^2-c^2$

$\Rightarrow 3b^2 = a^2-c^2$

$3Ca\cos A\cos C = 3\cos\left(\dfrac{b^2+c^2-a^2}{2bc}\right).\dfrac{2b}{a}$

$= 3b^2+3c^2-3a^2$

$= a^2-c^2+3c^2-3a^2$

$= 2\left(c^2-a^2\right)$

$\Rightarrow 3Ca\cos A\cos C + 2a^2 = 2c^2$

4. $\dfrac{1}{2}\alpha a = \Delta$

$\Rightarrow \dfrac{1}{\alpha} = \dfrac{a}{2\Delta}$

$\Rightarrow \alpha^{-2}+\beta^{-2}+\gamma^{-2} = \dfrac{1}{4\Delta^2}\left(a^2+b^2+c^2\right)$

$= \dfrac{1}{\Delta}\left(\cot A+\cot B+\cot C\right)$

5. $SMC = \dfrac{1-\cos A\cos B}{\sin A\sin B} \le 1$

$\Rightarrow 1 \le \cos\left(A-B\right)$

$\Rightarrow A = B$

$\Rightarrow SMC = 1 \Rightarrow C = \dfrac{\overline{u}}{2}, A = B = \dfrac{\overline{u}}{4}$

$\Rightarrow \sin A+\sin B+\sin C = 1+\sqrt{2}$

6. $AG = \dfrac{2}{3}\times AD = \dfrac{8}{3}$

$\dfrac{BG}{\frac{1}{2}} = \dfrac{AG}{\frac{\sqrt{3}}{2}}$

$\Rightarrow BG = \dfrac{8}{3\sqrt{3}}$

Ar. of $\Delta ABG = \dfrac{1}{2}BG.AG$

$= \dfrac{32}{9\sqrt{3}}$

$\Rightarrow$ Area of $\Delta ABC = \dfrac{32}{3\sqrt{3}}$

7. $A = K, B = 2K, C = 3K$

$\Rightarrow 6K = 180 \Rightarrow K = 30^0$

$\Rightarrow a:b:c = \sin A:\sin B:\sin C$

$= \dfrac{1}{2}:\dfrac{\sqrt{3}}{2}:1$

$= 1:\sqrt{3}:2$

8. Angle between ships $=45^0+15^0=60^0$

$d_1=6, d_2=8$

$d^2=d_1^2+d_2^2-2d_1d_2\cos 60^0$

$=36+64-2(6)(8)\frac{1}{2}$

$=52$

$d=2\sqrt{13}$

9. Length of medium through B

$=\frac{1}{2}\sqrt{2a^2+2c^2-b^2}$

$=\frac{1}{2}\sqrt{2(4)+2(49)-36}$

$=2\sqrt{7}$

10. $\tan\left(\frac{A-B}{2}\right)=\frac{a-b}{a+b}\cot\frac{C}{2}$

$\Rightarrow \frac{a-b}{a+b}=\frac{1}{4}$

$\Rightarrow 3a=5b$

$\Rightarrow b=3 \Rightarrow \sqrt{a^2-b^2}=4$

11. $\frac{\sin 2B}{\alpha+1}=\frac{\sin B}{\alpha-1}$

$\Rightarrow 2\cos B=\frac{\alpha+1}{\alpha-1}$

$\Rightarrow 2\left[\frac{(\alpha+1)^2+\alpha^2-(\alpha-1)^2}{2(\alpha+1)\alpha}\right]=\frac{\alpha+1}{\alpha-1}$

$\Rightarrow \alpha=5$.

12. $\sin A+\sin B=\frac{a+b}{c}, \sin A\sin B=\frac{ab}{c^2}$

$\Rightarrow \sin A, \sin B=\frac{a}{c},\frac{b}{c}$

$\Rightarrow c=90^0$

13. $a^4+b^4+c^4-2a^2b^2-2b^2c^2+2c^2a^2=2c^2a^2$

$\Rightarrow (a^2+c^2-b^2)^2=2c^2a^2$

$\Rightarrow \frac{a^2+c^2-b^2}{2ac}=\pm\frac{1}{\sqrt{2}} \Rightarrow \cos B=\pm\frac{1}{\sqrt{2}}$

$\Rightarrow B=\frac{\bar{u}}{4} \text{ or } \frac{3\bar{u}}{4}$

14. $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}=0 \Rightarrow 3abc-a^3-b^3-c^3=0$

$\Rightarrow -\frac{(a+b+c)}{2}\left[(a-b)^2+(b-c)^2+(c-a)^2\right]=0$

$\Rightarrow a=b=c \Rightarrow A=B=C=\frac{4}{3}$

$\Rightarrow \cos A\cos B+\cos B\cos C+\cos C\cos A=\frac{3}{4}$

15. $s-a=11k, s-b=12k, s-c=13k$

$\Rightarrow s=36k$

$\tan^2\frac{A}{2}+\tan^2\frac{C}{2}=\frac{(s-b)(s-c)}{s(s-a)}+\frac{(s-a)(s-b)}{s(s-c)}$

$=\frac{12k}{36k}\left[\frac{13k}{11k}+\frac{11k}{13k}\right]$

$=\frac{290}{429}$.

16. $\frac{2a^2(b-c)\sin A\sin B\sin C}{(b+c)\left[s-(a\cos C+c\cos A)\right]\left[s-(a\cos B+b\cos B)\right]}$

$=\frac{(b-c)}{(b+c)}.\frac{\Delta}{(s-b)(s-c)}=\frac{b-c}{b+c}\cot\frac{c}{2}$

$=\tan\left(\frac{B-c}{2}\right)=1$

17. $\cos C=\frac{a^2+b^2-c^2}{2ab}$

$=\frac{\sqrt{3}+1}{2\sqrt{2}}$

$\Rightarrow \sin C=\frac{\sqrt{3}-1}{2\sqrt{2}}$

$\frac{a}{\sin A}=\frac{c}{\sin C}$

$\Rightarrow \sin A=2\left(\frac{\sqrt{3}-1}{2\sqrt{2}}\right)\frac{1}{\left(\sqrt{3}+1\right)}$

$=\frac{3+1-2\sqrt{3}}{\sqrt{2}(2)}=\frac{2-\sqrt{3}}{\sqrt{2}}$

$\sin^2 C-\sin^2 A$

$\cos A=\frac{b^2+c^2-a^2}{2bc}$

$=\frac{1}{\sqrt{2}}\Rightarrow A=45^0$

$\frac{a}{\sin A}=\frac{c}{\sin C}\Rightarrow \sin C=\frac{c}{a}.\sin A$

$=\frac{\left(\sqrt{3}+1\right)}{2}\times\frac{1}{\sqrt{2}}$

$\Rightarrow C=75^0$

$\sin^2 C-\sin^2 A=\sin(C+A).\sin(C-A)$

$=\sin 120^0\sin 30^0=\frac{\sqrt{3}}{4}$

18. $\sum a^2\cos(B-C)=\sum a^2.2B\sin(B+C)\cos(B-C)$

$=R\sum a^2.(\sin 2B+\sin 2C)$

$=R\sum a^2\left(2\sin B\cos C+2\sin C\cos C\right)$

$=\sum a^2 b\cos C+a^2 c\cos C$

$=\sum ab\left(a\cos C+c\cos A\right)$

$=3abc$

19. $I\quad \sin C=\sqrt{1-\frac{121}{625}}=\frac{\sqrt{504}}{25}$

$2l=\frac{c}{\sin c}$

$=\frac{6\times 25}{\sqrt{504}}\Rightarrow R=\frac{25}{2\sqrt{14}}$

II $\quad c^2>a^2+b^2$

$\Rightarrow \Delta ABC$ is obtuse angled.

20. $2B=A+C\Rightarrow 3B=40\Rightarrow B=60^0$

$\cos B=\frac{a^2+c^2-b^2}{2ac}$

$\Rightarrow ac=a^2+c^2-b^2,\quad b<a\Rightarrow c$ is smallest

$c^2-ac+a^2-b^2=0$

$c=\frac{a\pm\sqrt{a^2-4\left(a^2-b^2\right)}}{2}$

$=\frac{a\pm\sqrt{4b^2-3a^2}}{2}$

MATHS-B

1. $6x^2+5xy-6y^2=0$

$\Rightarrow 6x^2+9xy-4xy-6y^2=0$

$\Rightarrow (2x+3y)(3x-2y)=0$

2. $h^2-ab>0\Rightarrow 1-4a^2>0$

$\Rightarrow a^2-\frac{1}{4}<0$

$\Rightarrow -\frac{1}{2}<a<\frac{1}{2}$

3. Homogenizing and

$Coe\ of\ x^2+Coe\ of\ y^2=0$

4. $g_1\left(ax^2+2hxy+by^2+2gx\right)-g\left(a_1x^2+2h_1xy+b_1y^2+2g_1x\right)=0$

$\Rightarrow \left(ag_1-a_1g\right)x^2+\left(2hg_1-2h_1g\right)xy+\left(bg_1-b_1g\right)y^2=0$

$\Rightarrow Coe\ of\ x^2+Coe\ of\ y^2=0$

$\Rightarrow ag_1-ag+bg_1-b_1g=0$

$\Rightarrow (a+b)g_1-(a_1+b_1)g=0$

$\Rightarrow \frac{g}{g_1}=\frac{a+b}{a_1+b_1}$

5. $S=\frac{-2h}{b}=\frac{-2(-1)}{-15}=\frac{-2}{15}$

$P=\frac{a}{b}=\frac{3}{-15}$

$S:P=\frac{-2}{15}:\frac{-3}{15}$

$\Rightarrow S:P=2:3$

6. $m+m^2=6$; $m.m^2=\frac{a}{1}\Rightarrow m^2=a$

$\Rightarrow\left(m+m^2\right)^3=216$

$\Rightarrow m^3+m^6+3mm^2\left(m+m^2\right)=216$

$\Rightarrow a+a^2+3a(6)=216$

$\Rightarrow a^2+19a-216=0$

$\Rightarrow(m+27)(m-8)=0$

$\Rightarrow m=-27\ (or)\ \ m=8$

7. Equation of pair of bisectors of $ax^2+2hxy+by^2=0$ is $h\left(x^2+y^2\right)=(a-b)xy$

But the equation of bisectors are $xy=0$

$\Rightarrow h=0\ \ and\ \ a-b\neq 0$

8. Equation to the pair of bisectors of $(a-b)\left(x^2-y^2\right)+4hxy=0$ is

$2h\left(x^2-y^2\right)-\left[(a-b)+(a-b)\right]xy=0$

$\Rightarrow h\left(x^2-y^2\right)-(a-b)xy=0$

$\therefore$ One pair bisects the angles between the other.

9. a, h, b are in A.P $\Rightarrow h=\frac{a+b}{2}$

Area $=\frac{n^2\sqrt{h^2-ab}}{\left|am^2-2hlm+bl^2\right|}$

$=\left|\frac{4\sqrt{h^2-ab}}{a+2h+b}\right|$

$=\left|\frac{2\sqrt{2h^2-4ab}}{2(a+b)}\right|$

$=\left|\frac{\sqrt{(a+b)^2-4ab}}{a+b}\right|$

$=\left|\frac{a-b}{a+b}\right|$

10. $Ax^2+2Hxy+By^2=0, ax+by+c=0$ form an equilateral triangle

$\Rightarrow Ax^2+2Hxy+By^2=0,(ax+by)^2-3(bx-ay)^2=0$ represents the same line

$\Rightarrow A=a^2-3b^2;\ B=b^2-3a^2; H=4ab$

$\therefore(A+3B)(3A+B)=\left(-8a^2\right)\left(-8b^2\right)$

$=64a^2b^2$

$=4H^2$

11. Let $P(\alpha,\beta)$ and $Q\left(x_1,y_1\right)$ be a point on one of the lines in the required pair of lines

Area of $\Delta OPQ = \frac{1}{2} OQ.d$

$\Rightarrow \frac{1}{2}|x_1\beta - y_1\alpha| = \frac{1}{2}\sqrt{x_1^2 + y_1^2}.d$

$\Rightarrow d^2\left(x_1^2 + y_1^2\right) = \left(x_1\beta - y_1\alpha\right)^2$

Locus of $\left(x_1, y_1\right)$ is $d^2\left(x^2 + y^2\right) = \left(\beta x - \alpha y\right)^2$

12. $a = -6, b = 2, h = -\frac{1}{2}, l = 1, m = 1, n = -1$

$K = \frac{-n(a+b)}{am^2 - 2hlm + bl^2} = \frac{1-(-6+2)}{-6+1+2} = \frac{-4}{-3} = \frac{4}{3}$

$\therefore$ Orthocentre $= (Kl, Km) = \left(\frac{4}{3}, \frac{4}{3}\right)$

13. If the given equation represent three coincident lines y=mx then

$y^3 + \frac{3c}{d}y^2x + \frac{3b}{d}yx^2 + \frac{a}{d}x^3 = (y - mx)^3$

$= y^3 - 3y^2(mx) + 3y(mx)^2 - m^3x^3$

$\Rightarrow m^3 = \frac{-a}{d}, m^2 = \frac{b}{d}, m = \frac{-c}{d},$

$\Rightarrow m^2 = m \qquad m^3 = m$

$\frac{-b}{c} = \frac{-c}{d} \qquad -\frac{a}{b} = \frac{-c}{d}$

$\Rightarrow -\frac{a}{b} = \frac{-b}{c} = \frac{-c}{d}$

$\Rightarrow \frac{a}{b} = \frac{b}{c} = \frac{c}{d}$

14. The given equation can be written as $(y-2x)(y-3x)(y+4x) = 0$

$\Rightarrow$ lines $y = 2x, y = 3x$ and $y = -4x$ meet the line $x + y = 1$ at the points

$A\left(\frac{1}{3}, \frac{2}{3}\right), B\left(\frac{1}{4}, \frac{3}{4}\right), C\left(-\frac{1}{3}, \frac{4}{3}\right)$

$\therefore OA^2 + OB^2 + OC^2 = \frac{5}{9} + \frac{10}{16} + \frac{17}{9} = \frac{221}{72}$

15. The given lines $15x^2 + 31xy + 14y^2 = 0$ are $5x + 7y = 0$ and $3x + 2y = 0$ length of the perpendiculars from (2, 3) to the lines are $P_1 = \frac{31}{\sqrt{74}}$ *and* $P_2 = \frac{12}{\sqrt{13}}$

Now $P_1^2 + \frac{1}{74} - P_2^2 + \frac{1}{13} = \frac{961}{74} + \frac{1}{74} - \frac{144}{13} + \frac{1}{13} = 2$

16. Let the slopes be m, 2m

$\Rightarrow$ The ratio =1:2

The required condition is $ab(l+m)^2 = 4h^2lm$

$\Rightarrow ab(1+2)^2 = 4h^2(1)(2)$

$\Rightarrow 8h^2 = 9ab$

17. Let the equation of the line through P(2,3) making an angle 'θ' with positive direction of x-axis be

$\frac{x-2}{\cos\theta} = \frac{y-3}{\sin\theta} = r$

$\Rightarrow P(2 + r\cos\theta, 3 + r\sin\theta)$

$x^2-2xy-y^2=0$

$\Rightarrow (2+r\cos\theta)^2-2(2+r\cos\theta)(3+r\sin\theta)-(3+r\sin\theta)^2=0$

$\Rightarrow r^2(\cos 2\theta-\sin 2\theta)-2r(\cos\theta+5\sin\theta)-17=0$

$\Rightarrow PA.PB=\dfrac{17}{\cos 2\theta-\sin 2\theta}$

$\Rightarrow \cos 2\theta-\sin 2\theta=1$

$\Rightarrow \theta=0$ satisfied the equation

$\Rightarrow$ The equation of the line is $y-3=0$

18. Let m and m^n be the slopes of the lines represented by $ax^2+2hxy+by^2=0$

$\Rightarrow m+m^n=\dfrac{-2h}{b}; mm^n=\dfrac{a}{b}\Rightarrow m^{n+1}=\dfrac{a}{b}$

$\Rightarrow m=\left(\dfrac{a}{b}\right)^{\frac{1}{n+1}}$

Now

$m+m^n=\dfrac{-2h}{b}$

$\Rightarrow \left(\dfrac{a}{b}\right)^{\frac{1}{n+1}}+\left(\dfrac{a}{b}\right)^{\frac{n}{n+1}}=\dfrac{-2h}{b}$

$\Rightarrow a^{\frac{1}{n+1}}.b^{\frac{n}{n+1}}+a^{\frac{n}{n+1}}.b^{\frac{1}{n+1}}=-2h$

19. Centroid =(2, 3)

Mid point of third side $=\left(\dfrac{3}{2}\alpha,\dfrac{3}{2}\beta\right)$

$=\left(3,\dfrac{9}{2}\right)$

20. Equation of the line through (0,0) and (2,3) is $3x-2y=0$

Equation of the line through (0,0) and (4,5) is $5x-4y=0$

Pair of lines is $(3x-2y)(5x-4y)=0$

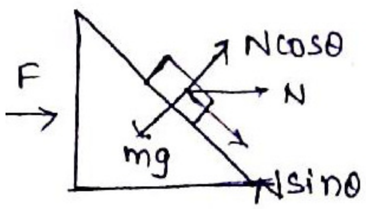
$\Rightarrow 15x^2-227+8y^2=0$

$\Rightarrow a+2h+b=15-22+8=1$

PHYSICS

1. $F<f_s(\max)$ then $f_s=F=2.5N$

2.



$N\cos\theta=mg$

$N=\dfrac{mg}{\cos\theta}$

3. $\mu = \tan\theta\left(1-\frac{1}{n^2}\right)$; given $\theta = 30^0$ and $n = 2$

4. Given $u = 6m/s;\ v = 0;\ t = 10\sec$

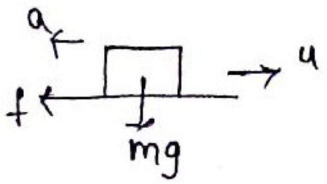
$a = \frac{-f}{m} = \frac{-\mu mg}{m} = -\mu g = -10\mu$

$v = u + at$

$u = at = 10\mu(10)$

$6 = 100\mu \Rightarrow \mu = 0.06$

5.



$f = \mu mg;\quad a = -\mu g;\quad P = mu$

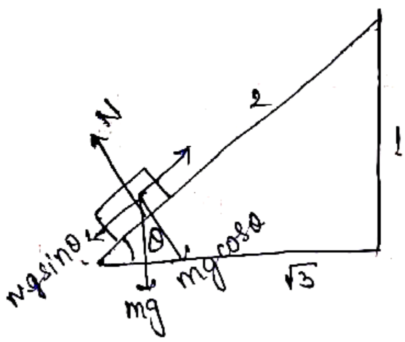
$u = \frac{p}{m};\quad v = 0;\quad s = ?$

$v^2 - u^2 = 2as$

$\Rightarrow s = \frac{v^2 - u^2}{2a} = \frac{p^2}{m^2 2\mu g}$

$\therefore s = \frac{p^2}{2\mu m^2 g}$

6.



$N = mg\cos\theta;\quad v = 36kmph = 10m/s$

$F = mg\sin\theta + \mu N$

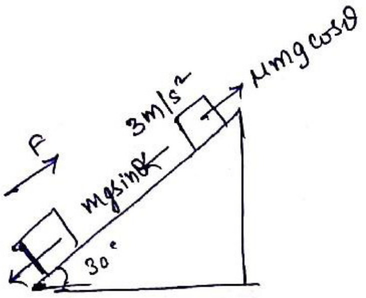
$F = mg\left(\frac{1}{2}\right) + \frac{1}{\sqrt{3}}mg\left(\frac{\sqrt{3}}{2}\right)$

$F = mg$

$\therefore$ Power $= F.V = 1000\times 9.8\times 10$

$= 98KW$

7.



Rough inclined plane

$a = g(\sin\theta - \mu\cos\theta)$

$3 = 10\left(\frac{1}{2} - \frac{\sqrt{3}}{2}\mu\right)$

$\Rightarrow \mu = \frac{2}{5\sqrt{3}}$

Then $F - mg\sin\theta - \mu mg\cos\theta = ma$

$F - 2\times10\times\frac{1}{2} - \frac{2}{5\sqrt{3}}2\times10\times\frac{\sqrt{3}}{2} = 2\times3$

$F - 10 - 4 = 6$

$F = 20N$

8. $\frac{l}{L} = \frac{\mu}{\mu+1}$

9. $a_1 = \frac{F - f_1}{m} = \frac{F - \mu m_1 g}{m_1} = 10m/s^2$

$a_2 = \frac{-F + \mu m_2 g}{m_2} = -1\,m/s^2$

$S = \frac{1}{2}a_{rel}t^2 = \frac{1}{2}\left[10-(-1)\right]t^2$

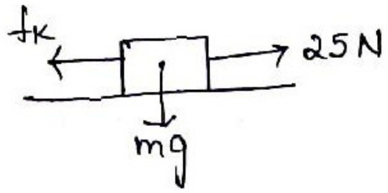
$22 = \frac{1}{2}11t^2$

$t = 2\sec$

10. $m\frac{v}{t} = F - f$

11. $F = mg(\sin\theta - \mu\cos\theta)$

12.



$f_k = \mu N = 10N$

$\therefore\ F_{net} = 25 - 10 = 15$

$W = F.S = 15(10) = 150J$

13. For limiting equilibrium

$\tan\alpha = \mu$

$\mu = \frac{h}{R}$

$\Rightarrow h = R\mu$

Volume, $V = \frac{1}{3}\pi R^2 h = \frac{\pi R^3\mu}{3}$

14. For smooth inclined plane $a = g\sin\theta$

$v^2 - u^2 = 2as$

$v = \sqrt{2gl\sin\theta}$

$v^1 = \sqrt{2gl\sin 2\theta} = \sqrt{2gl2\sin\theta\cos\theta}$

$= \sqrt{(2\cos\theta)}\,v$

15. For rough inclined plane $N = mg\cos\theta$

$F = mg(\sin\theta - \mu\cos\theta)$

Given $\frac{F}{N} = \frac{1}{2} = \frac{mg(\sin\theta - 0.5\cos\theta)}{mg\cos\theta}$

$\Rightarrow \cos\theta = 2\sin\theta - \cos\theta$

$\Rightarrow 2\cos\theta = 2\sin\theta$

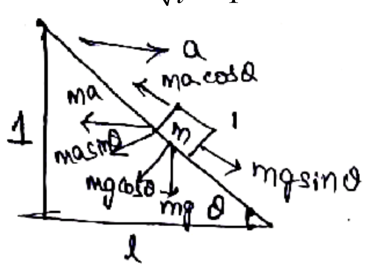
$\Rightarrow \theta = 45^0$

16. At equilibrium condition

$ma\cos\theta = mg\sin\theta$

$a = g\tan\theta$

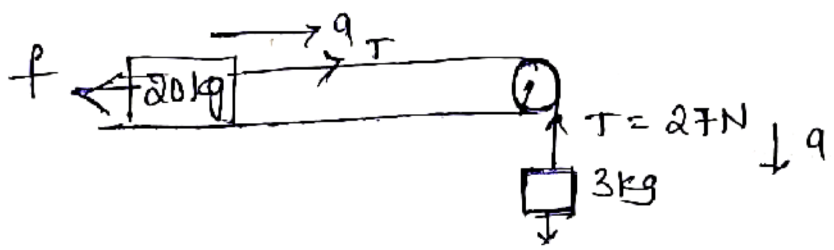
But $\tan\theta = \frac{1}{\sqrt{l^2 - 1}}$ $\quad \therefore a = \frac{g}{\sqrt{l^2 - 1}}$



17. Using $Jm\,L_{ice} = f_s$

$\Rightarrow Jm\,L_{ice} = \mu mg.s$

18.



For 3 kg Block

$3a = 3g - T$

$a = \frac{3}{3} = 1\ m/s^2$

For 20 kg Block

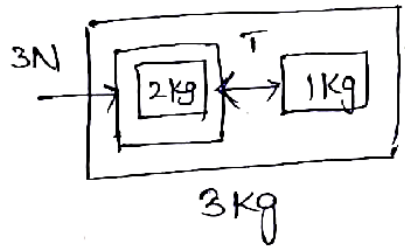
$T - f = 20a$

$27 - \mu(20)(10) = 20(1)$

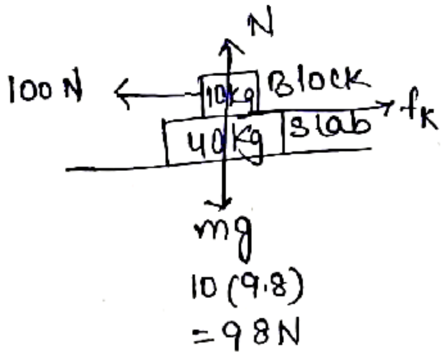
$\Rightarrow \mu = \frac{7}{200} = 0.035$.

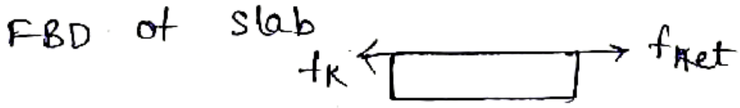
19. $a = \frac{F}{m} = \frac{3}{3} = 1\,m/s^2$

$T = f = ma = 1\times1 = 1N$



20.





$$f_k = \mu N = 0.4\times 98 = f_{net} = ma$$

$$\Rightarrow a = \frac{0.4\times 98}{m} = \frac{0.4\times 98}{40}$$

$$\Rightarrow a = \frac{98}{100} = 0.98\ \ m/s^2$$

CHEMISTRY

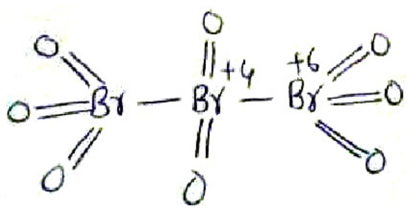
1. The weight of oxygen in these compounds are in the ratio of 16:32 (or) 1:2

2. $m = \dfrac{wt\ of\ solute}{mol\ wt\ of\ solute} \times \dfrac{1000}{wt\ of\ solvent\ in\ gms}$

   Wt of solute = 93 gm
   Mol.wt of solute = 98
   Wt of solution $= d\times v$
   $= 1.84\times 100 = 184 gm$
   $\therefore$ wt of solvent $= 184 - 93 = 91$
   $\therefore m = \dfrac{93}{98}\times\dfrac{1000}{91} = 10.42m$

3. No. of atoms = $n\times N\times$ atomicity
   $= \dfrac{4.25}{17}\times 4\times N$
   $= N$

4.



5. $\overset{(+5)}{ClO_3^-} + 6H^+ + 6e^- \rightarrow \overset{(-1)}{Cl^-} + 3H_2O$

6. No. of molecules

Moles of $H_2 = \frac{8}{2} = 4$ $4N_A$

Moles of $SO_2 = \frac{64}{64} = 1$ N_A

Moles of $CO_2 = \frac{44}{44} = 1$ N_A

Moles of $O_3 = \frac{48}{48} = 1$ N_A

7. Molecular mass of $Na_2CO_3 = 106$

106g of Na_2CO_3 contains $= 3\times6.023\times10^{23}$ oxygen atoms.

$\therefore$ 10.6g of Na_2CO_3 will contain $= \frac{3\times6.023\times10^{23} kt10.6}{106}$

$= 1.806\times10^{23}$

8. $n = \frac{M.wt}{E.F.wt} = \frac{180}{30} = 6$

$M.F = n\times E.F$

$= 6(CH_2O)$

$= C_6H_{12}O_6$

9. $H_2S_2O_8, H_2SO_5, H_2SO_4, H_2S_2O_7, SO_2Cl_2$

10. $Ag_2CO_{3(s)} \to 2Ag_{(s)} + CO_{2(g)} + \frac{1}{2}O_{2(g)}$

M.wt of $Ag_2CO_3 = 276g$

$276g\ of\ Ag_2CO_3$ on heating gives 216g of Ag

$\therefore 2.76g$ of Ag_2CO_3 on heating gives 2.16g of Ag.

11. $\frac{12.8}{12};\frac{2.1}{0.008};\frac{85.1}{79.9} = \frac{1.06}{1.06};\frac{2.08}{1.06};\frac{1.06}{1.06}$

$= 1:2:1$

E.F $= CH_2Br$

E.F.wt $= 12+2+80 = 94$

$n = \frac{187.9}{94} = 2$

$\therefore M.F = C_2H_4Br_2$.

12. $Cl_2 \frac{cold\ KOH}{solution} OCl^- + Cl^-$

0 +1 -1

Oxidation numbers are +1 and – 1.

13. CrO_2Cl_2 ; MnO_4^-

$x + 2(-2) + 2(-1) = 0$ $x + 4(-2) = -1$

$x = +6$ $x = -1 + 8$

=+7

14. MnO_4^- oxidises Fe^{+2} and $C_2O_4^{-2}$ both.

$Fe^{+2} + C_2O_4^{-2} \to Fe^{+3} + 2CO_2 + 3e^-$

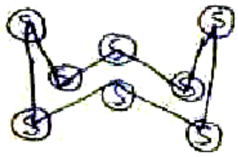
$MnO_4^- + 5e^- \to Mn^{+2}$

$5FeC_2O_4 = 3MnO_4^-$

$1FeC_2O_4 = \frac{3}{5} MnO_4^-$

15. Volume strength $= 5.6\times$ Normality
$= 5.6\times 1.5$
$= 8.4$

16. In molecular state oxidation number of sulphur is 0 and covalency is 2.



17. $N;\ 1s^2 2s^2 2p^3\ ;N^{-3}\ ;1s^2 2s^2 2p^6$
Valence $e^- s$ es = 8
Total no. of valence $e^- s = \frac{W}{A.W}\times N_0 \times n$
$= \frac{4.2}{14}\times N_0 \times 8$
$= 2.4N_0$

18. No. of electrons in one molecule of H_2O is 2+8=10
Density = 1 g/ml
$\therefore$ 18ml means 18g
$moles = \frac{18}{18} = 1$
$\therefore$ No. of electrons $= 6.023\times 10^{23}\times 10 = 6.023\times 10^{24}$

19. $\overset{+6}{Cr_2} O_7^{-2} \rightarrow 2Cr^{+3}$
For 2 Cr atoms charge difference is 6

20. $3Cu + 8HNO_3 \rightarrow Cu(NO_3)_2 + 2NO + H_2O$