

Xth phy- book back and interior and solved and numerical problem questions

Unit-1. LAWS OF MOTION

2 mark:

1. Define inertia and give its types.
2. State Newton's first, second and third law of motion
3. What are the types of force?
4. Define linear momentum
5. Define Impulse
6. Define Torque or moment of a force
7. State laws of gravitation
8. What is meant by weightlessness?
9. What is apparent weight?
10. State principle of moments
11. If a 5 N and 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.
12. Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?
13. While catching a cricket ball the fielder lowers his hands backwards. Why?
14. How does an astronaut float in a space shuttle?
15. Define moment of a couple and give its unit.
16. Define equilibrant.
17. Write the examples of Newton's third law.
18. State the law of conservation of linear momentum.

4 mark:

1. Explain the types of force
2. Write the application of Torque
3. Derive the relation between g and G
4. Explain the different possibilities of the apparent weight 'R' of the person that arise, depending on the motion of the lift; upwards, downwards, rest and falling down freely.
5. Difference between mass and weight
6. Give the applications of universal law gravitation.
7. Describe rocket propulsion.

7 mark:

1. What are the types of inertia? Give an example for each type.
2. State Newton's laws of motion?
3. Deduce the equation of a force using Newton's second law of motion.
4. State and prove the law of conservation of linear momentum.
5. State the universal law of gravitation and derive its mathematical expression.

Unit-2. OPTICS

2 mark:

1. What is refractive index?
2. State Snell's law.
3. Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and 2F.
4. Define dispersion of light
5. State Rayleigh's law of scattering
6. Differentiate convex lens and concave lens.
7. What is power of accommodation of eye?
8. What are the causes of 'Myopia'?
9. What is Tyndall scattering or Tyndall effect?
10. What is Raman line? Explain their types.
11. Difference between a convex and concave lens
12. What are the uses of convex lens and concave lens?
13. Define power of a lens.
14. What are the uses of simple microscope?
15. What are the advantages and disadvantages of the telescope?
16. Why does the sky appear in blue colour?
17. Why are traffic signals red in colour?
18. What is meant by refraction of light?
19. What are the types of scattering?
20. What is Rayleigh scattering?
21. What is Raman scattering or Raman effect?

4 mark:

1. List any five properties of light
2. Differentiate the eye defects: Myopia and Hypermetropia.
3. What are the advantages and disadvantages of telescope?
4. Explain the structure of human eye.
5. Draw a neat diagram human eye and explain the working of human eye.
6. Explain the simple microscope.
7. What is the type of telescope? Explain.

7 mark:

1. Explain the rules for obtaining images formed by a convex lens with the help of ray diagram.
2. Explain the construction and working of a 'Compound Microscope'.
3. Draw a ray diagram to show the image formed by a convex lens when the object is placed i) At infinity ii) Beyond or before C ($>2F$) iii) At C or $2F$ iv) between F and $2F$ or C v) At F
4. Draw a neat diagram human eye and explain the structure of the human eye.

Unit-3. THERMAL PHYSICS

2 mark:

1. Define one calorie.
2. What is co-efficient of cubical expansion?
3. State Boyle's law
4. State-the law of volume
5. Distinguish between ideal gas and real gas.
6. What is co-efficient of real expansion?
7. What is co-efficient of apparent expansion?
8. What is meant by a thermal equilibrium?
9. Define Thermal energy.
10. Define one kilocalorie.
11. What is meant by thermodynamic temperature?
12. Define linear, areal and cubical expansions.

4 mark:

1. Write the characteristic features of heat energy transfer.
2. Distinguish between linear, areal and superficial expansion.

7 mark:

1. Derive the ideal gas equation.
2. Explain the experiment of measuring the real and apparent expansion of a liquid with a neat diagram.
3. Explain the three fundamental laws which connect the relation between pressure, volume and temperature.

Unit-4. ELECTRICITY

2 mark:

1. Define electric current
2. Define unit of electric current
3. Define electric potential and potential difference.
4. Define resistance of a conductor.
5. Define unit of resistance of a conductor.
6. Difference between series and parallel circuit.
7. State Joule's law of heating.
8. Define electric power?
9. Define unit of electric power?
10. What is the role of the earth wire in domestic circuits?
11. State Ohm's law.
12. What happens to the resistance, as the conductor is made thicker?
13. Why is tungsten metal used in bulbs, but not in fuse wires?
14. Name any two devices, which are working on the heating effect of the electric current.

4 mark:

1. Distinguish between the resistivity and conductivity of a conductor.
2. Explain the equivalent resistance of a series.
3. Explain the equivalent resistance of a parallel.
4. Write the applications of heating effect.
5. Write the merits of a LED pulb.
6. Write the advantages of LED television.
7. Explain the series connection of parallel resistors.

8. Explain the parallel connection of series resistors.

7 mark:

1. With the help of a circuit diagram derive the formula for the resultant resistance of three resistances connected: a) in series and b) in parallel

2. a) What is meant by electric current?

b) Name and define its unit.

c) Which instrument is used to measure the electric current? How should it be connected in a circuit?

3. a) State Joule's law of heating.

b) An alloy of nickel and chromium is used as the heating element. Why?

c) How does a fuse wire protect electrical appliances?

4. Explain about domestic electric circuits. (Circuit diagram not required)

5. a) What are the advantages of LED TV over the normal TV?

b) List the merits of LED bulb.

6. A piece of wire having a resistance R is cut into five equal parts.

a) How will the resistance of each part of the wire change compared with the original resistance?

b) If the five parts of the wire are placed in parallel, how will the resistance of the combination change?

c) What will be ratio of the effective resistance in series connection to that of the parallel connection?

Unit-5. ACOUSTICS

2 mark:

1. What is a longitudinal wave?

2. What is the audible range of frequency?

3. What is the minimum distance needed for an echo?

4. What will be the frequency sound having 0.20 m as its wavelength, when it travels with a speed of 331 ms⁻¹?

5. Name three animals, which can hear ultrasonic vibrations.

6. Distinguish between the sound and light waves.

7. Define Laws of reflection.

8. What are the difference between the sound and light waves?

9. Define Doppler Effect.

10. Define echo.

4 mark:

1. Why does sound travel faster on a rainy day than on a dry day?
2. Why does an empty vessel produce more sound than a filled one?
3. Air temperature in the Rajasthan desert can reach 46°C . What is the velocity of sound in air at that temperature? ($V_0 = 331 \text{ ms}^{-1}$).
4. Explain why, the ceilings of concert halls are curved.
5. Mention four cases in which there is no Doppler effect in sound?
6. Write the categories of sound waves based on their frequencies.
7. Explain the velocity of sound waves.
8. What are the applications of reflection of sound?
9. Explain the application of Doppler Effect.

7 mark:

1. What are the factors that affect the speed of sound in gases?
2. What is mean by reflection of sound?

Explain:

- a) Reflection at the boundary of a rarer medium
 - b) Reflection at the boundary of a denser medium
 - c) Reflection at curved surfaces
3. a) What do you understand by the term 'ultrasonic vibration'?
 - b) State three uses of ultrasonic vibrations.
 - c) Name three animals which can hear ultrasonic vibrations.
4. What is an echo?
 - a) State two conditions necessary for hearing an echo.
 - b) What are the medical applications of echo?
 - c) How can you calculate the speed of sound using echo?
5. Explain the measuring velocity of sound by echo method.
 6. Explain the Doppler Effect.

Unit-6. NUCLEAR PHYSICS

2 mark:

1. Write any three features of natural and artificial radioactivity.
2. Define critical mass.
3. Define one roentgen.
4. State Soddy and Fajan's displacement law.

5. Give the function of control rods in a nuclear reactor.
6. In Japan, some of the new born children are having congenital diseases. Why?
7. Mr. Ramu is working as an X - ray technician in a hospital. But, he does not wear the lead Aprons. What suggestion will you give to Mr. Ramu?
8. What is stellar energy?
9. Give any two uses of radio isotopes in the field of agriculture?
10. Define radioactivity.
11. Define alpha decay, beta decay, gamma decay.
12. Define nuclear fission and fusion.
13. X – rays should not be taken often'. Give the reason.
14. Cell phone towers should be placed far away from the residential area – why?

4 mark:

1. Write the features of nuclear fission and nuclear fusion.
2. What are the uses of medical application of isotopes?
3. Explain the atom bomb.
4. Explain the safety measures are permitted range and preventive measures.
5. Write the uses of nuclear reactor.
6. State Soddy and Fajan's displacement law.
7. Explain the conditions necessary for nuclear fusion.

7 mark:

1. Explain the process of controlled and uncontrolled chain reactions.
2. Compare the properties of alpha, beta and gamma radiations.
3. What is a nuclear reactor? Explain its essential parts with their functions.
4. Explain the uses of radioactivity.

All units solved and numerical problems and hot questions

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Book back problem questions:

UNIT-1

1. Calculate the velocity of a moving body of mass 5 kg whose linear momentum is 2.5 kg m s^{-1} .
2. A door is pushed at a point whose distance from the hinges is 90 cm, with a force of 40 N. Calculate the moment of the force about the hinges.
3. At what height from the centre of the Earth the acceleration due to gravity will be $1/4^{\text{th}}$ of its value as at the Earth.

UNIT-2

4. Light rays travel from vacuum into a glass whose refractive index is 1.5. If the angle of incidence is 30° , calculate the angle of refraction inside the glass.
5. A beam of light passing through a diverging lens of focal length 0.3m appear to be focused at a distance 0.2m behind the lens. Find the position of the object.
6. A person with myopia can see objects placed at a distance of 4m. If he wants to see objects at a distance of 20m, what should be the focal length and power of the concave lens he must wear?
7. For a person with hypermetropia, the near point has moved to 1.5m. Calculate the focal length of the correction lens in order to make his eyes normal.

UNIT-3

8. A container whose capacity is 70 ml is filled with a liquid up to 50 ml. Then, the liquid in the container is heated. Initially, the level of the liquid falls from 50 ml to 48.5 ml. Then we heat more, the level of the liquid rises to 51.2 ml. Find the apparent and real expansion.
9. Keeping the temperature as constant, a gas is compressed four times of its initial

Pressure. The volume of gas in the container changing from 20cc (V_1 cc) to V_2 cc. Find the final volume V_2 .

UNIT-4

10. A charge of 12 coulomb flows through a bulb in 5 second. What is the current through the bulb?

11. The work done in moving a charge of 10 C across two points in a circuit is 100 J. What is the potential difference between the points?

12. Calculate the resistance of a conductor through which a current of 2 A passes, when the potential difference between its ends is 30 V.

13. The resistance of a wire of length 10 m is 2 ohm. If the area of cross section of the wire is $2 \times 10^{-7} \text{ m}^2$, determine its (i) resistivity (ii) conductance and (iii) conductivity.

14. Three resistors of resistances 5 ohm, 3 ohm and 2 ohm are connected in series with 10 V battery. Calculate their effective resistance and the current flowing through the circuit.

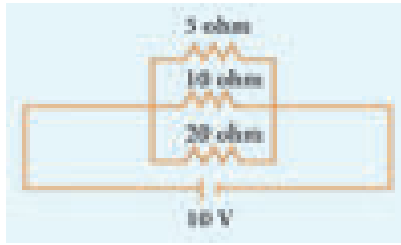
15. An electric heater of resistance 5Ω is connected to an electric source. If a current of 6 A flows through the heater, then find the amount of heat produced in 5 minutes.

16. Two bulbs are having the ratings as 60 W, 220 V and 40 W, 220 V respectively. Which one has a greater resistance?

17. Calculate the current and the resistance of a 100 W, 200 V electric bulb in an electric circuit.

18. In the circuit diagram given below, three resistors R_1 , R_2 and R_3 of 5Ω , 10Ω and 20Ω respectively are connected as shown.

Calculate:



- A) Current through each resistor
- B) Total current in the circuit
- C) Total resistance in the circuit

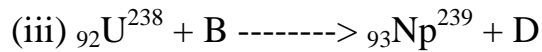
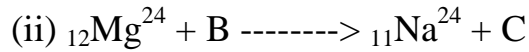
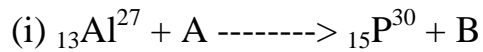
21. Three resistors of 1Ω , 2Ω and 4Ω are connected in parallel in a circuit. If a 1Ω resistor draws a current of 1 A , find the current through the other two resistors.
22. A source producing a sound of frequency 90 Hz is approaching a stationary listener with a speed equal to $(1/10)^{\text{th}}$ of the speed of sound. What will be the frequency heard by the listener?

UNIT-5

23. A source producing a sound of frequency 500 Hz is moving towards a listener with a velocity of 30 ms^{-1} . The speed of the sound is 330 ms^{-1} . What will be the frequency heard by listener?
24. A source of sound is moving with a velocity of 50 ms^{-1} towards a stationary listener. The listener measures the frequency of the source as 1000 Hz . what will be the apparent frequency of the source when it is moving away from the listener after crossing him? (velocity of sound in the medium is 330 ms^{-1})
25. A source and listener are both moving towards each other with a speed $v/10$ where v is the speed of sound. If the frequency of the note emitted by the source is f , what will be the frequency heard by the listener?
26. At what speed should a source of sound move away from a stationary observer so that observer finds the apparent frequency equal to half of the original frequency?

UNIT-6

27. Identify A, B, C, and D from the following nuclear reactions.



28. A radon specimen emits radiation of 3.7×10^3 GBq per second. Convert this disintegration in terms of curie. (One curie = 3.7×10^{10} disintegration per second)

29. ${}_{92}\text{U}^{235}$ experiences one α - decay and one β - decay. Find number of neutrons in the final daughter nucleus that is formed.

30. Calculate the amount of energy released when a radioactive substance undergoes fusion and results in a mass defect of 2 kg.

NUMERICAL PROBLEM QUESTIONS:

UNIT-1

1. Two bodies have a mass ratio of 3:4 The force applied on the bigger mass produces an acceleration of 12 ms^{-2} . What could be the acceleration of the other body, if the same force acts on it.

2. A ball of mass 1 kg moving with a speed of 10 ms^{-1} rebounds after a perfect elastic collision with the floor. Calculate the change in linear momentum of the ball.

3. A mechanic unscrew a nut by applying a force of 140 N with a spanner of length 40 cm. What should be the length of the spanner if a force of 40 N is applied to unscrew the same nut?

4. The ratio of masses of two planets is 2:3 and the ratio of their radii is 4:7 Find the ratio of their accelerations due to gravity.

UNIT-2

5. An object is placed at a distance 20cm from a convex lens of focal length 10cm. Find the image distance and nature of the image.
6. An object of height 3cm is placed at 10cm from a concave lens of focal length 15cm. Find the size of the image.

UNIT-3

7. Find the final temperature of a copper rod. Whose area of cross section changes from 10 m^2 to 11 m^2 due to heating. The copper rod is initially kept at 90 K. (Coefficient of superficial expansion is $0.0021 /\text{K}$)
8. Calculate the coefficient of cubical expansion of a zinc bar. Whose volume is increased 0.25 m^3 to 0.3 m^3 due to the change in its temperature of 50 K.

UNIT-4

9. An electric iron consumes energy at the rate of 420 W when heating is at the maximum rate and 180 W when heating is at the minimum rate. The applied voltage is 220 V. What is the current in each case?
10. A 100 watt electric bulb is used for 5 hours daily and four 60 watt bulbs are used for 5 hours daily. Calculate the energy consumed (in kWh) in the month of January.
11. A torch bulb is rated at 3 V and 600 mA. Calculate it's
a) power b) resistance c) energy consumed if it is used for 4 hour.
12. A piece of wire having a resistance R is cut into five equal parts.
a) How will the resistance of each part of the wire change compared with the original resistance?
b) If the five parts of the wire are placed in parallel, how will the resistance of the combination change?

c) What will be ratio of the effective resistance in series connection to that of the parallel connection?

13. A sound wave has a frequency of 200 Hz and a speed of 400 ms^{-1} in a medium. Find the wavelength of the sound wave.

14. The thunder of cloud is heard 9.8 seconds later than the flash of lightning. If the speed of sound in air is 330 ms^{-1} , what will be the height of the cloud?

15. A person who is sitting at a distance of 400 m from a source of sound is listening to a sound of 600 Hz. Find the time period between successive compressions from the source?

16. An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the transmission and reception of the wave is 1.6 seconds. What is the depth of the sea, if the velocity of sound in the seawater is 1400 ms^{-1} ?

17. A man is standing between two vertical walls 680 m apart. He claps his hands and hears two distinct echoes after 0.9 seconds and 1.1 second respectively. What is the speed of sound in the air?

18. Two observers are stationed in two boats 4.5 km apart. A sound signal sent by one, under water, reaches the other after 3 seconds. What is the speed of sound in the water?

19. A strong sound signal is sent from a ship towards the bottom of the sea. It is received back after 1s. What is the depth of sea given that the speed of sound in water 1450 ms^{-1} ?

UNIT-6

20. ${}_{88}\text{Ra}^{226}$ experiences three α - decay. Find the number of neutrons in the daughter element.

21. A cobalt specimen emits induced radiation of 75.6 millicurie per second. Convert this disintegration in to becquerel (one curie = 3.7×10^{10} Bq)

HOT QUESTIONS:

UNIT-1

1. Two blocks of masses 8 kg and 2 kg respectively lie on a smooth horizontal surface in contact with one other. They are pushed by a horizontally applied force of 15 N. Calculate the force exerted on the 2 kg mass.
2. A heavy truck and bike are moving with the same kinetic energy. If the mass of the truck is four times that of the bike, then calculate the ratio of their momenta.
(Ratio of momenta = 2:1)
3. "Wearing helmet and fastening the seat belt is highly recommended for safe journey" Justify your answer using Newton's laws of motion.

UNIT-2

4. While doing an experiment for the determination of focal length of a convex lens, Raja Suddenly dropped the lens. It got broken into two halves along the axis. If he continues his experiment with the same lens,
(a) can he get the image? (b) Is there any change in the focal length?
5. The eyes of the nocturnal birds like owl are having a large cornea and a large pupil. How does it help them?

UNIT-3

6. If you keep ice at 0°C and water at 0°C in either of your hands, in which hand you will feel more chillness? Why?

UNIT-4

7. Two resistors when connected in parallel give the resultant resistance of 2 ohm; but when connected in series the effective resistance becomes 9 ohm. Calculate the value of each resistance.

8. How many electrons are passing per second in a circuit in which there is a current of 5 A?
9. A piece of wire of resistance 10 ohm is drawn out so that its length is increased to three times its original length. Calculate the new resistance.

UNIT-5

10. Suppose that a sound wave and a light wave have the same frequency, then which one has a longer wavelength?
- a) Sound b) Light c) both a and b d) data not sufficient
11. When sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound remain the same. Do you hear an echo sound on a hotter day? Justify your answer.

UNIT-6

12. Mass number of a radioactive element is 232 and its atomic number is 90. When this element undergoes certain nuclear reactions, it transforms into an isotope of lead with a mass number 208 and an atomic number 82. Determine the number of alpha and beta decay that can occur.
13. 'X – rays should not be taken often'. Give the reason.
14. Cell phone towers should be placed far away from the residential area – why?

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