

Adamjee Cantonment Public School

Dhaka Cantonment, Dhaka-1206

SSC Suggestion-2020

Subject: Physics

CHAPTER-1

1. The vernier constant of a slide calliper is 0.01 cm. The diameter of a sphere is measured using this slide callipers. Here the main scale reading is 12.2 cm, vernier coincidence is 5. There is no instrumental error in this slide callipers. The mass of the given sphere is 1 kg.
 - a. What is called least count?
 - b. Force is a derived quantity-Explain.
 - c. Determine the radius of the given sphere.
 - d. The sphere will whether sink or float in water Explain with mathematical logic.

CHAPTER-2

1. A tortoise and a rabbit start for a competition. Rabbit starts with an initial velocity of 0.05ms and acceleration of 0.0001 ms^{-1} . The tortoise of starts with an average velocity of 0.2 ms^{-1} . After starting the competition rabbit runs for 1 hour. Then the rabbit sleeps for 4 hour. The rabbit again starts with same velocity and same acceleration. The distance for competition is 3 km.
 - a. What is periodic motion?
 - b. Will distance and displacement be equal always? Explain.
 - c. How far the rabbit ahead from tortoise after 1 hour?
 - d. Who will win the race? Explain mathematically.
2. The table of velocity and time of a car is given below:

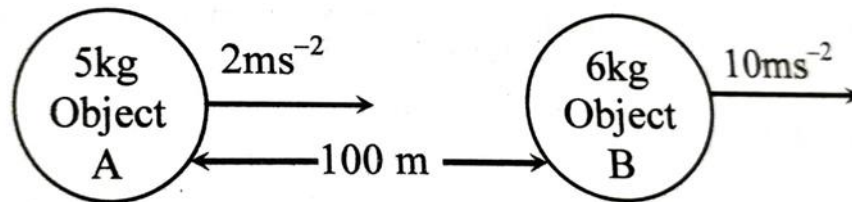
Time (s)	0	2	4	6	8	10	12	144
Velocity (ms^{-1})	4	8	12	16	18	20	10	0

- a. What is instantaneous velocity?
 - b. What do you understand by 200N force?
 - c. What is the displacement of the car in 3rd second?
 - d. Calculate the average velocity of the car.
3. A man of 50 kg started a car of 1950 kg from rest. After travelling with uniform acceleration 1st 10 seconds and with uniform velocity for the next 10 minutes, he stopped the car in 1 second after applying the brake. After 4 sec from starting the velocity is 8 ms^{-1} .
 - a. What is dimension?
 - b. The impulse of force of object is equal to the change of momentum- Explain.
 - c. Determine the traversed distance by the car in 1st 10 seconds.
 - d. If 3000N force is applied then will it be possible or not to stop the car within 1 second? Explain with mathematical analysis.
 4. An object travels 50m within 5 sec from static position with uniform acceleration.
 - a. What is acceleration?
 - b. Write two differences between vector quantity and scalar quantity?
 - c. What will be the velocity after 15 sec?
 - d. How much time does the object require to travel another 30 m? Analyze mathematically.

5. A force of 100N is applied on a stationary body of mass 5kg for 10s.
 - a. What is momentum?
 - b. What do you mean by electromagnetic force?
 - c. What is the velocity after 10s?
 - d Show velocity and distance travelled by drawing graph in 15sec.

CHAPTER-3

1.



In the figure as above the body A is moving from rest with a uniform acceleration of 2ms^{-2} and the body B is moving with uniform velocity of 10ms^{-1} along same direction. They faced with an elastic collision. Also they moved after collision with a uniform velocity.

- a. What is inertia?
 - b. Explain v-t diagram for a body moving on a frictional path.
 - c. When will the given bodies collide with each other?
 - d. After collision which object had more kinetic energy? Analyse mathematically.
2. A force 10N is applied on a rest body of mass 10,000g for 10s. Then action of force is stopped. Frictional force on the road is 1N.
 - a. What is force?
 - b. Why passenger lend in forward while break is applied on a running bus?
 - c. Determine distance in 15s.
 - d. Is it possible to move 0.4 km by the body? Analyze it mathematically.
3. A tiger starts to run with uniform acceleration 10ms^{-1} to catch a deer 50m ahead of it. Sensing the presence of tiger the deer starts to run with uniform velocity of 30ms^{-1} towards a shelter 90m away from the deer.
 - a. What is stress?
 - b. Write down the laws of motion.
 - c. When will the velocity of tiger be equal to the velocity of deer?
 - d. Can the deer reach the shelter safely? Explain your opinion mathematically.
4. Between two objects, the mass of each object is 50kg. The objects are coming from opposite direction with the velocity 15ms^{-1} and 10ms^{-1} . Suddenly they collide with each other and after collision they began to move opposite direction separately.
 - a. What is called acceleration due to gravity?
 - b. What do you mean by the spring constant of a spring is 2000ms^{-1} ? -Explain.
 - c. Find out the momentum of the second object after collision.
 - d. Will the collision mentioned in the stem be an elastic collision? Give your opening mathematically?

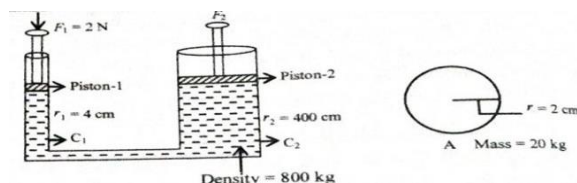
5. A cricket ball of mass 300 gm start to fall downward with a velocity 10 ms^{-1} from 100 m height. Rafiq said that if there is no air resistance then the mechanical energy of these two objects will remain same. [Consider that there us no air friction]
 - a. What is spring constant?
 - b. Approximately every energy in this earth come from sun-Explain.
 - c. Find where the kinetic energy will be 30% of of potential energy of the ball.
 - d. Show mathematically whether the statement of Rafiq is right or wrong.

CHAPTER-4

1. A motor capable of lifting water at a height of 20m in 1 minute. The power of the motor is 1.96 kw and efficiency is 50%. But when the motor is damage, a man is lifting same amount of water in same height by using a pot. The capability of the water of the pot is 20kg and mass of the man is 48kg. The man is capable of lifting same amount of water takes time 2 minutes. The mass of the pot is 2kg.
 - a. What is potential energy?
 - b. Why the nuclear reaction is not environment friendly? Explain.
 - c. Determine the potential energy of the man with full of water pot at maximum height.
 - d. Whether it will change the efficiency of the two motors when you installed a new motor and the motor is lifting same amount of water in 30s. Analyze.
2. An object with a mass of 250g Is thrown vertically upward at 49ms^{-1} velocity.
 - a. What is efficiency?
 - b. How can geothermal energy be used? Explain.
 - c. How long will the body take to reach the maximum height?
 - d. Show that, the total energy of the body before throwing it is equal to its total energy at the maximum height.
3. The power of an engine is 20 kW. This engine has raised 2000kg water in the roof of a building of height 25m in 1.75 minutes.
 - a. What is power?
 - b. Acceleration of freely falling body is not absolutely uniform? Explain.
 - c. Calculate the efficiency of the engine?
 - d. The temperature of how much amount of water can be raised at 60°C with the loss energy of the engine? Explain mathematically.
4. A man throws a cricket ball straight upward direction 58.8 ms^{-1} velocity. The mass of the ball is 250g.
 - a. What is kinetic energy?
 - b. Write down two differences between velocity and speed.
 - c. How much time it will take to come back to ground?
 - d. At what height will the potential and kinetic energy be the same? Give your opinion with mathematical logic.
5. Rony lifted up a flag of mass 200gm applying 1N force at a height of 10m which was tied with a string with the help of a pulley. Secondly, he released an object of mass 1kg tying it at the other end of the string from a from a height of 2m and succeeded to lift up the flag at the same height. Rony takes 5 second to lift up the flag.
 - a. What is uniform acceleration?
 - b. What will be the graph of uniform acceleration in (v-t) graph? Explain.
 - c. Determine the power of Rony to lift up the flag.
 - d. Will the 2nd process follow the law of conservation of energy? Explain mathematically.

CHAPTER-5

1. The ratio of the radius of larger and smaller piston in a cylinder piston system is 10:1. A force of magnitude 200 N is applied on the smaller piston. The maximum tension that the wall of the larger cylinder can tolerate is 10^4 N.
 - a. Define density of matter.
 - b. State the factors on which evaporation of a liquid depends.
 - c. Calculate the ratio of the pressure applied and experienced in the pistons.
 - d. Mathematically estimate the maximum force that can be multiplied using the cylinder piston system.
- 2.



- a. What is called potential energy?
 - b. What is Torricelli vacuum? Explain
 - c. Find out the experienced force on the piston-2.
 - d. If the object A is released in the liquid of the stem will it float or immerse? Analyze mathematically.
3. The radius of a solid rubber ball in round shape is 21cm. Mass of the ball 5kg. Density of the water 1000 kgm^{-3} . To immerse the ball into the water, a piece of iron enters into the ball. Mass of every iron piece ball is 5kg.
 - a. What is atmospheric pressure?
 - b. Why ice is floating in water? Explain.
 - c. Determine the density of the rubber ball.
 - d. Whether the ball sinks in the water when 10 iron ball entrance into the rubber ball? Analyze mathematically.
4. An ordinary hydrometer of mass 28 g floats with 3 cm of its stem out of water. The area of cross section of the stem is 0.75 cm^2
 - a. What is called intensity of sound?
 - b. Why is a green leaf seen black under red light?
 - c. Determine the total volume of water displaced by the hydrometer.
 - d. Find out the length of the stem above the surface when it floats in a liquid of density 1.4 gcm^{-3}
5. A 5 meter wire is stretched with 25 kg load, so that the wire is increased by 1 cm. The radius of the wire is 2mm and its length expansion co-efficient is $11.6 \times 10^{-5} \text{ K}^{-1}$
 - a. What is hooke's Law?
 - b. Convert 274F into Celsius scale.
 - c. At what temperature the wire will increase by 1 cm? 3
 - d. Calculate the Hooke's constant from the stem. 4

CHAPTER-6



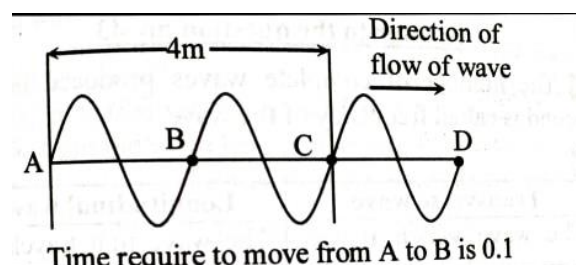
In 1st condition
 $n = 4.5 \text{ mol}$
 $V_1 = 0.1 \text{ m}^3$
 $P = 1.2 \times 10^5 \text{ Nm}^{-2}$

Fig: Helium gas contained Balloon

1. **At constant pressure the final temperature of balloon reaches to 480K. The maximum gas capacity of balloon is 0.2m. [R=8.314 Jmol⁻¹k⁻¹]**
 - a. What is evaporation?
 - b. Write the differences between specific heat and heat capacity.
 - c. Determine the co-efficient of volume expansion of the gas in 1st condition.
 - d. Later on whether the balloon will burst. Analyze with mathematical logic.
2. **Ira mixed equal masses of ice and boiling water together. As a result the whole amount of ice melts in water and the final temperature of the mixture becomes 10° C.**
 - a. What is called ice point?
 - b. Pressure is a thermometric property of matter-Explain.
 - c. Determine the specific latent heat of fusion of ice.
 - d. Will there be any change in the temperature of mixture, if the ice of temperature -5°C is mixed with boiling water of same mass?
3. **The length of a wire is 1m and its diameter is 5 x 10⁻⁴ m. When a force of 19.6N is applied on the wire its length is increased to 1.02m**
 - a. What is co-efficient of cubical expansion?
 - b. What do you mean by absolute zero temperature?
 - c. Find the young's modulus of the above given wire.
 - d. If Young's modulus of the wire is 2 x 10⁻⁵ Nm⁻² and diameter becomes half then to increase length 5%. How much force needs to apply?
4. **A steel fragment is of mass 7kg and volume 900cm⁻³ To increase the temperature from 20° to 60°C heat is applied to the steel fragment. For steel the coefficient of linear expansion is 11 x 10⁻⁶k⁻¹ and specific heat is 400 JKg⁻¹k⁻¹.**
 - a. What is melting?
 - b. Why is coldness generated during evaporation?
 - c. Determine the volume expansion of the steel for increasing the temperature mentioned in the stem.
 - d. is it possible to melt ice of 0.5 kg at 0°C temperature fully from the necessary heat that was applied to increase the temperature of the steel? Analyze mathematically.
5. **100 g water of temp 20°C and 200 g boiling water are mixed together. Specific latent heat of fusion of ice is 3,36,000 JKg⁻¹.**
 - a. State Pascal's law.
 - b. Explain that iron is more elastic than rubber.
 - c. Determine the temperature of the mixture.
 - d. Find out the mass of ice of temp - 1°C can just be melted using the heat of the mixture.

CHAPTER-7

1.



- a. What is echo?
- b. Write down two differences between longitudinal and transverse wave?
- c. Calculate the frequency of the wave.
- d. Is there any change of frequency if the wavelength is made half keeping the amplitude constant? Analyze mathematically.

2. Velocity of sound in medium A and B are 300 ms^{-1} and 340 ms^{-1} respectively. The difference between wavelengths of sound in the mediums is 0.2m .
 - a. What is frequency?
 - b. Write down two differences between longitudinal and transverse wave?
 - c. Find out the frequency of the sound in the stem.
 - d. Find out the difference between the traveled distance for 50 oscillations in medium A and B.
3. A sound wave in air has travelled 1400 m during its 7000 oscillations in 4 s . Two obstacle are placed at a distance 200 m and 350 m at a right angle from the Source.
 - a. Define frequency of a wave.
 - b. Explain the physical change experienced by a sound wave due to change in medium.
 - c. Calculate the Frequency, wavelength and speed of the sound wave.
 - d. Mathematically infer about the Time difference between the two echoes.
4. A person standing between two ten storied buildings shot a bullet from a gun. He heard the first echo after 2s and second echo after 2.15s . The temperature of air was 35°C at that time.
 - a. What is called amplitude?
 - b. The intensity of sound is 40 Wm What does it mean?
 - c. Determine the distance between the buildings.
 - d. At what time after hearing the second echo, he willhear the third echo? Explain with mathematical logic.
5. The distance between source and reflector is 20 m . At that time the temperature of air is 20°C .
 - a. What is amplitude?
 - b. The particles of transverse wave are in periodic motion- Explain.
 - c. How long it will take to travel the sound from source to reflector?
 - d. Give your opinion by the mathematical arguments if the echo will be listened or not on 30°C .

CHAPTER-8

01.

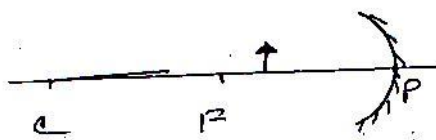


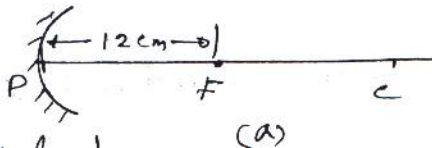
Figure - 1



Figure - 2

- a. What is Internal reflection?
- b. How can a lens be indentified without touching?
- c. Draw the image of the object in figure no. 1 and explain.
- d. Which mirror always create virtual and smaller image than object?

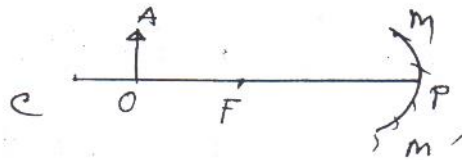
02.



- a. What is image?

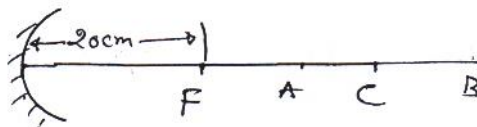
- b. What is meant by the critical angle of diamond 24° ?
- c. Where is the object set in mirror 'a' the magnification will be 1? Explain with figure.
- d. The same type of image can be found in a bone there mirrors. Explain with figure.

03.



- a. What is linear magnification?
- b. Why is the layer of mercury attached to the back of a mirror?
- c. Find out the position, nature and magnification of the object with rays.
- d. Show that, the above mirror can structure both real and virtual image.

04.



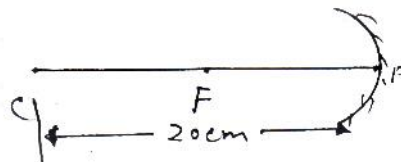
The length of the object is 10cm. The object is putting in A and B the magnification is 0.8 and 1.2

- a. What is optical centre?
- b. In irregular reflection the reflect rays are not parallel, Are the incident angle and reflected angle equal? Explain.
- c. Find out the power of the convex lens which focal length is equal the above mirror radius of curvature?
- d. In the above figure, In A and B the length of the image are equal? Explain mathematically.

05. A object is 2 cm long. It is putting in front of a mirror the magnification will be 1.5.

- a. what is image?
- b. What is meant by least distance of distinct vision?
- c. What is the length of the image in the stem mirror?
- d. What kind of mirror is the stem mirror? Structure the image with rays when $m > 1$.

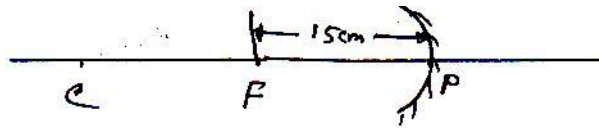
06.



The object of length is 10cm is places at a distance equal to half of the radius of curvature.

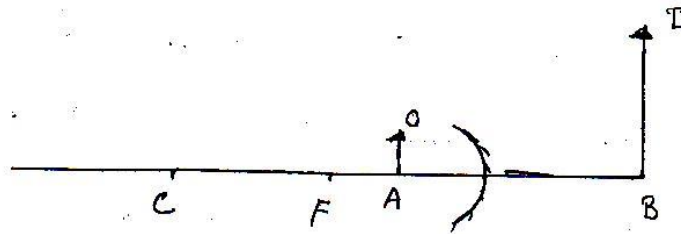
- a. What is pole of a mirror?
- b. What is meant by the linear magnification of an object is 1.25?
- c. Find out the length of the image when linear magnification is 1.5.
- d. Analyze the position, nature and size of the image with the completion of the figure?

07.



- What is mirror?
- Explain the properties of a plane mirror image?
- Calculate the radius of the curvature.
- Analyse the position, nature and size of the image when the object is between F and P.

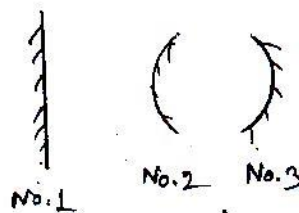
08.



In figure object $AO = 5\text{ cm}$; focal point F, pole p and centre of curvature is C.

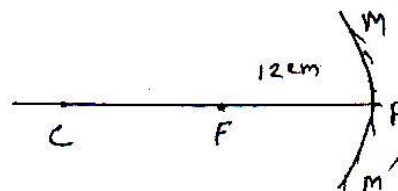
- What is centre of curvature?
- Write the properties of a plane mirror.
- If $IB = 15\text{ cm}$, then find out the linear magnification?
- Analyse the position, size and nature of an image at the above mirror is depend at the position of the object.

09.



- What is light of reflection?
- Draw a real and virtual image?
- Find out the focal length in figure-2, the spherical of the radius 200 mm.
- Analyse the image when a 2 cm length of object is situated in front of the above mirror?

10.

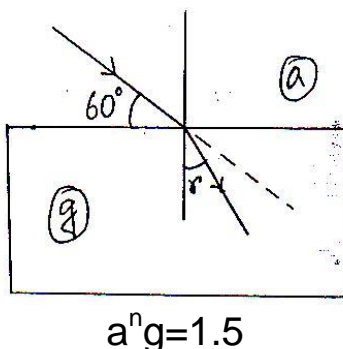


- What is linear magnification?
- Why a concave mirror is a converging mirror? Explain.
- Find out the linear magnification when a object is located 24cm from p in the above figure?
- Analyse the position and nature with the figure-1 of the image when the object is located 10 cm and 15 cm from p in the above figure?

CHAPTER-9

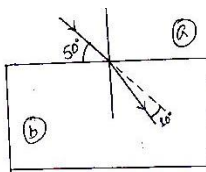
Refraction of light

01.



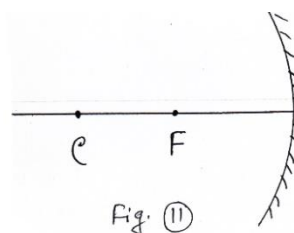
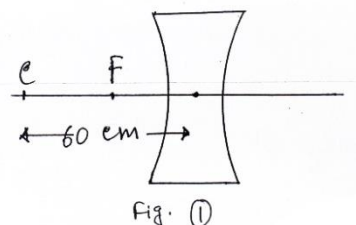
- a. What is refractive index?
- b. Why refraction of light occurs?
- c. What is the value of r in the stem? Determine.
- d. If the light ray incident obliquely on medium a from medium g then what phenomena will occur? Explain with ray diagram.

02.



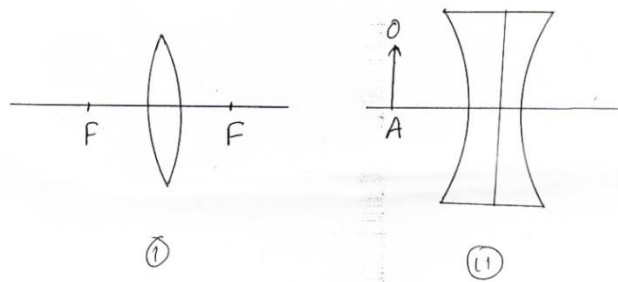
- a. What is absolute refractive index?
 - b. Explain total internal reflection with ray diagram.
 - c. Determine a^nb from stem.
 - d. If the light ray incident on medium a from medium b then for what angle which is more than incident angle the light ray comes back to the first medium.
03. Absolute refractive index of water and glass are 1.33 and 1.5 respectively.
- a. What is critical angle?
 - b. "Absolute refractive index of glass is 1.52" What does it mean?
 - c. Find the absolute refractive index of glass with respect to water.
 - d. In above stem if the light rays goes to the rarer medium from denser medium then for what angle which is more than incident angle the light ray comes back to the first medium.

04.



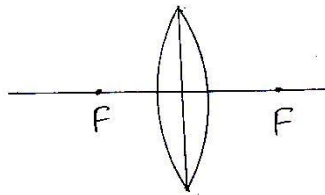
- a. What is one diopter?
- b. Why convex lens is called converging lens?
- c. Determine the power of lens (i).
- d. In figure (ii) there is formed real and virtual image. Explain with ray diagram.

05.



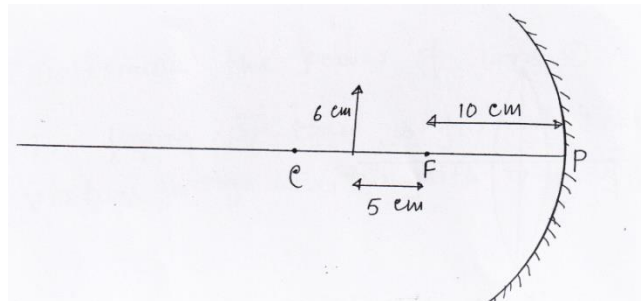
- What is optical center (in case of lens)?
- "Power of lens is $-4D$ " - What does it mean?
- In figure (ii) draw image and explain it.
- How can it be possible to solve the eye problem by using (i) and (ii) no lens? Explain with ray diagram.

06.



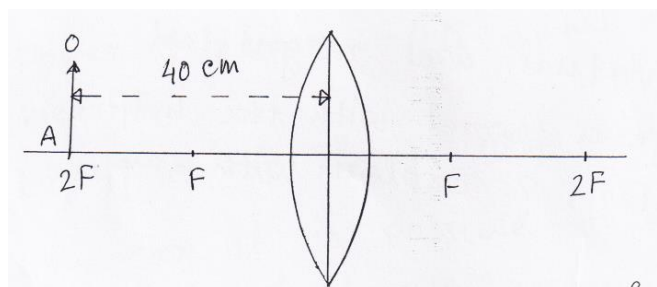
- What is optical center?
- Explain the total internal reflection of light with ray diagram.
- If the object is placed 15 cm distant from the optical center of above lens then their is formed an image which is equal and inverted to the object. Determine the power of lens.
- How can virtual and magnified image is formed with the help of above lens? Explain with ray diagram.

07.



- What is critical angle?
- Why reflection of light occurs?
- What is the magnification of the object in figure? Determine.
- In above stem there is possible to form an imaginary image. Explain the shape, nature and position of the image by ray diagram.

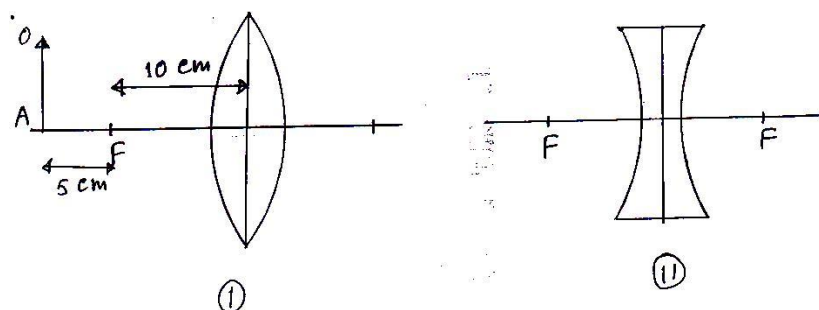
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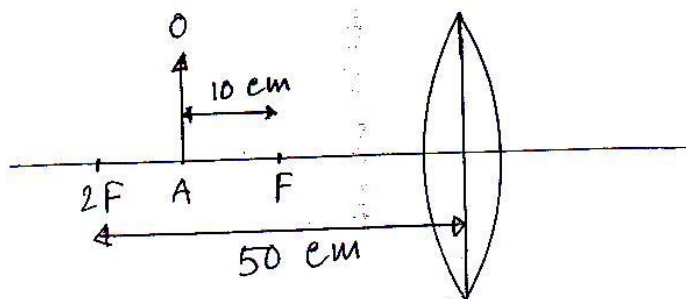
- What is optical center in case of lens?

- b. Explain snell's law in case of refraction of light.
- c. Determine the power of the above lens.
- d. How can it is possible to form a virtual, erect and magnified image. explain with ray diagram.

09.



- a. What is refractive index?
 - b. Explain the total internal reflection of light with ray diagram.
 - c. At which distance the image is formed in lens (i).
 - d. It is possible to form virtual image in both lens - Explain shape, nature and position by ray diagram.
10. Nafiz once felt that he could not see the letters in his books clearly. So he goes to doctor and doctor solve his problem by giving him a lens of power + 2D.
- a. What is lens?
 - b. The critical angle of glass is 41° with respect to air - What does it mean?
 - c. If an object is placed at 20 cm distance from Nafiz's lens then determine the distance of image.
 - d. Explain the solution of the problem of Nafiz's eye with the help of above lens by ray diagram.
11. i. The diameter of a concave is 60 cm.
- ii. For coming late Ramim goes to the last bench of his class. Thats why he could not see the letters on board clearly. He goes to doctor. Doctor solve his problem with the help of lens.
- a. What is principal axis in case of lens?
 - b. "Refractive index of glass is 1.5 with respect to air" - what does it mean?
 - c. Find the distance of the image if the object is placed at 20 cm away from the mirror (i).
 - d. How can doctor solve the problem of Rahim's eyes by lens? Explain with rays diagram.
- 12.

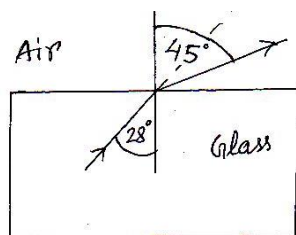


- a. What is one diopter?
 - b. "The power of a lens is 3D" - what does it mean?
 - c. Determine the position of image of obj AO.
 - d. How can the above lens is used as a simple microscope? Explain with ray diagram.
13. The information of defective eye of two persons are given below.

Person	Near point of eye	Far point of eye
A	15 cm	100 cm
B	35 cm	Infinity

- What is optical center?
- Write down the uses of optical fiber in case of medical science.
- What is the power of the lens of person A? Determine it.
- Find the solution of the problem of eye of person B by lens. Explain with ray diagram.

14.

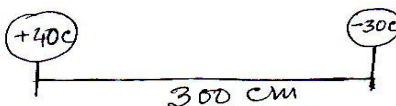


- What is absolute refractive index?
- "The power of a lens - 3D" - What does it mean?
- What is the velocity of light in air? Determine it.
- For what change of angle of incidence of the refracted ray goes along the surface of separation. Explain mathematically.

CHAPTER-10

Static Electricity

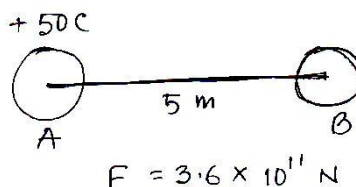
01.



[Coulomb's constant, $C = 9 \times 10^9 \text{ NM}^2\text{C}^{-2}$]

- What is called Electric potential?
- Why is the electric current decrease, when internal resistance increase?
- Find the amount of force between A and B.
- Where electric field intensity will be equal along the connecting line of A and B? Analyze.

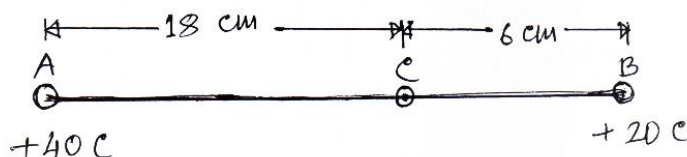
02.



Here A and B are identical in size and in element $C = 9 \times 10^9 \text{ NM}^2\text{C}^{-2}$.

- What is electric lines of force?
- Explain is reason to create a neutral point between two same charges.
- Calculate the electric intensity at the point of 'B' due to 'A'.
- If 'A' and 'B' are connected by a conducting wire then in which direction electron will flow? Analyze it.

03.

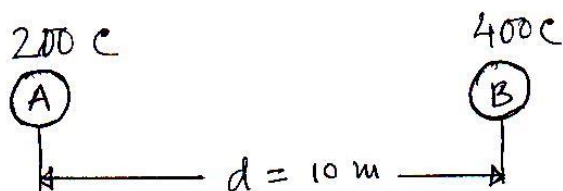


Charge A and B are placed in air medium.

- What is electric potential?
- 220v-60w is written in a electric bulb. Explain the meaning.

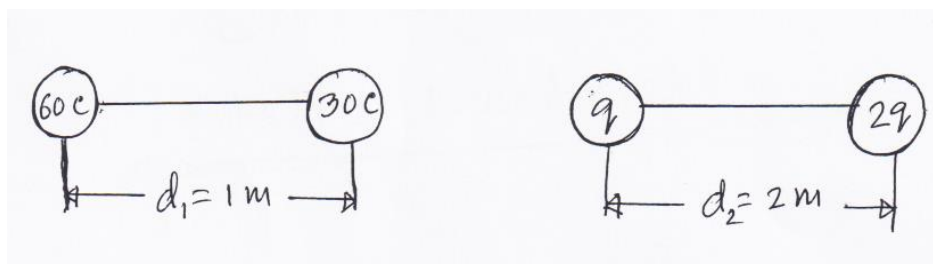
- c. Find out the amount of force acting between the charges A and B.
- d. If a unit positive charge is placed at the point C, for which charge the intensity at C will be greater? Explain mathematically.

04.



200J and 300J work are done to bring +5C charge from infinity to the electric field of A and B respectively.

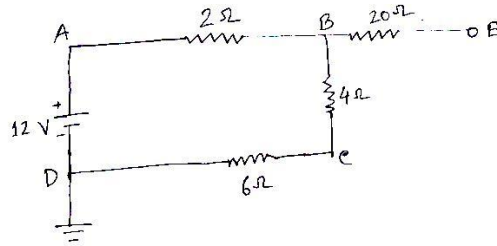
- a. Write down the coulomb's law.
 - b. Potential of a point charge will get decreased with the increase of distance in an electric field - explain.
 - c. Determine the force between A and B.
 - d. If A and B are connected with a conducting wire determine the direction of flow of electron with mathematical logic.
05. Two charged bodies of 7.29C and 12.25C are placed at a distance of 700cm in air. There is a point 'D' between them where the electric intensity is Zero.
- a. What is called electric induction?
 - b. There is no direct connection between the electric line and electric pillar - explain.
 - c. Determine the force between the charged bodies.
 - d. 'D' is whether the middle point or not between them - explain with mathematical logic.
06. A and B are two charged body and C is a neutral body. The charge of A and B are $-5C$ and $120C$ respectively. The electric intensity of a point 'X' is $2NC^{-1}$ for B which is nearer to A.
- a. What is electric energy?
 - b. Within resistance and resistivity which term is dependent on the physical state?
 - c. Find the force on point 'X' applied by B.
 - d. It is possible to convert object C into a negatively charged object by the object A and B due to induction? Explain with logic.
- 07.



- a. What is electric potential?
- b. Write down four usages of statically electricity.
- c. Find F_1 from stem.
- d. For which value of q, $F_2 = 4F_1$? Explain with mathematical logic.

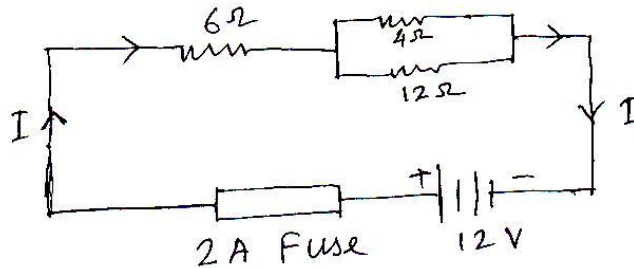
CHAPTER-11 Current Electricity

01.



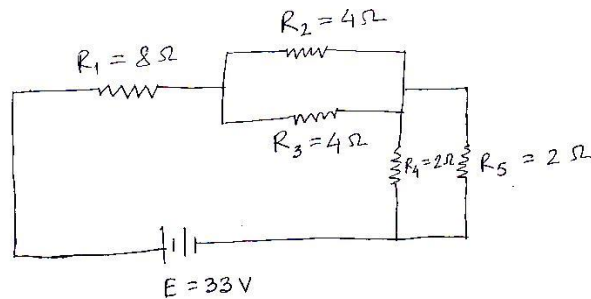
- What is capacitor?
- What is meant by the electric intensity at any point of an electric field 120NC^{-1} ? Explain.
- Calculate the total current of the above circuit.
- Determine the voltage at the point E and of the above circuit.

02.



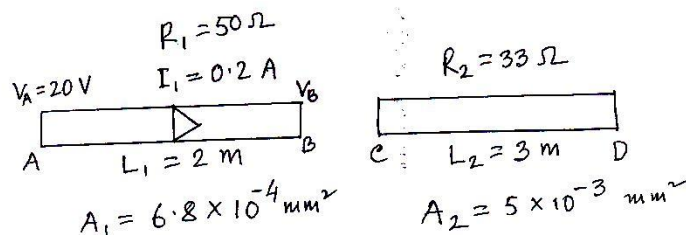
- What is electric circuit?
- How to reduce system loss? Explain.
- Determine equivalent resistance the circuit.
- If all the resistances the stem are connector in parallel, will the fuse k burnt for the produced electricity. Analyze mathematic.

03.



- What is called electric capacitor?
- Explain the change of resistance of a copper wire if it is elongated by pulling uniformly.
- Determine the equivalent resistance of the circuit.
- Which one of R_1 , R_2 and R_4 is of more power? Explain with mathematical logic.

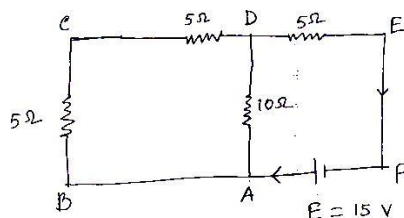
04.



- What is called electromotive force?

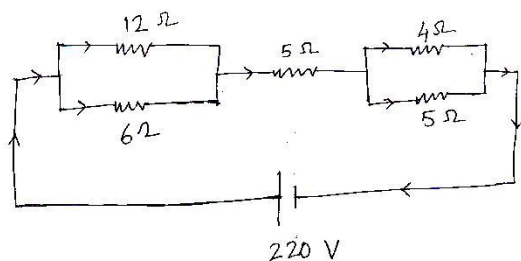
- b. How are the area of the cross section and resistance of conductor related? Explain.
- c. Determine V_B .
- d. The conductivity of the material of which wire AB and CD is more? Explain with mathematical logic.

05.



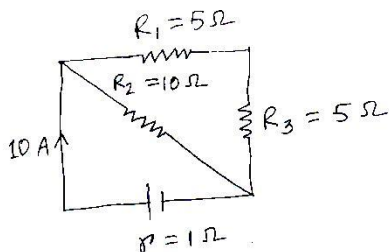
- a. What is electric energy?
- b. Between resistance and resistivity which one is depended on physical of mauer.
- c. Find out the energy spent by the cell in 5 minutes.
- d. Will the potential difference between A & D and D & E be equal? Give your opinion with mathematical argument.

06.



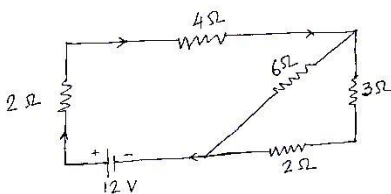
- a. What is semiconductor?
- b. What is meant by 220V-60W written in a bulb?
- c. Determine the equivalent resistance of the above circuit.
- d. How are the resistance of the circuit of stem rearranged so that the flow of current will be 12.98 A? Draw the circuit by analyzing mathematically.

07.



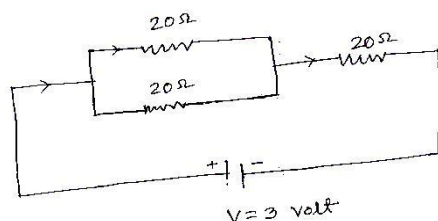
- a. Write down the Ohm's Law.
- b. Write down four differences between resistance and resistivity.
- c. Determine the difference between E and V. (Where E and V represents usual symbol.)
- d. Is it possible to get double electric current by rearranging the resistances? Explain with mathematical logic.

08.



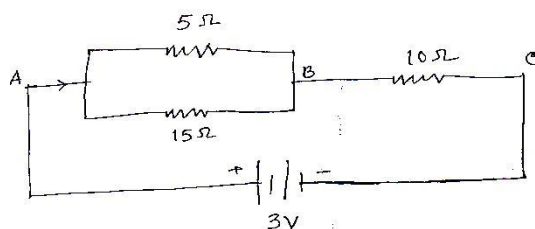
- What is conductor?
- Explain why more current flows through the wider wire in compare to narrow wire?
- Calculate equivalent resistance of the given circuit.
- What amount of money is to pay as electric bill for one month if the given circuit run 6 hours per day? (Price per unit Tk. 5, 1 month = 30 days).

09.



- What is insulator?
- What is meant by 10 coulomb charge?
- Find the equivalent resistance of the above circuit.
- Whether the electric current through all the resistances in the circuit are equal or not. Explain with mathematical logic.

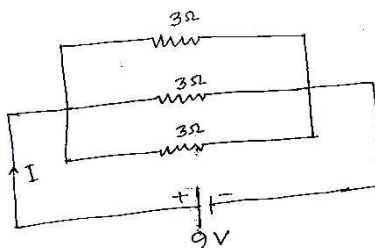
10.



Potential difference between B and C point is 2.2V.

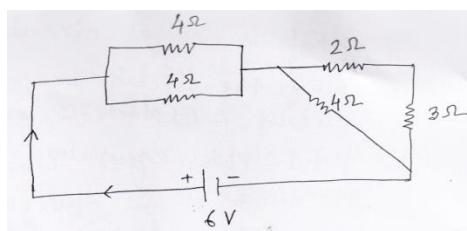
- What is charge?
- Convert 1 KWH into Joule?

11.



- What is resistance?
- "The specific resistance of copper is $1.5 \times 10^{-4} \pi \text{ m}$ " - what does it mean?
- Find the equivalent resistance of the circuit.
- How can you arrange the given resistance to get a electric current 2A without changing the value of resistances? Explain mathematically.

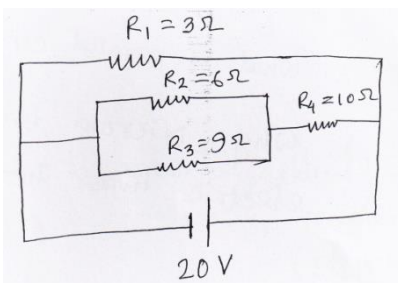
12.



- What is conductivity?
- Why does the resistance increased due to increase of temperature - Explain it.
- Find the equivalent resistance of the circuit.

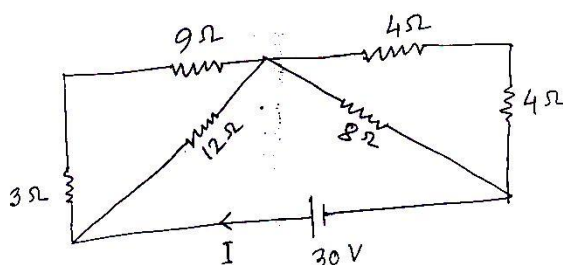
- d. If all the resistances are connected in parallel then what will be the change of electric current? Explain mathematically.

13.



- What is series circuit?
- Why the circuit breaker is used in circuit? Explain.
- Find the equivalent resistance of the circuit.
- Find the electric current passes through R_4 resistance.

14.

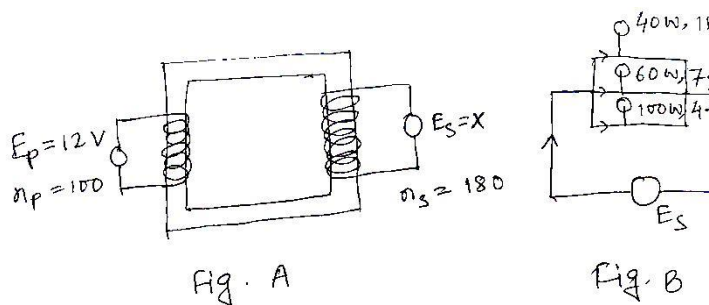


- What is parallel circuit?
- Why Nicrom wire is used in electric heater?
- Find the equivalent resistance of the circuit.
- Find the electric current passes through 12Ω resistance.

CHAPTER-12 **Magnetic Effects of Current**

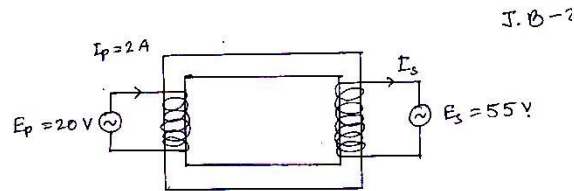
- The ratio of the number of turns of primary and secondary coil of a transformer is 1:50. The electric current and voltage of the primary coil is 5A 220V respectively.
 - Find $E_p:E_s$ according to stem.
 - From the stem mathematically show the electric power the primary and secondary coil of the transformer remain constant.

02.



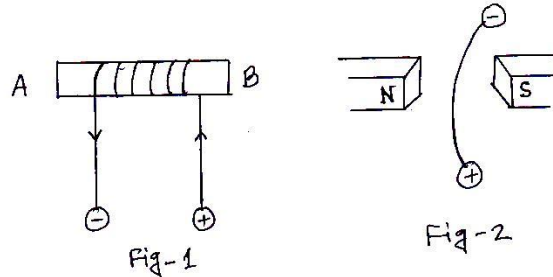
- Find the value of X from fig: A.
- If all bulbs run at a time with the obtained value of X in fig: B, is it possible to get the maximum light? Give your opinion through mathematical analysis.

03.



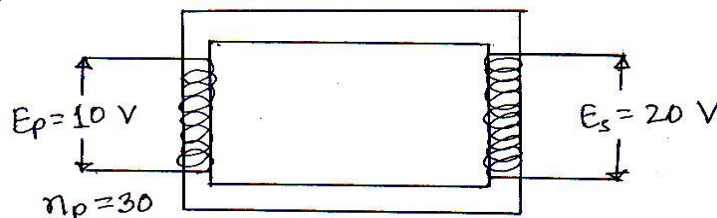
- c. Determine I_s
- d. If for E_p electrical source, inst of AC, DC is chosen, explain the transformer will work.

04.



- c. Which one is north pole in Fig-1? Explain.
- d. In which direction will the wire in git acquire resultant force? Explain it.

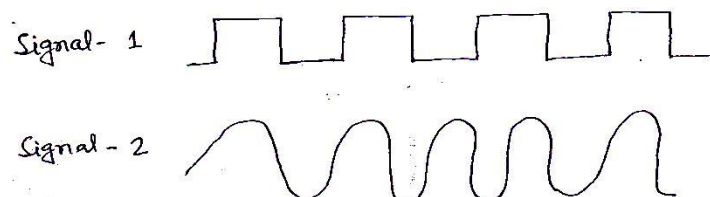
05.



- c. Calculate the ratio of current flor between primary and secondary coil the given divice.
 - d. Analyze the importance of the given device to supply electric current.
06. 450V, 100 turns and 1.5 A current are available in the prin coil. 6.15A current is available in the secondary coil of a transfor.
- a. What is called electric induction?
 - b. How can the magnetic field intensis produced in a solenoid be increased?
 - c. Determine the electromotive force of the secondary coil.
 - d. Is it possible or not to drive a electric motor which power is 1.5 KW by given transformer, prove it by the mathematical analysis.

CHAPTER-13 **Modern Physics and electronics**

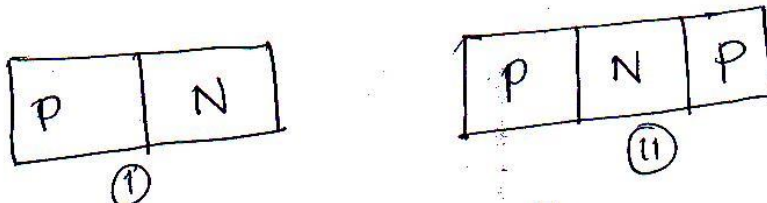
01.



- a. What is half life?
- b. What can be done with the help of the internet?

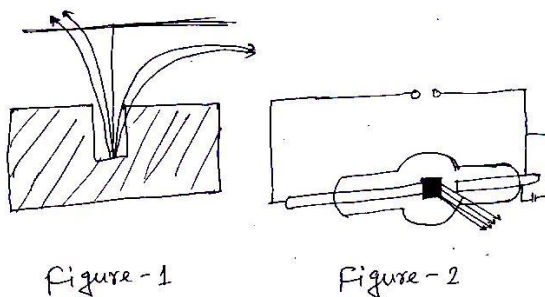
- c. Explain the action of signal-2.
- d. Signal-1 is more convenient than signal-2 explain.

02.



- a. What is p-type?
- b. Every semiconductor is chargeless. Why?
- c. Why figure (i) is called rectifier? Explain.
- d. How does the figure (ii) influence the circuit's signal.

03.

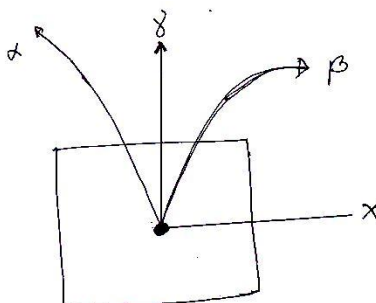


- a. What is radioactivity?
- b. How can digital signal can be converted to analog signal?
- c. How X-Ray can created by figure-2. Explain.
- d. In figure-2 rays emerged different paths - Explain.

04. The phenomenon of emission of radioactive rays or particles from an element is called radioactivity. Different instrument of our uses such as colour TV, Mobile phone etc also emits such kind of rays.

- a. Due to the radioactive decay radium metal converted to which thing?
- b. Digital signal is more convenient than analog signal - Explain.
- c. Explain the application of above rays.
- d. Discuss the harmful effects of the rays mentioned in human life.

05.



- a. What is the half life of radioactive element?
- b. Why PN - Junction called as a rectifier?
- c. Compare the ray properties of three rays in figure.
- d. The substance like X is a blessing or a curse in our lives? Explain.

CHAPTER-14

Physics to save life

01. Ahona went to doctor for sever stomachache. At the end of the examination, doctor advised to have x-rays in doubt about stone in bile. After doing x-ray it is noticed to stone in bile.
 - a. What is isotope?
 - b. Why 'dye' is used during angiogram?
 - c. How can x-ray produced? Explain.
 - d. Is it possible to identify the Ahona's stone in bile through any other treatment method? Explain with logic.
02. Ultrasonography experiment developed the modern medical treatment. Through this, it is possible to identify various complex diseases easily and quickie. It is used to minitor internal organs and diagnose diseases in the body.
 - a. What is the elaborate form of CT Scan.
 - b. What is the contribution of optical fibre in endoscopy?
 - c. Describe the used of the text method of above stem.
 - d. Explain how the above process is completed.
03. Rima's uncle's body is seen in various places like tumor swelling. The doctor advised him to do radiotherapy.
 - a. What is the elaborate form of ECG?
 - b. "Human body is and organic device" - Explain.
 - c. Explain the reasons for swelling in different parts of the body of Rima's uncle.
 - d. What is the reason the doctor give him radiotherapy?
04. Karim is suffering form brain problems including headache. The doctor advised him to do CT Scan.
 - a. Write down the elaborate form of ETT.
 - b. Write down difference between x-rays and general light.
 - c. Explain the importance of diagnosis of above device.
 - d. Why doctor advise him to CT scan instead of X-ray? Explain your opinion.