ICSE · CLASS 10 · PHYSICS

ICSE Class 10 Physics Important Questions 2027

165 question patterns that repeated across past papers · the years show every time each was asked

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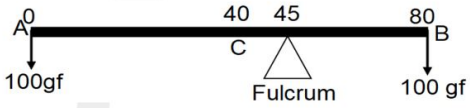
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Force, Turning Effect and Equilibrium

1. compare weights of the two halves of a non-uniform rod cut at its centre

Asked 4× · Board 2023, Sample 2025, Sample 2026, Sample 2027 · 1 marks

A metal rod AB of length 80 cm is balanced at 45 cm from the end A with 100 gf weights suspended from the two ends. If this rod is cut at the centre C, then compare the weight of AC to the weight of BC. (Use >, < or =)



2. give reason relating balance point to weights of the two halves of a rod

Asked 3× · Sample 2025, Sample 2026, Sample 2027 · 2 marks

Give a reason for your answer in (a) [comparison of the weights of AC and BC].

3. compare or find suspended weights on a wheel using the principle of moments

Asked 4× · Sample 2023, Sample 2024 · 1/2 marks

Two bags are suspended from ropes at P and Q on a wheel that can rotate around O; the wheel remains in equilibrium. State with a reason who is carrying the heavier bag.

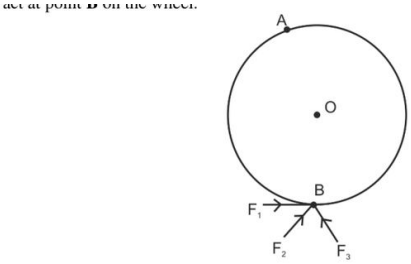
(i) [3]



4. identify which force/arrangement produces the maximum moment about a pivot

Asked 4× · Board 2023, Sample 2023, Sample 2027 · 1 marks

The diagram shows wheel O pivoted at point A. Three equal forces F1, F2 and F3 act at point B on the wheel. Which force will produce maximum moment about A?



5. sign convention of an anticlockwise moment of couple (MCQ)

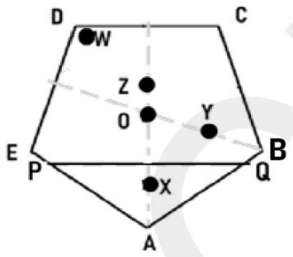
Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

A moment of couple has a tendency to rotate the body in an anticlockwise direction. The moment of couple is taken as: (a) positive (b) negative (c) maximum (d) zero

6. most probable new CG position when clay is added to a pentagon

Asked 2× · Sample 2026, Sample 2027 · 1 marks

ABCDE is a regular pentagon with its centre of gravity (CG) at O. What will be the most probable position (W, X, Y, Z or O) of the new centre of gravity if a piece of clay is attached at point A?



[Application]

7. most probable new CG position when part of a pentagon is cut off

Asked 2× · Sample 2026, Sample 2027 · 1 marks

What will be the most probable position of the new centre of gravity if the pentagon is cut along the line PQ (CG of the remaining part DCBQPE)?

8. direction of friction on a car in uniform circular motion

Asked 2× · Board 2026, Sample 2027 · 1 marks

Complete by choosing the correct answer: Friction acts _____ [tangential / radial] to a car undergoing circular motion.

9. state two factors on which the position of the centre of gravity depends

Asked 2× · Board 2026, Sample 2023 · 2 marks

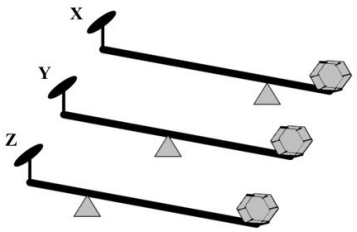
State two factors on which the position of Centre of Gravity of a body depends.

Work, Energy, Power and Machines

10. identify the class of a given lever

Asked 5× · Board 2024, Board 2025, Sample 2024, Sample 2027 · 1 marks

Three levers X, Y, Z of equal lengths are shown. Which class of lever do these belong to?



11. draw a labelled block and tackle pulley system of a given velocity ratio

Asked 5× · Board 2023, Board 2024, Board 2025, Sample 2025, Sample 2026 · 2/3 marks

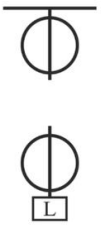
Given two pulleys, copy and complete the labelled diagram connecting the two pulleys with a tackle to obtain Velocity Ratio = 2.

(iii) Given are two pulleys. [4]

(a) Copy and complete the labelled diagram connecting the two pulleys with a tackle to obtain Velocity Ratio = 2.

(b) If Load = 48 kgf and efficiency is 80% then calculate:

1. Mechanical Advantage.
2. Effort needed to lift the load.



12. sign of work done by gravity when moving on level ground (zero)

Asked 3× · Sample 2025, Sample 2026, Sample 2027 · 1 marks

State whether the work done by gravity is positive, negative, or zero: a person walks on a levelled road.

13. sign of work done by gravity when a person climbs (negative)

Asked 3× · Sample 2025, Sample 2026, Sample 2027 · 1 marks

State whether the work done by gravity is positive, negative, or zero: a person climbs a ladder.

14. sign of work done by gravity for a body moving down a slope (positive)

Asked 3× · Sample 2025, Sample 2026, Sample 2027 · 1 marks

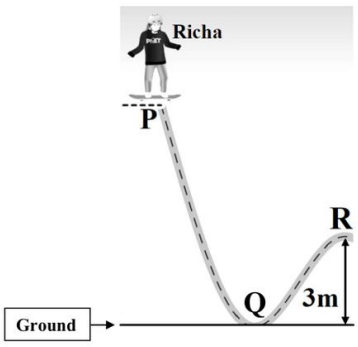
State whether the work done by gravity is positive, negative, or zero: a car in a neutral gear is coming down the slope.

15. calculate the kinetic energy of a body from its mass and speed

Asked 3× · Board 2025, Sample 2027 · 1 marks

Richa weighing 40 kgf leaves point P on her skateboard and reaches point Q on the ground with velocity 10 ms^{-1}. Calculate the kinetic energy of Richa at point Q.

(iii) [4]



16. quantity on which kinetic energy of a body depends (MCQ)

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

The kinetic energy of a given body depends on the: (a) position (b) centre of gravity (c) momentum (d) displacement

17. chain of energy conversions in a coal thermoelectric power plant (MCQ)

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

During power production in a coal-based thermoelectric power plant, the correct sequence of energy conversions taking place is: (a) heat -> mechanical -> chemical (b) heat -> mechanical -> electrical (c) chemical -> heat -> light (d) heat -> chemical -> electrical

18. match nodding of the head to its class of lever

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Match the movement of the body part to the class of lever: Nodding head.

19. match standing on toes to its class of lever

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Match the movement of the body part to the class of lever: Lifting body weight on your toes.

20. calculate the mechanical advantage of a lever from its arm lengths

Asked 2× · Sample 2024, Sample 2027 · 1 marks

Based on the lever arrangement identified in part (a), calculate the maximum mechanical advantage using the distances shown.

21. effect on kinetic energy when speed/mass is changed

Asked 3× · Board 2023, Sample 2023, Sample 2025 · 1/2 marks

Complete by choosing the correct answer: If the mass as well as the velocity of a body is doubled then the kinetic energy of the body _____ [is doubled / becomes eight times / becomes four times] the initial kinetic energy.

22. state which class of lever always has MA greater than one

Asked 2× · Sample 2025, Sample 2026 · 1 marks

Complete by choosing the correct answer: A _____ [Class II / Class III] lever will always have M.A. > 1.

23. potential energy of a load lifted by a pulley to a given height

Asked 2× · Sample 2025, Sample 2026 · 1 marks

Calculate the potential energy gained by a load of 100 kgf lifted by this pulley to a height of 5 m. ($g = 10\ ms^{-2}$)

24. energy transformation during photosynthesis (MCQ)

Asked 2× · Board 2026, Sample 2027 · 1 marks

The energy transformation taking place during photosynthesis in plants is: (a) heat to chemical (b) chemical to light (c) light to chemical (d) chemical to heat

25. velocity ratio of a block and tackle from the number of pulleys (MCQ)

Asked 2× · Board 2026, Sample 2027 · 1 marks

The Velocity Ratio (V.R.) of a block and tackle system of three pulleys with the effort in upward direction is: (a) 1 (b) 2 (c) 3 (d) 4

26. find mechanical advantage (and effort) of a pulley system from its efficiency

Asked 3× · Board 2024, Sample 2023, Sample 2024 · 1/2 marks

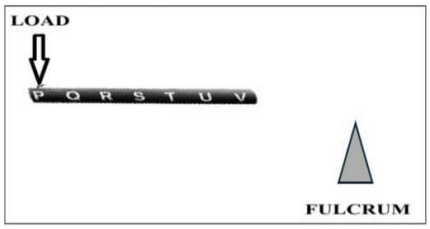
If Load = 48 kgf and efficiency is 80% then calculate: 1. Mechanical Advantage. 2. Effort needed to lift the load.

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27. identify the arrangement/lever giving the greatest mechanical advantage

Asked 2× · Board 2025, Sample 2027 · 1/2 marks

A bar of length 120 cm is used as a lever to raise a load placed at point P. Seven equidistant points P, Q, R, S, T, U, V are marked 20 cm apart. Specify the fulcrum and effort points that yield the greatest mechanical advantage.



28. speed at the lowest point/on hitting ground from energy conservation

Asked 2× · Board 2026, Sample 2026 · 1/2 marks

Calculate the speed of the ball at which it hits the ground. [g = 10 m/s^2]

29. draw the potential energy versus height graph for a body thrown up

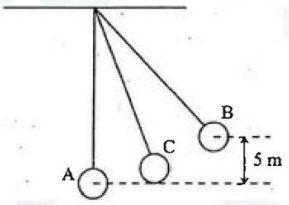
Asked 2× · Sample 2024, Sample 2025 · 2 marks

Draw a graph of potential energy vs height for a body thrown vertically upwards. [Assume no friction is present.]

30. potential energy of a pendulum bob at its raised extreme position

Asked 2× · Sample 2024, Sample 2025 · 1 marks

A simple pendulum of mass 200 g is displaced from mean position A to extreme position B, being raised by 5 m; potential energy at A is zero. What is the potential energy of the pendulum at position B? (g = 10 ms^{-2})



(a) What is the potential energy of the pendulum at the position B?

31. total mechanical energy of a pendulum at an intermediate point

Asked 2× · Sample 2024, Sample 2025 · 1 marks

What is the total mechanical energy at point C?

32. speed of a pendulum bob at the mean position from energy conservation

Asked 2× · Sample 2024, Sample 2025 · 2 marks

What is the speed of the bob at position A when released from B? (Take g = 10 ms^{-2}, no loss of energy.)

33. number of pulleys in a block of a block and tackle system

Asked 2× · Sample 2023, Sample 2025 · 1 marks

The adjacent diagram shows the movable block of a block and tackle system with effort in a convenient direction. From the diagram we can conclude that the number of pulleys used in the fixed block are _____. (a) 1 (b) 3 (c) 2 (d) 4

(iv) The adjacent diagram shows the movable block of a block and tackle system with effort in a convenient direction. From the diagram we can conclude that the number of pulleys used in the fixed block are _____.

(a) 1

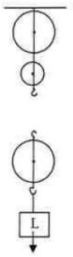
(b) 3



34. redraw a block and tackle to give maximum velocity ratio with force directions

Asked 2× · Sample 2023, Sample 2024 · 2 marks

The diagram shows a block and tackle system. Copy and complete the labelled diagram showing the correct connection of the tackle and the direction of the forces involved to obtain maximum V.R. with the convenient direction.



35. potential energy of a body at a given height

Asked 2× · Board 2026, Sample 2023 · 1/2 marks

A ball of mass 20 g falls from a height of 45 m and rebounds to a height of 40 m. Calculate the initial potential energy of the ball. [g = 10 m/s^2]

36. calculate power from work done in a given time

Asked 2× · Board 2023, Board 2024 · 2 marks

Sumit does 600 J of work in 10 min and Amit does 300 J of work in 20 min. Calculate the ratio of the powers delivered by them.

Refraction of Light and Lenses

37. identify the lens that forms a virtual, erect, diminished image

Asked 5× · Sample 2023, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

A glass lens always forms a virtual, erect, and diminished image of an object kept in front of it. Identify the lens.

38. phenomenon governing an optical fibre / endoscope

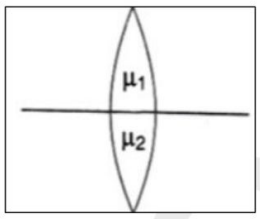
Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

Advanced optical sensors in missiles use fibre optic cables to transmit light signals with minimal loss. Name the optical phenomenon that allows light signals to remain confined within the fibre optic cables during transmission.

39. number of images formed by a lens made of two refractive indices

Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

A lens is made of two materials of different refractive indices (μ1, μ2) as shown. If the rays are coming from a distant object, then how many images will be formed?



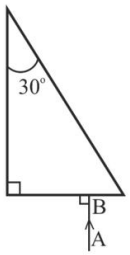
[Application]

(b) A glass lens always forms a virtual, erect, and diminished image of

40. complete the path of a ray through a prism given the critical angle

Asked 5× · Board 2023, Board 2025, Board 2026, Sample 2023, Sample 2024 · 2/3 marks

Redraw the diagram and complete the path of the light ray AB through the glass prism till it emerges out of the prism. Critical angle of the glass is 42°.



41. name the phenomenon forming a fish's image at the water surface

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

The diagram shows a fish in the tank and its image seen on the surface of water. Name the phenomenon responsible for the formation of this image.



42. nature of image formed by a convex lens for an object beyond 2F

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

An object is placed at a distance of 24 cm in front of a convex lens of focal length 8 cm. What is the nature of the image so formed?

43. find the image distance using the lens formula

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 2 marks

Calculate the distance of the image from the lens.

44. state the two conditions necessary for total internal reflection

Asked 2× · Sample 2026, Sample 2027 · 2 marks

List the two main conditions necessary for this phenomenon to occur.

45. how the refractive index changes with a rise in temperature

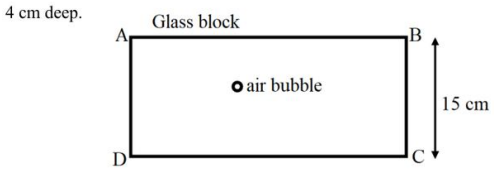
Asked 3× · Board 2024, Sample 2024, Sample 2025 · 1 marks

The refractive index of water is 1.33 at a certain temperature. When the temperature of water is increased by 40°C, the refractive index changes to 'x'. State whether x < 1.33 or x > 1.33.

46. find apparent or real depth from refractive index

Asked 3× · Board 2023, Board 2025, Sample 2026 · 1/2 marks

A rectangular glass block of refractive index 1.5 has an air bubble trapped inside it; when seen from surface AB it appears to be 4 cm deep. Calculate the actual depth of the air bubble from the surface AB.



47. direction to move a screen to focus a convex-lens image (MCQ)

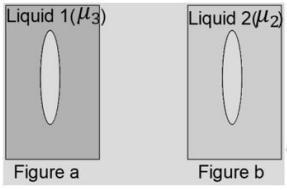
Asked 2× · Sample 2025, Sample 2026 · 1 marks

A convex lens with a focal length of 12 cm has an object at a distance of 20 cm in front of the lens. A blurred image is obtained on the screen placed at a distance of 23 cm in front of the lens. In order to obtain a clear image, the screen has to be moved: (a) towards the lens. (b) away from the lens. (c) to a position very far from the lens. (d) either towards or away from the lens.

48. how a convex lens converges or diverges in media of different refractive index

Asked 2× · Sample 2025, Sample 2026 · 2 marks

A double convex lens with refractive index μ1 is placed inside two liquids of refractive indices μ2 and μ3, with μ2 > μ1 and μ1 > μ3. How would a parallel incident beam of light refract when it comes out of the lens in each of the cases: (1) in Figure a (2) in Figure b?



49. how the wavelength changes when light passes into another medium

Asked 2× · Board 2026, Sample 2027 · 1 marks

As the ray of light travels from medium 1 to medium 2, how does the wavelength of light change? (State whether it increases, decreases, or remains constant.)

50. identify the convex lens as the one forming a real image on a screen

Asked 2× · Sample 2023, Sample 2027 · 1 marks

A candle and a screen are placed 90 cm apart. A lens is placed between them such that a clear image is formed on the screen and the image is twice the size of the object. Which type of lens is used?

51. state differences between ordinary reflection and total internal reflection

Asked 2× · Sample 2024, Sample 2025 · 2 marks

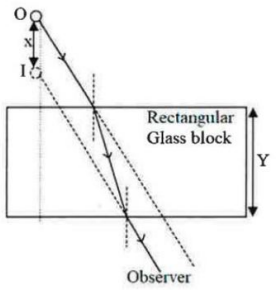
State two differences between normal reflection and total internal reflection.

52. name and define the phenomenon causing the apparent shift through a glass block

Asked 2× · Sample 2023, Sample 2024 · 2 marks

The diagram shows that an observer sees the image of an object O at I through a glass block. Name and define the phenomenon responsible for seeing the image at a different position.

(iii) [4]



53. effect on apparent shift when the glass-block thickness changes

Asked 2× · Sample 2023, Sample 2024 · 2 marks

State the effect on X (apparent shift) when: 1. Y (thickness) increases 2. Y decreases.

54. find the focal length of a concave lens from object and image distances

Asked 2× · Board 2025, Sample 2023 · 2/3 marks

An object is placed in front of a concave lens at a distance of 45 cm from it. If its image is formed at a distance of 30 cm from the lens, calculate the focal length of the lens.

55. identify TIR as the cause of everyday sparkle (diamond/air bubbles)

Asked 2× · Board 2023, Sample 2023 · 1 marks

Small air bubbles rising up a fish tank appear silvery when viewed from some particular angle is due to the: (a) reflection (b) refraction (c) dispersion (d) total internal reflection

56. concave lens produces a diminished image (m<1)

Asked 2× · Board 2023, Board 2024 · 1 marks

Linear magnification (m) produced by a concave lens is: (a) $m < 1$ (b) $m > 1$ (c) $m = 1$ (d) $m = 2$

Spectrum and Dispersion

57. name the invisible radiation studied with a quartz prism (UV)

Asked 4× · Board 2025, Sample 2024, Sample 2025, Sample 2026 · 1 marks

Name the invisible radiation which is studied using the quartz prism.

58. scattering increases for shorter wavelength (assertion-reason/identify)

Asked 4× · Board 2024, Board 2025, Board 2026, Sample 2027 · 1 marks

Assertion (A): Blue light scatters more than red light in the atmosphere. Reason (R): Intensity of scattered light is inversely proportional to the fourth power of wavelength. (a) (A) is true and (R) is false. (b) (A) is false and (R) is true. (c) Both (A) and (R) are true, and (R) is the correct explanation of (A). (d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

59. which colours show maximum and minimum deviation through a prism

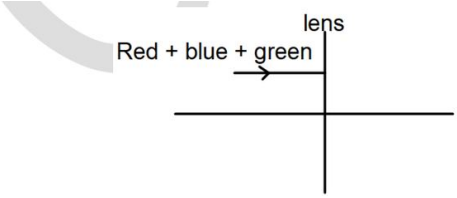
Asked 3× · Sample 2024, Sample 2025, Sample 2027 · 1/2 marks

If red, blue, green and yellow lights are allowed to enter the same glass block with the same angle of incidence (∠i), then for which colour will the angle of deviation be the greatest? (a) blue (b) green (c) yellow (d) red

60. whether colours focus at one or different points through a convex lens

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1/2 marks

A mixture of red, blue, and green light rays is passed through a convex lens. State whether the ray passes through a single point or through different points on the principal axis after refraction.



61. name a radiation with a wavelength longer than a given one

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

Name one type of radiation with a wavelength greater than that of the radiation mentioned by you in (b) above.

62. compare speed and refraction of red versus blue light inside a prism (MCQ)

Asked 2× · Sample 2025, Sample 2026 · 1 marks

Inside the prism, during the dispersion of white light, compared to blue, red light: (a) slows down less and refracts more. (b) slows down more and refracts less. (c) slows down more and refracts more. (d) slows down less and refracts less.

63. state one use of ultraviolet radiation

Asked 2× · Sample 2025, Sample 2026 · 1 marks

State one use of the radiation mentioned by you in (b) above.

64. assertion-reason on infrared travelling through fog with minimal scattering

Asked 2× · Sample 2024, Sample 2025 · 1 marks

Assertion (A): Infrared radiations travel long distance through a dense fog and mist. Reason (R): Infrared radiations undergo minimal scattering in earth's atmosphere. (a) both A and R are true and R is the correct explanation of A. (b) both A and R are True and R is not the correct explanation of A. (c) assertion is false but reason is true. (d) assertion is true but reason is false.

65. emergent colour when monochromatic light passes through a prism

Asked 2× · Sample 2024, Sample 2025 · 1 marks

If instead of sunlight, a green-coloured ray is passed through a glass prism, what will be the colour of the emergent ray?

66. compare the speeds of spectral colours in glass/medium

Asked 3× · Board 2023, Sample 2023 · 1 marks

Speed of blue light in water is: (a) more than green light (b) more than orange light (c) more than violet light (d) more than red light

67. identify/arrange electromagnetic waves by wavelength

Asked 2× · Board 2024, Board 2025 · 1 marks

Which one of the following combinations is the correct ascending order of electromagnetic waves in terms of wavelength? (a) gamma-rays, visible light, microwaves (b) microwaves, visible light, gamma-rays (c) gamma-rays, microwaves, visible light (d) microwaves, gamma-rays, visible light

68. state a property common to all electromagnetic radiations

Asked 2× · Board 2024, Board 2025 · 1 marks

Name one property common to all electromagnetic radiations.

69. why red (scattering least) is used for danger/traffic signals

Asked 2× · Board 2024, Board 2025 · 1 marks

Name the radiation which is used in traffic signals in India.

Sound

70. compare the pitch of two sound waves of different frequency (MCQ)

Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

Two sound waves, X and Y have the same amplitude and the same wave pattern, but their frequencies are 60 Hz and 120 Hz respectively, then: (a) X will be shriller, and Y will be grave. (b) X will be grave, and Y will be shriller. (c) X will differ in quality than Y. (d) X will be louder than Y.

71. distance from a cliff using echo time and speed of sound

Asked 4× · Sample 2023, Sample 2024, Sample 2025, Sample 2026 · 1 marks

A person standing in front of a cliff fires a gun and hears its echo after 3 s. Speed of sound in air is 336 ms^{-1}. Calculate the distance of the person from the cliff.

72. distance moved from the change in echo time at a cliff

Asked 4× · Sample 2023, Sample 2024, Sample 2025, Sample 2026 · 2 marks

After moving a certain distance from the cliff, he fires the gun again and this time the echo is heard 1.5 s later than the first. Calculate the distance that the person has moved.

73. name the ultrasonic waves used for echo depth sounding / SONAR

Asked 4× · Board 2024, Sample 2024, Sample 2025, Sample 2026 · 1 marks

Name the wave used for echo depth sounding.

74. reason for using ultrasonic waves in echo depth sounding

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

Give one reason why the waves mentioned in (a) are used for the above purpose.

75. identify the position for a periodic push to increase a swing's amplitude

Asked 2× · Sample 2025, Sample 2026 · 1 marks

A mother pushes her daughter on a swing going through positions A, B, C (A and C extreme, B mean). Which is the right position (A, B or C) for the mother to give a constant periodic push in the forward direction to increase the amplitude of the swing?

(iii) [4]



76. name the phenomenon increasing a swing's amplitude with periodic pushes

Asked 2× · Sample 2025, Sample 2026 · 1 marks

Name the phenomenon involved in this.

77. explain how resonance increases the amplitude of a swing

Asked 2× · Sample 2025, Sample 2026 · 2 marks

On the basis of this example, explain how this phenomenon helps to increase the amplitude of the swing.

78. name loudness as the characteristic of sound affected in a situation
Asked 3× · Board 2023, Sample 2023, Sample 2024 · 1 marks

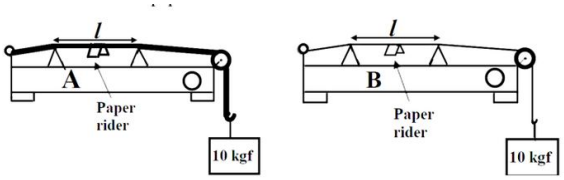
Name the important characteristic of sound that is affected during this phenomenon.

79. name and define the resonance involved in tuning a radio/TV
Asked 3× · Board 2023, Sample 2023, Sample 2024 · 1/2 marks

A boy tunes a radio channel to a radio station 93.5 MHz. Name and define the scientific wave phenomenon involved in tuning the radio channel.

80. name and explain resonance of stretched wires with a tuning fork
Asked 2× · Board 2025, Sample 2027 · 2 marks

Two sound boxes A and B have wires of same length (l) and tension (10 kgf) but different cross-sectional areas. Vibrating tuning forks of frequency 300 Hz are placed on the boxes; the paper rider falls off in case of B but not in case of A. Name and explain the phenomenon responsible for the falling off of the paper rider in B.



81. compare a wire's resonant frequency with a given value and justify
Asked 2× · Board 2025, Sample 2027 · 2 marks

A loud sound is heard from wire A when the experiment is repeated using a tuning fork of frequency 'f'. Is 'f' greater than, less than or equal to 300 Hz? Justify your answer.

82. name the vibrations of a plucked/released object as free/natural
Asked 3× · Board 2023, Board 2026, Sample 2023 · 1 marks

One end of a plastic foot ruler is held tightly at the edge of a table and the other end is plucked. Name the vibrations produced in the ruler.

83. compare the minimum distance for a distinct echo in two media
Asked 2× · Board 2024, Sample 2027 · 1/2 marks

Complete by choosing the correct answer: The minimum distance for distinct echo formation is _____ [greater / lesser] in water as compared to air.

84. identify vibrations produced under a periodic force (MCQ)
Asked 3× · Board 2023, Board 2024, Sample 2024 · 1 marks

When the stem of vibrating tuning fork is pressed on a table, the tabletop starts vibrating. These vibrations are definitely an example of: (a) resonance (b) natural vibrations (c) forced vibrations (d) damped vibrations

85. convert a given frequency (MHz) into SI units
Asked 2× · Sample 2023, Sample 2024 · 1/2 marks

Convert 93.5 MHz to SI unit.

86. the characteristic (quality) distinguishing notes of same pitch and loudness
Asked 2× · Board 2023, Board 2026 · 1 marks

Complete by choosing the correct answer: Quality of sound depends on its _____ [amplitude / waveform].

87. state one way to increase or decrease the frequency of vibration

Asked 2× · Board 2023, Sample 2023 · 1 marks

State one way to increase the frequency of these vibrations.

88. find distance to an underwater obstacle from echo time and speed

Asked 2× · Board 2023, Board 2025 · 2/3 marks

A submarine in the sea sends an ultrasonic ping and a stopwatch is started simultaneously. The stopwatch stops on receiving the reflected wave from an obstacle and reads 1 minute 40 seconds. Calculate the distance of the obstacle from the submarine. (Speed of sound in water 1500 ms^{-1}.)

Current Electricity and Household Circuits

89. colour of the earth wire in the old convention (MCQ)

Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

According to the old convention, the colour of the earth wire is: (a) black (b) green (c) yellow (d) red

90. compare resistivity/specific resistance of the same material in different shapes

Asked 4× · Sample 2023, Sample 2024, Sample 2025, Sample 2026 · 1 marks

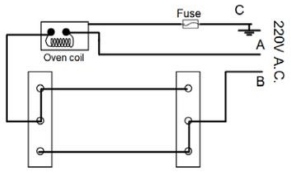
Compare (> or < or =) the specific resistance in both cases.

91. the fuse and switch must be placed in the live wire

Asked 5× · Board 2023, Sample 2023, Sample 2024 · 1 marks

Tim wants to connect a fuse to his oven and control it from two different locations, as shown in the circuit diagram. Which one of the two, A or B, should be a live wire?

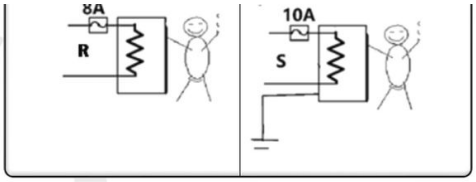
from two different locations. Shown below is his circuit diagram.



92. identify the safely earthed household wiring circuit for an appliance

Asked 3× · Sample 2025, Sample 2026, Sample 2027 · 1/2 marks

An appliance with a metal covering, rated at 2 kW, 220 V, is to be connected in a circuit. Given two diagrams (R and S) depicting different circuit configurations, identify the safest circuit.



(a) Identify the safest circuit. [Analysis]

93. find the current through the 3 ohm resistor in a network

Asked 3× · Sample 2023, Sample 2024, Sample 2025 · 2 marks

Calculate the current through the 3 Ω resistance when the circuit is complete.

94. factor (temperature) making two same-material wires differ in resistivity

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Complete by choosing the correct answer: Two copper wires can have different resistivity if they have different _____ [lengths / temperatures].

95. find appliance running time from energy meter readings and power
Asked 2× · Sample 2026, Sample 2027 · 2 marks

The image displays kilowatt-hour meter readings recorded at two distinct points in time. Assuming a continuously running 2000 W air conditioner as the sole electrical device in use, calculate the time interval, in hours, between these two meter readings.



96. justify the safest circuit using earthing and a fuse-rating calculation
Asked 2× · Sample 2026, Sample 2027 · 2 marks

Write two reasons, supported by mathematical calculations where applicable, to justify your choice of the safest circuit.

97. compare resistances of two wires of different length and cross-section
Asked 2× · Sample 2026, Sample 2027 · 1 marks

A Nichrome wire X with length (l) and cross-sectional area (A) is connected to a 10 V source and another Nichrome wire Y with length (2l) and cross-sectional area (A/2) is connected to a 20 V source. Compare the resistances of wires X and Y. [Given the resistivity of Nichrome is ρ.]

98. compare the electrical power consumed by two wires
Asked 2× · Sample 2026, Sample 2027 · 1 marks

Compare the electrical power consumed by each wire.

99. compare the masses of two wires from volume and density
Asked 2× · Sample 2026, Sample 2027 · 1 marks

Compare the masses of these wires. [Given the density of nichrome is d.]

100. compare the temperature rise of two wires heated equally (T/F)
Asked 2× · Sample 2026, Sample 2027 · 1 marks

State True or False: Wire X and wire Y both show the same rise in temperature at the same time.

101. identify parallel as the connection where the highest-power bulb glows brightest
Asked 2× · Sample 2026, Sample 2027 · 1 marks

Three bulbs of powers P1, P2 and P3 (P1 < P2 < P3) are connected in a certain way such that P3 glows the brightest. What type of connection exists between these bulbs?

102. compare the voltages across bulbs connected in parallel
Asked 2× · Sample 2026, Sample 2027 · 1 marks

Compare the voltages (V1, V2, V3) across these bulbs. (Use >, < or =)

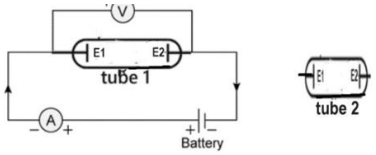
103. whether a parallel circuit still works when one branch fails
Asked 2× · Sample 2026, Sample 2027 · 1 marks

Will the circuit still function if one of the bulbs is fused?

104. compare resistances of the same conductor reshaped to new dimensions

Asked 2× · Sample 2025, Sample 2026 · 1 marks

A circuit is used for studying Ohm's Law using a glass tube filled with mercury (tube 1) connected through electrodes E1 and E2; the experiment is repeated with tube 2 which the same amount of mercury fills. Neglecting internal resistance, use (> or < or =) to compare the resistance in both cases.



105. compare voltmeter readings for the same cell across different resistances

Asked 2× · Sample 2025, Sample 2026 · 1 marks

Compare (> or < or =) the voltmeter readings in both cases.

106. explain the meaning of an appliance's power and voltage rating

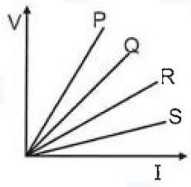
Asked 3× · Board 2023, Sample 2023, Sample 2024 · 1/2 marks

What is the meaning of the statement that the bulb is rated 600 W, 220 V?

107. select a high-resistance material for a filament/coil from a V-I graph

Asked 2× · Sample 2024, Sample 2025 · 1 marks

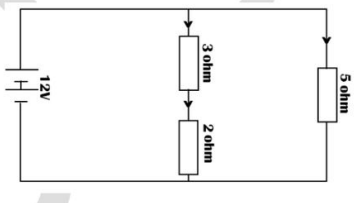
The graph of voltage vs current for four different materials is shown. Which of these four materials would be used for making filament of a bulb? (a) Q (b) S (c) P (d) R



108. compare currents through resistors in a series/parallel circuit

Asked 2× · Board 2024, Sample 2026 · 1 marks

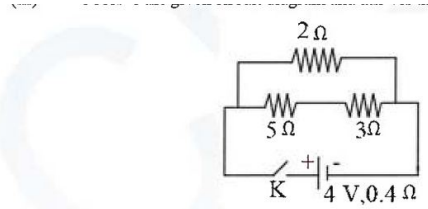
In the circuit given below, identify the correct relation between the currents flowing through the 2 Ω, 3 Ω, and 5 Ω resistors: (a) current through 2Ω > current through 3Ω (b) current through 5Ω < current through 3Ω (c) current through 2Ω = current through 5Ω (d) current through 5Ω > current through 3Ω



109. total resistance of a network including cell internal resistance

Asked 2× · Sample 2023, Sample 2025 · 2 marks

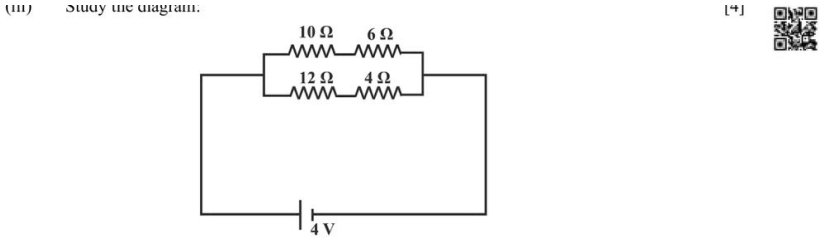
Observe the given circuit diagram (2 Ω in parallel with series 5 Ω and 3 Ω, cell 4 V, 0.4 Ω, key K). Calculate the resistance of the circuit when the key K completes the circuit.



110. calculate the total resistance of a resistor network

Asked 2× · Board 2024, Sample 2024 · 2 marks

Study the circuit diagram. Calculate the total resistance of the circuit.



111. decide/find the fuse rating from an appliance's power and voltage

Asked 2× · Board 2024, Board 2026 · 1/2 marks

An electric iron rated 1100 W, 220 V is operated for 5 hours. Calculate the minimum rating of the fuse required.

112. identify the correct live/neutral/earth colour code (MCQ)

Asked 2× · Board 2024, Sample 2023 · 1 marks

Identify the option that displays the correct wiring with correct colour code: (a) (b) (c) (d) [diagram options]

113. effect on a bulb's brightness when another bulb is removed

Asked 2× · Board 2024, Board 2025 · 1 marks

If the bulb B3 is removed from the circuit, then will the brightness of the bulb B1 increase, decrease or remain the same?

114. relation between emf, terminal voltage and internal resistance (MCQ)

Asked 2× · Board 2023, Board 2025 · 1 marks

In a closed circuit containing a bulb and a cell, the electromotive force (ε) and the terminal voltage (V) is related as (I is current, r is internal resistance): (a) V = ε + Ir (b) V = ε - Ir (c) V = ε ÷ Ir (d) V = ε x Ir

115. specific resistance depends only on material, not dimensions

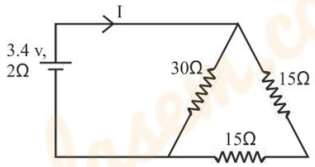
Asked 2× · Board 2023, Board 2024 · 1 marks

The specific resistance of a conductor depends on its: (a) length (b) material (c) area of cross section (d) radius

116. find the current drawn from the cell in a resistor network

Asked 2× · Board 2023, Board 2024 · 1/2 marks

For the given circuit, calculate the current I drawn from the cell.



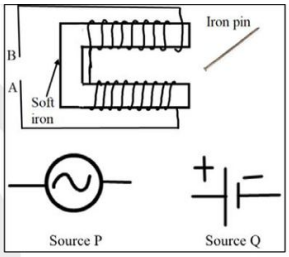
(a) Calculate the current **I**.

Magnetic Effect of Current and Electromagnetic Induction

117. state true/false whether both AC and DC magnetise an electromagnet

Asked 2× · Sample 2026, Sample 2027 · 1 marks

A copper wire is wound around a U-shape soft iron bar. An iron pin is brought near the arrangement. First Source P and then Source Q are connected across AB, each operating independently. State True or False: Source P as well as Source Q, when connected across AB, can attract the iron pin.



118. justify why both AC and DC magnetise an electromagnet

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Justify your answer to (a) with a suitable reason.

119. name the rule for the force/motion direction on a current-carrying conductor

Asked 3× · Board 2023, Board 2025, Sample 2023 · 1 marks

Name the law used to determine the direction of motion of PQ.

120. identify the transformer type that lowers a high emf

Asked 2× · Sample 2024, Sample 2025 · 1 marks

A transformer is used to change a high alternating e.m.f. to a low alternating e.m.f. of the same frequency. Identify the type of transformer used for the above purpose.

121. state the turns ratio of a step-down transformer (<1)

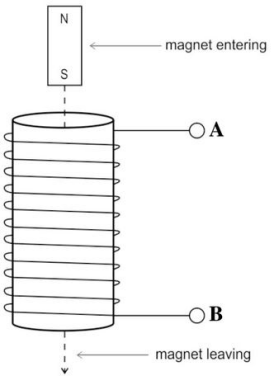
Asked 2× · Sample 2024, Sample 2025 · 1 marks

State whether the turns ratio of the above transformer is =1 or >1 or <1.

122. state the induced polarity at a coil end as a magnet moves (Lenz's law)

Asked 2× · Sample 2023, Sample 2024 · 1/2 marks

A magnet is released along the axis of a copper coil. State the polarity at the top end of the coil when the magnet leaves the coil.



123. name the law giving the direction of induced current/polarity

Asked 2× · Sample 2023, Sample 2024 · 1 marks

Name the law which can be used to determine the direction of the induced current in the coil.

124. determine battery polarity from a current loop's magnetic field pattern

Asked 2× · Board 2023, Sample 2025 · 1 marks

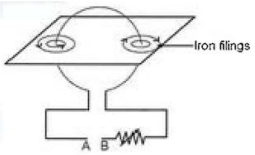
A wire bent in the form of a loop passes through a cardboard on which iron filings are kept; when current flows the filings arrange as shown with the direction of the magnetic field. State the polarities of the battery at A and B.

(a) State the polarities of the battery at A and B.

(b) State the effect on the magnetic field if an iron rod is held along the axis of the coil. [Understanding & Application]

(c) State one way to:

1. change the polarity of the coil.
2. decrease the strength of the magnetic field around the coil. [Understanding & Recall]



125. effect of an iron core on the magnetic field of a coil

Asked 2× · Board 2023, Sample 2025 · 1 marks

State the effect on the magnetic field if an iron rod is held along the axis of the coil.

126. one way to change polarity and one way to reduce a coil's field strength

Asked 2× · Board 2023, Sample 2025 · 2 marks

State one way to: 1. change the polarity of the coil. 2. decrease the strength of the magnetic field around the coil.

127. state a factor/way to change the magnitude of the induced current

Asked 2× · Board 2024, Sample 2024 · 1 marks

State one factor that affects the magnitude of induced current in an AC generator.

Calorimetry and Latent Heat

128. state the temperature range for the liquid state from a cooling curve

Asked 5× · Sample 2023, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

Mention the temperature range in which the substance is in its liquid state.

129. name the heat to melt a mass at its melting point (MCQ)

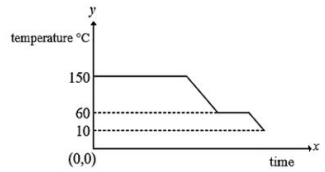
Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

The amount of heat energy required to melt a given mass of a substance at its melting point, without any rise in its temperature is called the: (a) specific heat capacity (b) specific latent heat of fusion (c) latent heat of fusion (d) heat capacity

130. read the condensation temperature from a cooling curve

Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 1 marks

The diagram shows a cooling curve for a substance X. State the temperature at which the substance condenses.



131. find a mass of ice/water using calorimetry with latent heat of fusion

Asked 4× · Board 2024, Board 2025, Sample 2024, Sample 2025 · 3 marks

30 g of ice at 0°C is used to bring down the temperature of a certain mass of water at 70°C to 20°C. Find the mass of water. [Specific heat capacity of water = 4.2 $Jg^{-1}°C^{-1}$ and specific latent heat of ice = 336 Jg^{-1}.]

132. correct definition of the heat capacity of a body (MCQ)

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

Heat capacity of a body is the: (a) energy needed to melt a body without change in its temperature. (b) energy needed to raise the temperature of a body by 1°C. (c) increase in volume of the body when its temperature increases by 1°C. (d) total amount of internal energy that is constant.

133. find the heat capacity of a solid by the method of mixtures

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 2 marks

A solid of mass 60 g at 100°C is placed in 150 g of water at 20°C. The final steady temperature is 25°C. Calculate the heat capacity of the solid. [sp. heat capacity of water = 4.2 J g^{-1} K^{-1}]

134. explain why ice is preferred to ice-cold water for cooling

Asked 3× · Sample 2023, Sample 2024, Sample 2025 · 1 marks

Why do we prefer ice to ice-cold water for cooling a drink?

135. state the SI/CGS unit of specific heat capacity

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Complete by choosing the correct answer: The CGS unit of specific heat capacity is _____ [erg g^{-1} K^{-1} / cal g^{-1} K^{-1}].

136. compare heat released in the liquid and solid states for equal cooling

Asked 2× · Sample 2026, Sample 2027 · 1 marks

State True or False: The amount of heat released when a substance is cooled by 10°C in its liquid state is greater than the heat released when it is cooled by the same amount in its solid state.

137. find a flame temperature using the method of mixtures

Asked 2× · Sample 2026, Sample 2027 · 4 marks

To measure the temperature of the flame of a Bunsen burner, a lump of copper of mass 0.12 kg is heated on the flame for a long time. The copper is quickly transferred into a beaker of negligible heat capacity containing 0.84 kg of water and the temperature of the water rose from 15°C to 35°C. Calculate the temperature of the flame. [sp. heat capacity of copper = 0.4 $Jg^{-1}°C^{-1}$, sp. heat capacity of water = 4.2 $Jg^{-1}°C^{-1}$]

138. relate specific heat to temperature rise / coolant choice for equal heat

Asked 4× · Board 2023, Board 2025, Sample 2023 · 1 marks

Each of the substances given below is supplied with the same amount of heat. Which one will attain the highest temperature? Lead (0.031), Aluminium (0.21), Copper (0.095), Iron (0.115) cal/g°C. (a) Aluminium (b) Copper (c) Iron (d) Lead

139. effect on specific heat capacity when a wire is stretched (MCQ)

Asked 2× · Board 2026, Sample 2027 · 1 marks

A metallic wire is stretched in such a way that its new length becomes twice the original length. How does its specific heat capacity change? (a) becomes double (b) becomes 4 times (c) becomes 1/4 (d) remains the same

140. property that latent heat absorbed is proportional to mass (MCQ/blank)

Asked 3× · Board 2023, Board 2025, Sample 2023 · 1 marks

Complete by choosing the correct answer: Heat absorbed during change of phase depends on _____ [mass / change in temperature / specific heat capacity] of the substance.

141. name/select a calorimeter material and its characteristic property

Asked 3× · Board 2023, Board 2025 · 1 marks

Which material, X or Y, would you select to make a calorimeter?

142. how latent heat released during freezing warms the surroundings

Asked 2× · Board 2024, Board 2026 · 1 marks

Atmospheric temperature after a hailstorm is greater than the temperature during the hailstorm. State True or False.

143. state the principle of calorimetry (method of mixtures)

Asked 2× · Board 2023, Board 2026 · 1 marks

State the principle of Calorimetry.

144. heat required to melt a given mass at its melting point using latent heat

Asked 2× · Board 2024, Board 2025 · 2 marks

Calculate the amount of heat absorbed by 200 g of paraffin wax to melt completely at its melting point. [Specific latent heat of fusion of paraffin wax = 146 Jg^{-1}]

145. total heat to melt ice at 0C and heat the resulting water

Asked 2× · Board 2023, Sample 2023 · 2/3 marks

Calculate the total amount of heat energy required to melt 200 g of ice at 0°C to water at 100°C. (Specific latent heat of ice = 336 J g^{-1}, specific heat capacity of water = 4.2 J g^{-1} $°C^{-1}$)

146. specific heat capacity does not change with mass / thermal capacity

Asked 2× · Board 2023, Board 2025 · 1 marks

A metal piece of mass 5 g has thermal capacity 2.5 JK^{-1}. If the mass of the metal is tripled, then its specific heat capacity will be: (a) 7.5 JK^{-1} (b) 2.5 JK^{-1} (c) 1.5 $Jg^{-1}K^{-1}$ (d) 0.5 $Jg^{-1}K^{-1}$

Modern Physics (Radioactivity and Nuclear Energy)

147. protons and neutrons remaining after alpha emission (MCQ)

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

A nucleus of an atom consists of 146 neutrons and 95 protons. It decays after emitting an alpha particle. How many protons and neutrons are left in the nucleus after an alpha emission? (a) protons = 93, neutrons = 142 (b) protons = 95, neutrons = 144 (c) protons = 93, neutrons = 144 (d) protons = 95, neutrons = 142

148. name the radiation with the highest penetrating power

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

Name the radiation that is emitted during the decay of a nucleus that has the highest penetrating power.

149. whether gamma emission changes the mass number

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

Does the emission of the above-mentioned radiation result in a change in the mass number?

150. identify a missing nuclide/value by balancing a nuclear reaction

Asked 3× · Board 2025, Sample 2027 · 1 marks

When ${}^{6}Li_{3}$ is bombarded with a neutron, it produces ${}^{4}He_{2}$ and an isotope of hydrogen. Write the notation for the hydrogen isotope formed.

151. name the parent-daughter relationship after alpha and two beta decays

Asked 3× · Sample 2023, Sample 2024, Sample 2025 · 1 marks

What is the general name of the elements X and Y?

152. find the parent atomic number after alpha and beta decays

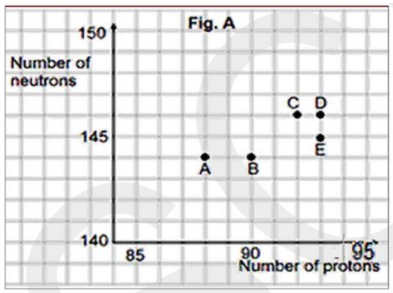
Asked 3× · Sample 2023, Sample 2024, Sample 2025 · 1 marks

If the atomic number of Y is 80 then what is the atomic number of X?

153. identify the radiation and write the reaction for a decay on a p-n graph

Asked 2× · Sample 2026, Sample 2027 · 2 marks

A graph shows number of protons (x-axis) vs number of neutrons (y-axis) for elements A, B, C, D, E. Identify the radioactive radiation emitted when element C decays into element E. Represent this using a nuclear reaction.



154. name same-atomic-number elements as isotopes

Asked 2× · Sample 2026, Sample 2027 · 1 marks

What is the special name given to elements like D and E?

155. how a radiation emitted in a decay behaves in an electric field

Asked 2× · Sample 2026, Sample 2027 · 1 marks

If element C transforms into element B by emitting a radioactive ray, how will this ray behave in an electric field?

156. the high-density element (lead) used for radiation shielding
Asked 3× · Board 2023, Board 2026 · 1 marks

Which element is used in the lining of the special aprons worn by workers in nuclear power plants?

157. position of the daughter element after alpha and two beta decays
Asked 2× · Sample 2024, Sample 2025 · 1 marks

A radioactive nucleus X emits an alpha particle followed by two beta particles to form nucleus Y. With respect to the element X, where would you position the element Y in the periodic table?

158. identify the daughter nucleus/element on a p-n graph after decay
Asked 2× · Board 2025, Sample 2025 · 1 marks

Which point on the graph indicates the daughter nucleus after Cm undergoes radioactive decay of 1 α followed by 2 β?

159. complete an alpha decay by balancing mass and atomic numbers
Asked 2× · Sample 2023, Sample 2024 · 2 marks

Copy and complete the following nuclear reaction: {}$^{222}_{86}$Rn → {}$^{218}_{84}$Po + {}$^{_}_{_}$X

160. effect of an electric field on the emitted alpha radiation
Asked 2× · Sample 2023, Sample 2024 · 1 marks

What will be the effect on the radiation X, emitted in the above reaction, when it is allowed to pass through an electric field?

161. state the mass number of the parent/daughter after alpha and beta decays
Asked 2× · Board 2025, Sample 2023 · 1 marks

State the mass number of the daughter nucleus.

162. which radiation deflects most/least in a magnetic field
Asked 2× · Board 2023, Board 2026 · 1 marks

Complete by choosing the correct answer: _____ radiation deviates minimum in a magnetic field. [Alpha / Beta].

163. name the radiation with the highest/lowest ionizing power
Asked 2× · Board 2023, Board 2025 · 1 marks

Complete by choosing the correct answer: The nuclear radiation with lowest ionizing power is _____ [α / β / γ].

164. radioactivity is unaffected by environment or chemical change
Asked 2× · Board 2023, Board 2024 · 1/2 marks

A radioactive element is placed in an evacuated chamber. Then the rate of radioactive decay will: (a) Decrease (b) Increase (c) Remain unchanged (d) Depend on the surrounding temperature

165. complete a decay chain with alpha and beta emissions
Asked 2× · Board 2023, Board 2024 · 2 marks

Complete the following radioactive reaction: {} X → Y + 2 {}^{4}He → {}$^{234}_{91}$Z + {}$^{0}_{-1}$e