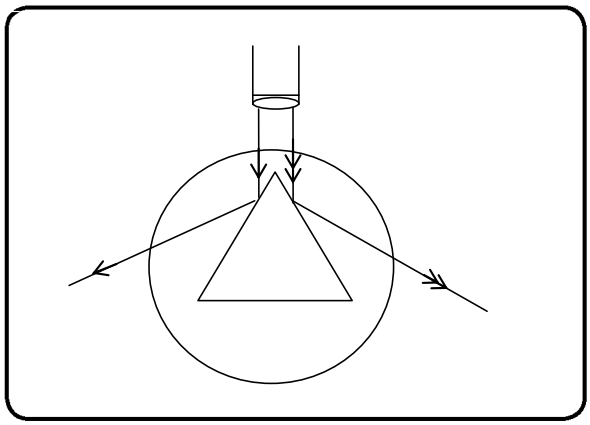
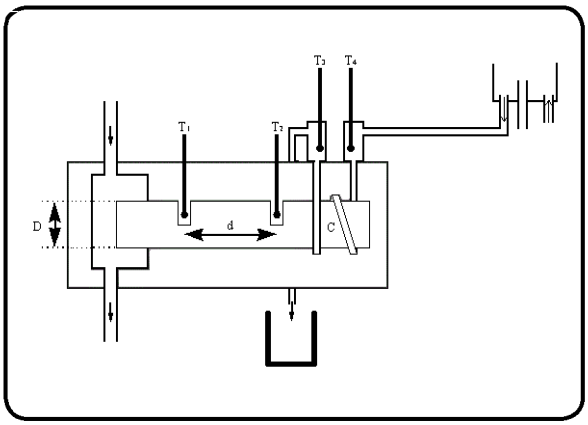
மொறட்டுவைப் பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்
நடாத்தும் க.பொ.த உயர்தர மாணவர்களுக்கான 9வது

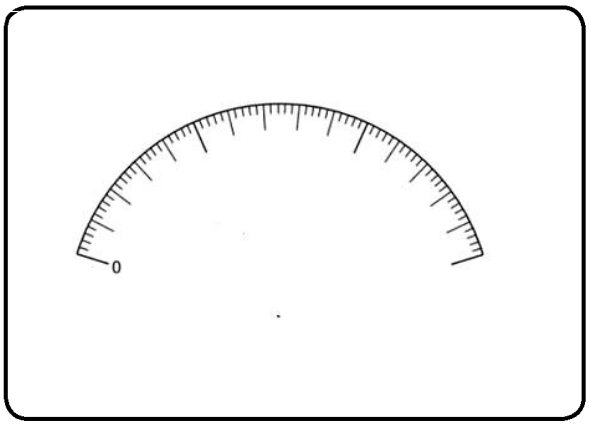
முன்னோடிப் பரீட்சை – 2018

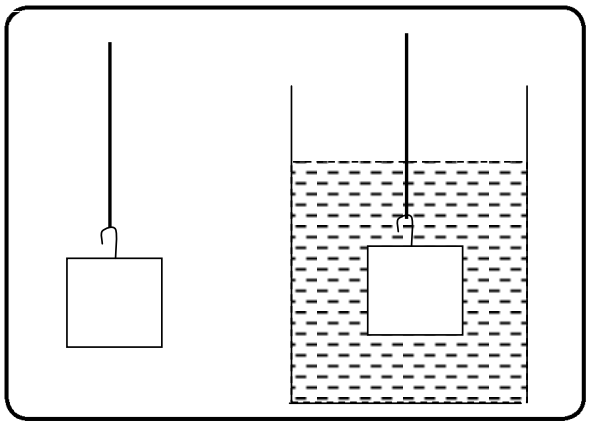
01 - பௌதிகவியல் விடைகள்

(ஆங்கில மொழி மூலமானது)









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மொறட்டுவை பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்

நடாத்தும் க.பொ.த உயர்தர மாணவர்களுக்கான 9வது

முன்னோடிப் பரீட்சை – 2018

பாடஎண் } 01

பாடம் } பௌதிகவியல்

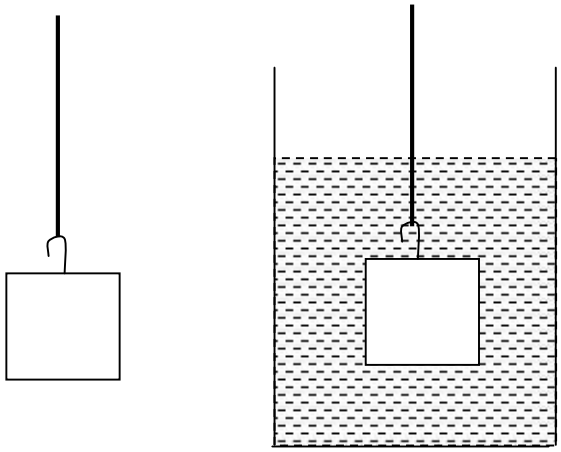
வினா இல.	விடை இல.	வினா இல.	விடை இல.	வினா இல.	விடை இல.	வினா இல.	விடை இல.	வினா இல.	விடை இல.
01)	3	11)	5	21)	2	31)	3	41)	2
02)	2	12)	5	22)	4	32)	3	42)	2
03)	4	13)	2	23)	4	33)	2	43)	3
04)	3	14)	2	24)	5	34)	5	44)	3
05)	1/4	15)	5	25)	3	35)	All	45)	2
06)	3	16)	5	26)	1	36)	4	46)	2
07)	4	17)	2	27)	All	37)	1	47)	2
08)	2	18)	2	28)	1	38)	3	48)	3
09)	4	19)	2	29)	3	39)	2	49)	1
10)	3	20)	2	30)	2	40)	4	50)	3

விசேட அறிவுறுத்தல் } ஒரு சரியான விடைக்கு (01) புள்ளி வீதம் 50

மொத்தப் புள்ளிகள் 1 x 50 = 50

01.

(a)



The tensions in the string when a block made of a particular type of alloy in the states of completely immersed in the air and glycerol are T_1, T_2respectively. The densities of alloy and glycerol areρ_m, ρ_g respectively ($\rho_m > \rho_g$). The volume of block with hook is V.

i. Write the expressions for T_1 and T_2.

$T_1 = V\rho_m g$ .....(1)

$T_2 = V(\rho_m - \rho_g)g$ .....(1)

ii. If the ratio of $T_2/T_1 = 4/5$, $\rho_m = 6250 kgm^{-3}$, then find $(\rho_m - \rho_g)$.

$T_2/T_1 = \frac{pm-pg}{pm}$

$\frac{\rho m - \rho g}{1250} = \frac{4}{5}$

$\rho_m - \rho_g = 5000 kgm^{-3}$ .....(1)

iii. If the least count of string balance used to measure tensionsis 0.1N, by considering both two instances what could be the minimum possible value for V to get error percentage less than or equal to 10%?

$T_1 > T_2$

?percentage error is high when T2 is obtaiined as the readingOr value of V to get les percentage error= V

$\frac{0.1}{T_2} \times 100 \leq 10$ $1 \leq V \times 5000 \times 10$ $\frac{0.1}{V(\rho_m - \rho_g)g} \times 100 = 10$

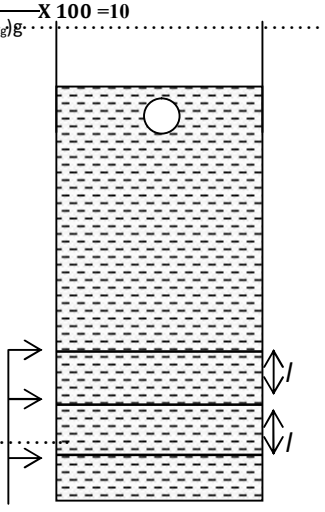
$1 \leq V(pm - pg)g$ $2x10^{-5} \leq V$ minimum possible

$V = 2x\ 10^{-5}$

$V = 2x10^{-5} m^3$ value for V= $20cm^3$ .....(1)

(b) Some metal balls made up of alloy mentioned above with different radii were dropped in to a tall vessel filled with glycerol from rest.

i. What could you conclude form that the time taken for the metal ball to pass the two tall portions made up of rubber bands become same?



Rubber band

.....we can conculte that metal ball attains the terminal velocity .....(1)

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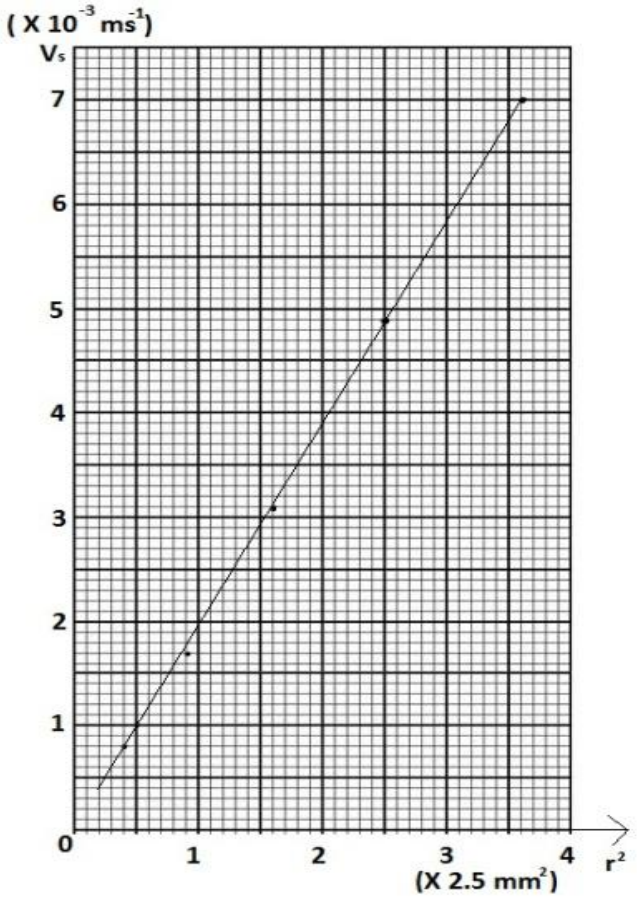
Experiment is conducted with the spheres of different radii. The graph of terminal velocity (Vs) against square of the radius (r^2) is shown below.

$$V_s = \frac{2r^2}{9n}(\rho_m - \rho_g)g$$



ii. Find the gradient and calculate the co-officient of viscosity (η) of glycerol

Gradient $= \frac{(6.6-1)10^{-3}}{(3.4-0.5)2.5\times10^{-6}}$ ……Gradient = $\frac{2(pm-pg)}{9n}g$ ……

……$= 7.72 \times 10^2 m^{-1}s^{-1}$ (7.71x10² -7.73x10²) …… $\frac{2\times5000}{9n}$ X 10 = 7.72 × 10² ……

…… $vs = \frac{2(pm-pg)}{9n}g \cdot r^2$ ……(1) η=14.35Pa s (14.35 – 14.45) ……(1) ……

iii. What are the environmental factors affect the value of n?

room temperature or surroundings' temperature or …temperature……(1) ……

iv. Water has a low value for coefficient of viscosity as 8.90 x10^{-4} Pas.What is the problem in using this experiment to determine the coefficient of viscosity of water?

……

In the experiment, terminal velocity may not be reached by the sphere

Or Very tall vessel may be needed ……(1)

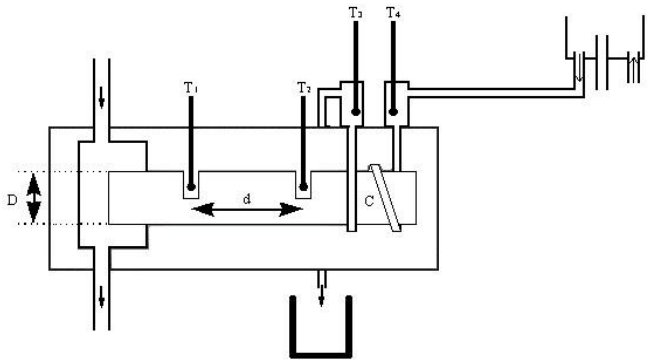
……

v. After reaching the terminal velocity, the sphere moves with the constant kinetic energy. But its potential energy gradually getsreduced. Explain how the energy is conserved in this case.

[See page 4

potential engery of the liquid increases
work done by sphere against the friction .....(1)

02. (a) The figure shows an experimental setup arranged to find the heat conductivity of a metal using Searle's law.

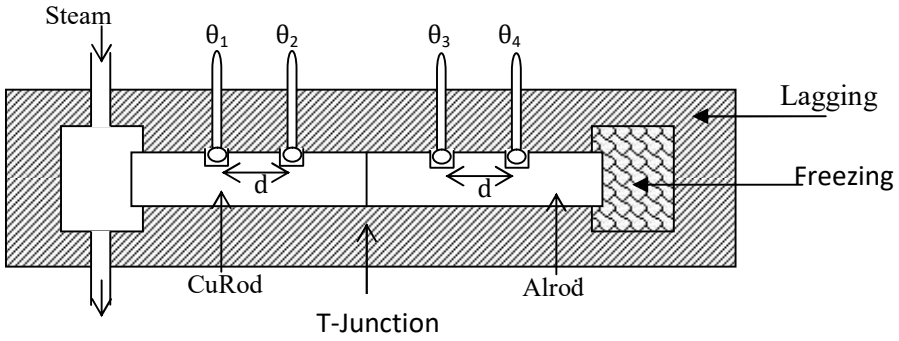


i. Listdown the measuring instruments required to carry out this experiment
meter ruler, vernier caliber, eloctronic balance, or four beam balance, hermometer, stop watch
.....(1)

ii. What is the purpose of using the constant pressuregauge in this experiment?

To attain a stable state..... .....(1)

(b) To determine the thermal conductivity of a metal, an alternate method is used for the above method. The following figure shows the experimental setup containing the copper, aluminium rods of same lengths and same cross-sectional areas which are connected to each other end to end.



i. What is the purpose of using steam and freezing mixture in this experiment?

……To maintain the temperature of the ends of the rods unchanged.....(1)

ii. The thermal conductivities of Cu & Al are K_1& K_2 respectively. The readings of the thermometers are θ_1, θ_2, θ_3 and θ_4. By considering the heat flow through the rods get a relationship among K_1,K_2 θ_1, θ_2, θ_3& θ_4.

$P = KA\frac{\Delta\theta}{l}$

$P = K_1A\left(\frac{\theta_2-\theta_1}{d}\right) = K_2A\left(\frac{\theta_4-\theta_3}{d}\right)$ .....(1) $K_1(\theta_2-\theta_1) = K_2(\theta_4-\theta_3)$ .....(1)

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iii. If $K_1 = 400 Wm^{-1}k^{-1}$ and the temperature readings obtained at the steady state are 91.2^0C, 80.1^0C, 54.6^0C, 32.4^0C then find the thermal conductivity of aluminum K_2.

$400\,(91.2 - 80.1) = K_2(54.6 - 32.4)$

$K_2 = 200 Wm^{-1}K^{-1}$ .....(1)

iv. What is the advantage of using this method instead of the usual method?

.there is no need to determine the rate of heate flow accross the rod **or** since measurements are decreased, error pecentage will decrease. .....(1)

v. If d=5cm and the length of a rod is 15cm, then find the resultant thermal conductivity of combined rod?

$P = KA\frac{\Delta\theta}{l}$ $\frac{400(91.2-80.1)}{5\times10^{-2}} = \frac{K\times100}{30\times10^{-2}}$

$P = K_1A\frac{(\theta_2-\theta_1)}{d} = \frac{KA(100-00)}{30\times10^{-2}}$ $K = 266.4 Wm^{-1}K^{-1}$ .....(1)

vi. What is the temperature at junction T?

$\frac{100-T}{15} = \frac{91.2-80.1}{5}$ $T = 66.7^0C$ .....(1)

vii. If the cross-sectional area of the rod is $8cm^2$, then what is the rate of heat flow through the rod?

$P = KA\frac{\Delta\theta}{l}$

$= 400\times8\times10^{-4}\frac{(91.2-80.1)}{5\times10^{-2}}$ $= 71.04 W$ **$m^{-1}k^{-1}$** .....(1)

03. Adjusting spectrometer components is an important step in spectrometer experiments.

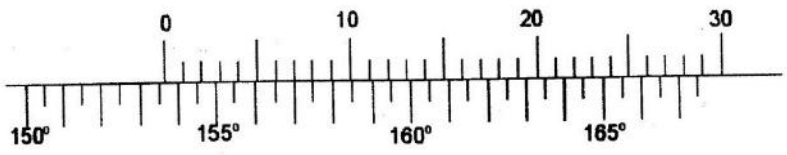
(a) What is the order or adjusting components in spectrometer

Telescope, colly mator, prism table.....(1)

(b) How could you adjust the eye piece of telescope

Telescope is placed infront of white screen and eye piece is adjusted by moving forth and back until a clear image of cross wire is obaitained .....(1)

(c) In the given spectrometer, 29 main scale units coincide with 30 vernier divisions.



i. What is the least count?

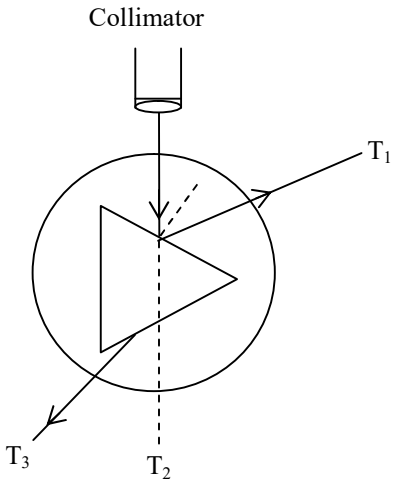
$0.5^0 \times {}^1/_{30} = 1/60^0$ or .....(1)

[See page 6

ii. What is the reading in the position shown in the figure?

$153^0\ 30' + 8 \times 1' = 153^0 38'$ .....(1)

(d) An experimental setup arranged to draw the variation graph of deviation (d) with angle of incidence (i) in a prism with the help of spectrometer is shown below.



In the shown position the reading taken for the image position of light beam was T_1 and T_3 the reading taken after prim is remove and coli meter and telescope kept facing each other was T_2. Let the reading increase clock wise from T_1 to T_3.

i. Explain the formation of light ray responsible for reading T_1.

By the partial reflection of ilight rays which undergo refraction on the prism face .....(1)

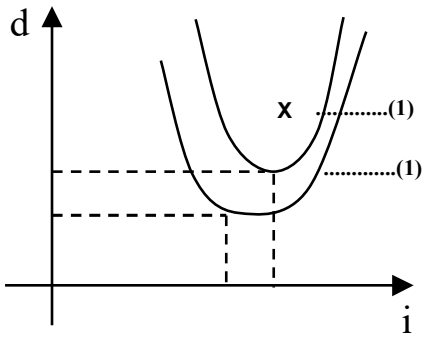
ii. Write the expression for angle of deviation (d) in terms of readings taken.

$d = T_3 - T_2$ .....(1)

iii. Write the expression for incident angle (i) in terms of reading taken.

$i = \frac{180^0 - (T_2 - T_1)}{2}$ .....(1)

iv. Draw the d Vs. I graph in the axis given below.



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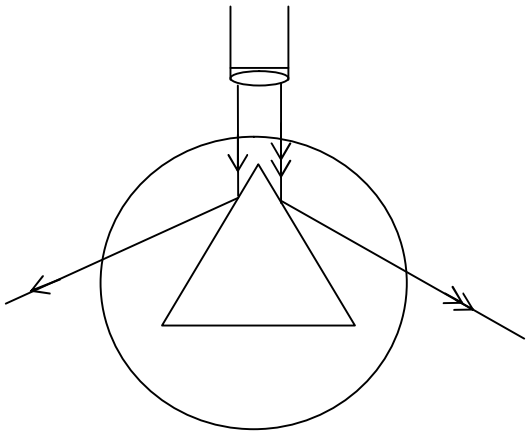
v. When another prism with same dimensions as this one but have higher reflective index from other is used **to** respect this experiment. Draw the expected graph in the same diagram & mark it as X.

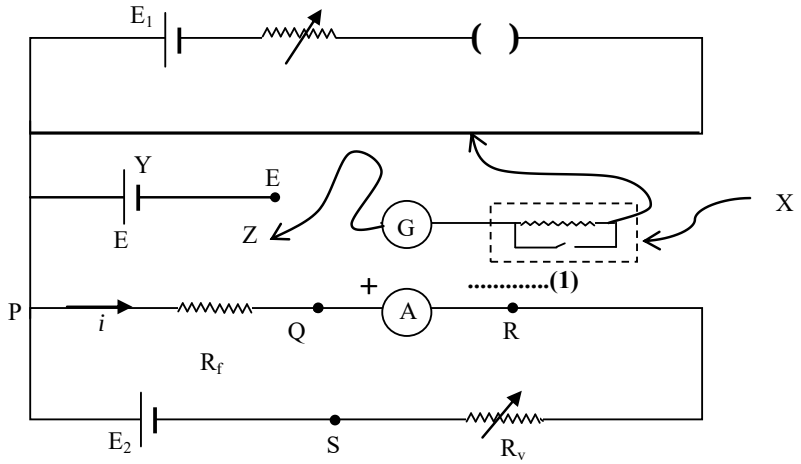
(e) After a proper adjustment of spectrometer, that student attempt to do an experiment to measure the prism angle (A) as shown in the figure



At this experiment, he was able to see the image of the slit reflected in prism surface by his naked eyes but unable to see through the telescope. Mention the reason for this?

……Telescope is always placed towards the center of the prism table.……
……**.....(1)**……
……

04. The circuit shown below is a setup used to calibrate an ammeter by a potentiometer. Y is a standard cell with emf E. Here E_1,E_2 are cells with constant emf



(a) By denoting +/- sign in terminals of ammeter A show how should you connect the Ammeter.

(b) Give 2 importance of the circuit named by X.

……Prevent the standard cell from high current flow .....(1)……
……Prevent the galvano meter from high current flow .....(1)……
……

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(c) In that particular experiment balance length taken for standard cell is l_1 and balance length when terminal z is connected with Q is l_2 for that instance write an equation for current flow i in terms of E, R, l_1, l_2

$E \alpha l_1$

$iR_f \alpha l_2$ ..... $i = \frac{l_2 E}{l_1 R_f}$

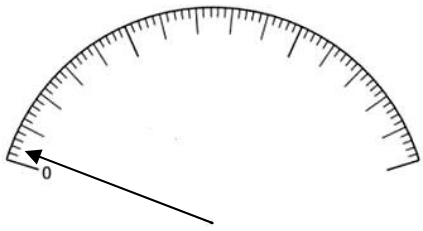
$\frac{iR_f}{E} = \frac{l_2}{l_1}$ $l_1 R_f$ .....(1)

(d) If emf of standard cell is 1.2V, value obtained for l_1, l_2 were 32cm, 80cm and $R_f = 1\Omega$, Find the current (i) flow ?

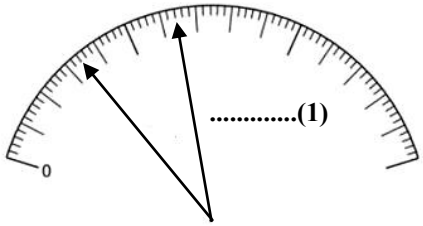
$i = \frac{30 \times 1.2}{32 \times 1}$

$= 3A$ .....(1)

(e) The figure shows the position of the indicator whenthere is no current flow through the ammeter (1) and when the current icalculated in above (b) flows through the ammeter of the above circuit (2).



(1)



.....(1)

(2)

1. Draw the positions of indicator in figure (2) when 2i current pass through ammeter
2. What is reason for answer in e(1)

Deflection of indicator is directly proportional to the current flow.....(1)

3. What is the least count of ammeter

3/15 = 0.2A

Internal resistance of ammeter is about to be **determined**

1. For this an additional reading is required to this which point among P,Q,R and S would you connect with Z

With **R** .....(1)

2. When the variable resistance R_V is kept in same value as it used to find l_2 in (d) and it connected as mentioned in f(i) then the balance length was 240cm find the internal resistance of ammeter.

$R_f \alpha 80$

$R_f + r \alpha 240$

$\frac{R_f + r}{R_f} = 3$

$\frac{1+r}{1} = 3$

r=2 Ω

Internal resistance of ammeter2Ω .....(1)

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05. (a)

i. Number of pitches = $\frac{2\times10}{1}$ = 20……..(1)

ii. Rotational frequency = $\frac{20}{10}\times 60$= 120rpm ……..(1)

iii. τ_b =0.01Nm ……..(1)

(b)

i. Number of pitches in the nut $\frac{8}{1} = 8$……..(1)

Maximum reaction force present between nut and wall = 8 x 200

=1600N ……..(1)

ii. $\tau_t = \mu Rr$

= 0.8 x 1000 x 5 x10^{-3}

= 4Nm ……..(1)

iii. Minimum torque reqired =

Summation of resistant torques = 0.01 + 4 + 5.99

= 10Nm……..(1)

(c)

i. Torque = F x d

10 = F x 0.25……..(1)

F =40N……..(1)

ii. Use a long nut key or

Fix a pipe with given nut key.

iii. F_1=500N……..(1) ……..(1)

F_2=540N……..(1)

iv. Yes

Maximum force could be experience by the edge of nut =520N

But F_2=540N ……..(1)

v. Make the nut to touch the margins of nut key completely

or draw an appropriate figure ……..(1)

(d) B,D……..(1)

06. (a) i. $\lambda/4 = l$

$\lambda = 4l$

Wave length of air column which resonate at the fundamental frequency= 4l……..(1)

$3\lambda/4 = 1$

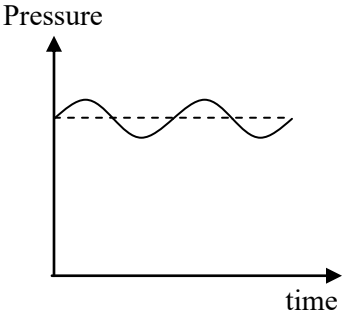
$\lambda = 4l/3$

Wave length of air column which resonate at the fundamental frequency of first over tone $= \frac{4l}{3}$ …..(1)

ii. Fundamental frequency $= \frac{V}{4l}$ ……..(1)

frequency of first over tone $= \frac{V}{4l/3} = \frac{3V}{4l}$ ……..(1)

iii. At A……..(1)



……..(1)

(b) i. $f_1 = \frac{336}{4\times 2.4\times 10^{-2}}$ =3500Hz ……(1)

$f_2 = 3f_1$ = 3 x3500

= 10500Hz ……..(1)

ii. Depth of auditory canal of elephant is higer than that of human

Depth of auditory canal of rat is smaller than that of human……(2)

iii. $\beta = 10\log_{10}\left(\frac{2\times10^{-9}}{10^{-12}}\right)$

$= 33dB$ ……(1)

iv. $I = 2\pi^2 f^2 a^2 pV$

$a = \sqrt{\frac{10^{-12}}{2\times\left(22/7\right)^2\times(35.00)^2\times1.2\times336}}$

$3.2\times10^{-12}Wm^{-2}$

Minimum amplitude = 3.2 x10^{-12}Wm^{-2} ……(1)

v. $a = \sqrt{\frac{1}{2\times\left(22/7\right)^2\times(3500)^2\times1.2\times336}}$

$3.2\times10^{-6}Wm^{-2}$ ……(1)

(c) i. $30 = 10\log_{10}\left(\frac{I}{10^{-12}}\right)$

$10^3 = \frac{I}{10^{-12}}$

$I = 10^{-9}$

least sound indensity = 10^{-9}Wm^{-2} ……(1)

ii. $\frac{10^{-9}}{10^{-12}}$ = By 3 times …….(1)

07. (a)

i. A –point corresponding to proportional limit.….(1)

B – Braking point …….(1)

ii. Young's modulous $= \frac{6\times10^{6}}{3}$

= 2 x10^6Pa…….(1)

(b)

i. stain = 3

stress= 6 x10^6 …….(1)

$= \frac{F}{1\times10^{-6}} = 6\times10^{6}$

$F = 6N$…….(1)

ii. Energy= ½ Fe $= \frac{1}{2}\times6\times(1\times10^{-2}\times3)$

= 9 x10^{-2}J…….(1)

iii. Rate of work done (power) $= 2\times9\times10^{-2}\times5\times \frac{96}{100}$ = 0.864W…….(1)

iv. Work done by the insect in 1 **s**

= work against gravitational force +

work done against air resistant…….(1)

0.864 = 0.064 + kv xv

0.800 =K x (20 x10^{-2})^2

0.8 = k x 4 x 10^{-2} k = 20kgs^{-1} …….(1)

v. $2\times9\times10^{-2}\times5\times\frac{96}{100} = 0.064 + kv^2$

1.728 = 0.064 + 20v^2

V = 0.29ms^{-1} (0.28ms^{-1} – 0.29ms^{-1}) …….(1)

(c)

i. $K = \frac{YA}{L} = \frac{YL^2}{L} = YL$…….(1)

K = 2x10^6 x 2 x10^{-4}

= 400Nm^{-1} …….(1)

ii. 0.5 = e/2x10^{-4}

e = 1 x 10^{-4}m

Force=ke

= 400 x1 x10^{-4}

= 4 x10^{-2}N…….(1)

iii.Elastic energy x 92/100 = kinectic energy gained by insect …….(1)

½ x 4 x10^{-2} x 1 x 10^{-4} x 92/100 x 2 = ½ x 0.46 x10^{-6}v^2

V^2 = 16

V = 4ms^{-1} …….(1)

08.

(a)Microbial disintegration is carried out(micro organisms degraded by this technology

help to dry some food items …….(1)

(b) advantages :- it has high yield than other methods

the disinfected food from this method can

be maintained for long time

· requirement of less time

reduction of nutrition loss

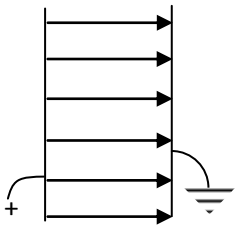
diadvatages - limiting enzyme function only to a limitation

only affect vegetative bacteria…….(1)

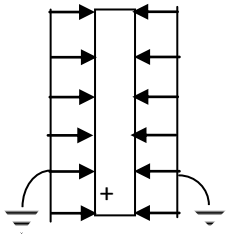
(only one advantage and one disadvantage is enough)

(c)when the electric field is formed, a potential difference is formed between the inner and outer surfaces of the cell walls of cells trapped within them…….(1)

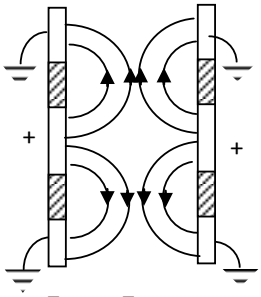
(d)



…….(1)



…….(1)



…….(1)

(e)

i. $[C] = \left[\frac{Q}{V}\right] = \left[\frac{Q}{W/Q}\right] = \frac{(IT)^2}{ML^2T^{-2}} =$ I^{2}T^{4}M^{-1}L^{-2}

$R = \frac{Pl}{A}$

$\frac{V}{I} = \frac{l}{\sigma A}$

$\frac{l}{\sigma A} = \frac{Wt}{Q^2}$

$$\left|\frac{\iota\sigma A}{d}\right| = \frac{(IT)^2}{ML^2T^{-2}}$$

$$= I^2T^4M^{-1}L^{-2}$$

$$|C| = \left|\frac{\iota\sigma A}{d}\right|$$

$$= I^2T^4M^{-1}L^{-2}$$

this equation is dimensionally correct. …….(2)

ii.

$$C = \frac{10\times10^{-6}\times0.5\times0.1}{5\times10^{-2}}$$

= 10μF…….(1)

iii. V = Ed

= 20 x5

= 100 kV…….(1)

iv.power of electric energy =energy given per 1s

= ½ CV^2 x 1

= ½ x 10^{-5} x $(100 \times 10^3)^2$

= 50kW…….(1)

iv. mass of juice treated per 1 s

$$= \frac{3.6\times10^3}{3600}$$ = 1kg…….(1)

energy gained by 1kg of juice= 50kJ

energy spent for a unit mass of juice= 50kJ/kg…….(1)

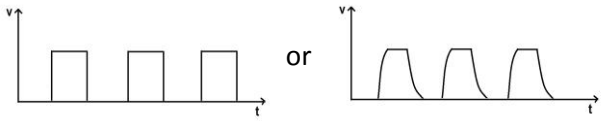
(f)

i. Q = CV

= 10 x 10^{-6} x 100 x 10^3

= 1C…….(1)

ii.



09. …….(1)

(A)

a. P = VI

$$I = \frac{3.6\times10^3}{240} = 15A$$ …….(1)

(b)31A fuse…….(1)

(c) Electric energy spent in 1 month H = 2x 3.6 x ½ x 30 KWh = 108 kWh …….(1)

cost of electric energy of 1kWh = 20/=

cost of electric energy of 108 kWh= 20 x 108

=2160/=…….(1)

(d) $$R = \frac{V}{I} = \frac{240}{15} = 16\Omega$$ …….(1)

Or

$$P = \frac{V^2}{R^2}$$

$$R = \frac{V^2}{P}$$

$$= \frac{240^2}{3.6\times10^3} = 16\Omega$$

Or

$$P = I^2R$$

$$R = P/I^2$$

$$= \frac{3.6\times10^3}{15^2}$$

$$= 16\Omega$$

(e)

$$R = \frac{Pl}{A} \qquad l = \frac{RA}{P}$$

$$= \frac{16\times22/7\times\left(\frac{0.3}{2}\times10^{-3}\right)^2}{4.5\times10^{-7}}$$ ……..(1)

=2.5m …….(1)

(give marks for the answers in between2.40m to 2.51m)

(f)i. resistanceat0^0C temperature…….(1)

ii.

$$\alpha = \frac{R_\theta - R_0}{R_0\theta}$$

$$R_0 = \frac{R_\theta}{1+\alpha\theta}$$

$$= \frac{16}{1+7.5\times10^{-5}\times200}$$

$$= \frac{16}{1.015}$$

$$= 15.76\Omega$$ …….(1)

(don't give marks 15.7 Ω, give marks for 15.8Ω

(g) i.H = msθ

$3.6 \times 10^3 \times 60 = (3.6 \times 10^{-3} \times 10^3) \times 4200 \times \theta$

$\theta = 14.28^0$C……(1)

temperature of the outlet water= 10 + 14.28

$= 24.28^0$C……(1)

(also give marks for 24.3^0)

ii. $7.2 \times 10^{-3}\ m^{-3}\ min^{-1}$ ……(1)

iii. possibility - $P = V^2/R$

power generated will increase due to the decrease in resistance……..(1)

Or

P = VI

Due to the decrease in resistance the electric current/ electric flow(I) of system will increase. therefore power generated will increase.

distress – when shower works ,the temperature of coil is high. Therefore coil will be burnt quickly/will be damaged soon

……(1)

(Don't give markes related to the answers coil will melt and burnt)

Dnger - Conecting wires will burn, due to the high current generated from main power supply

……(1)

(B)(a) i. $V_a = AV_{in}$

$5 = 10^5\ V_{min}$

$V_{min} = 5 \times 10^{-5}$ V ……(1)

$= 50\mu V$

ii. $V_{in} = V_1 - V_2$

$V_1 = V_{in} + V_2$

$= 5 \times 10^{-5} + 1$

$\approx 1V$ ……(1)

(b) i.

$$\frac{R_{AX}}{R_{AC}} = \frac{1}{2}$$

$$R_{AC} = 1 \times 2$$

$= 2k\Omega$ ……(1)

ii $\frac{R_{AX}}{R_{AC}} = \frac{1+5\times10^{-5}}{2}$

$\frac{R_{AX}}{2} = \frac{1+5\times10^{-5}}{2}$

$R_{AX} = 1+5\times10^{-5}\ k\Omega$ ……(1)

iii. change in resistance $= 5 \times 10^{-5}\Omega$ ……(1)

$1K\Omega >>> 5 \times 10^{-5} k\Omega$ ……(1)

(c) i. positive terminal ……(1)

ii. 6V ……(1)

iii. Vp = 1V

$V_q = 1.5V$

$V_R = 2.5V$

$V_S = 4V$

If all 4 answers are correct give 2 marks and give 1 mark for only 2 correct answer

iv. $R_1 = R/2$

$R_2 = R$

$R_3 = 3R/2$

$R_4 = 2R$

If all 4 answers are correct give 2 marks and give 1 mark for only 2 correct answer

v. V = IR

6 = 1x6R

$R = 6/6 = 1k\Omega$ ……..……(1)

(d)

A	B	C	F_1	F_2
1	1	1	0	1
1	1	0	0	1
1	0	1	0	1
0	1	1	1	1
1	0	0	0	1
0	1	0	1	1
0	0	1	1	0
0	0	0	0	0

F_1……..(1)

F_2……..(1)

10. (A) (a) Because the temperature is generated from the body **or** Two send out the temperagure generated from the body…...(1)

(b) 300W……..(1)

(c) 840W……..(1)

(d) excess temperature α rate of heat of heat loss ….(1)

$(38-30)\ \alpha\ 300$
$(\theta-30)\ \alpha\ 1140$ } .....(1)

$$\frac{\theta-30}{8}=\frac{1140}{300}$$

$$\theta = 60.4^0 C$$

Maximum temperature attained $\theta = 60.4^0 C$ ……(1)

(e) i. $(38-30)\ \alpha\ 300$
$(44-30)\ \alpha\ P$ } .....(1)

$$\frac{P}{300}=\frac{14}{8}$$

Rate of heate loss= 525W…….(1)

ii. H = ml …….(1)

$(1140-525) = m \times 2.025 \times 10^6$

$m = 3.03 \times 10^{-4}\ kgs^{-1}$ …….(1)

Give mark for the range ($3.03 \times 10^{-4} - 3.04 \times 10^{-4}$

iii. A part of heat generated by the body i released according to Newton's cooling law while remaining will be obtained by water …….(1)

(f) Relative humidty of air is high due the evapouration takes place in the trees of forrest area. There for vapourizability of water is decreased …….(2)

(g) Advantage - Heate generated by the body decreases quickly ……..(1)

Disadvantage - If large amount of heate is absorbed by water then it will be harmful ……..(1)

(B) $k._{E\ max} = hf - Ø$

$k._{Emax}$ - Maximum kinetic energy gained by an electron

h- Planck's constant

f- frequency of a photon

Ø– Work function of a metal …….(1)

(a) i. Electric current is produced when the electron released in Y reaches the X …….(1)

ii. X – Anode…….(1)

Y – Chathode …….(1)

iii. Make the Electron released from Y to reach the target (destination) or X

or Keep X in positive potential with respect to Y …….(1)

iv. Potential differance accross R

$$= \frac{1}{10^5} = 10^{-5} V$$ .....(1)

$$= \frac{10^{-5}}{10} = 10^{-6} A$$ Current flow ……..(1)

Num of electrons released in 1s

$$= \frac{10^{-6}}{1.6\times10^{-19}}$$ =625……..(1)

(b) i.

$$E = hc/\lambda = \frac{6.6\times10^{-34}\times3\times10^8}{254\times10^{-9}} = 7.8\times10^{-19} J$$

$$= 7.8\times10^{-19}$$

$$= 4.87eV (4.85-4.9)$$ ……..(1)

ii.

$$E = hc/\lambda = \frac{6.6\times10^{-34}\times3\times10^8}{546\times10^{-9}}$$

$= 3.6 \times 10^{-19} J$

$= 3.6 \times 10^{-19}$

= 2.26eV (2.25 – 2.27)…….(1)

(c) i. zero reading …….(1)

ii. Reading will decrease …….(1)

iii. Zero reading …….(1)

iv. No change in reading …….(1)

v. Zero reading…….(1)

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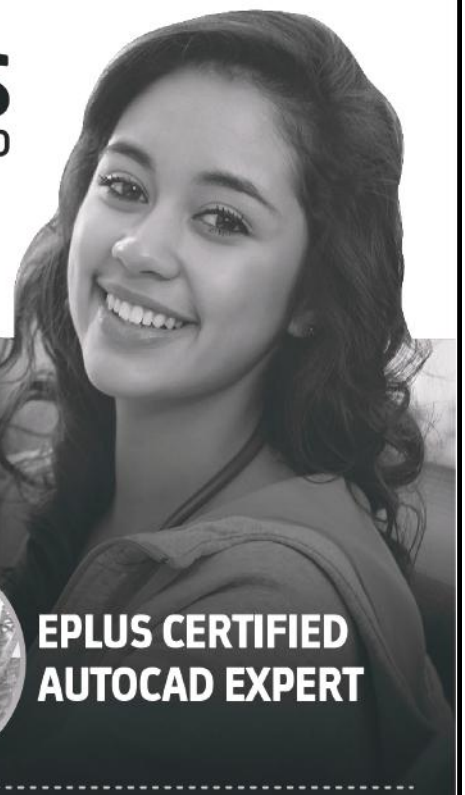

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