ICSE · CLASS 10 · PHYSICS

ICSE Class 10 Physics Guess Paper 2027

Time: 2 hours · Maximum marks: 80 · 36 questions

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Section A

Compulsory. Q1 is fifteen multiple-choice questions (1 mark each); the remaining questions are short-answer, fill-in-the-blank, match-the-column, reasoning and short numerical parts.

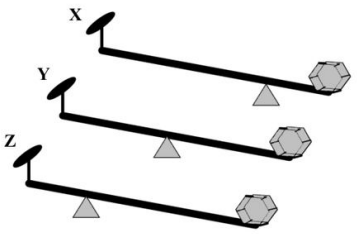
Q1. Two sound waves, X and Y have the same amplitude and the same wave pattern, but their frequencies are 60 Hz and 120 Hz respectively, then: (a) X will be shriller, and Y will be grave. (b) X will be grave, and Y will be shriller. (c) X will differ in quality than Y. (d) X will be louder than Y. — 1 mark

Q2. According to the old convention, the colour of the earth wire is: (a) black (b) green (c) yellow (d) red — 1 mark

Q3. 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 — 1 mark

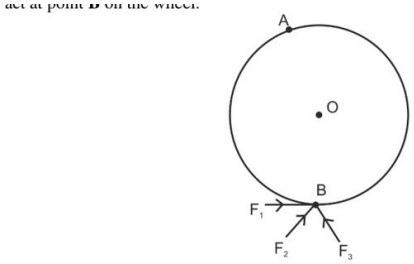
Q4. Advanced optical sensors in missiles use fibre optic cables to transmit light signals with minimal loss. Name the optical phenomenon that allows light signals to remain confined within the fibre optic cables during transmission. — 1 mark

Q5. Three levers X, Y, Z of equal lengths are shown. Which class of lever do these belong to? — 1 mark



Q6. 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 — 1 mark

Q7. 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? 1 mark



Q8. 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 1 mark

Q9. The kinetic energy of a given body depends on the: (a) position (b) centre of gravity (c) momentum (d) displacement 1 mark

Q10. 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 1 mark

Q11. 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 1 mark

Q12. 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. 1 mark

Q13. 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 1 mark

Q14. 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. 1 mark

Q15. 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. 1 mark

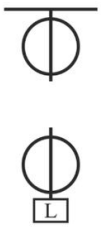
Q16. Given two pulleys, copy and complete the labelled diagram connecting the two pulleys with a tackle to obtain Velocity Ratio = 2. 2 marks

(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.

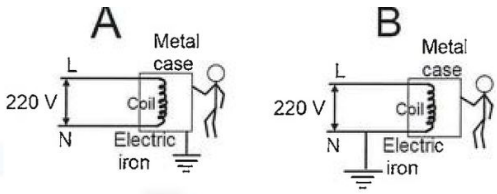
(b) If Load = 48 kgf and efficiency is 80% then calculate:

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



Q17. 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. 2 marks

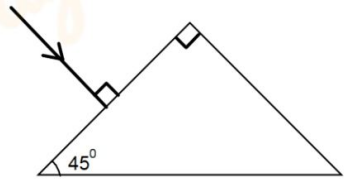
Q18. If the live wire makes an accidental contact with the metal case, which circuit (A or B) in the diagram, illustrating an electric iron, is considered safe for the user (assuming the fuse is present in the live wire in both circuits)? Justify your answer. 2 marks



[Application]

Q19. Give a reason for your answer in (a) [comparison of the weights of AC and BC]. 2 marks

Q20. Complete the path of the ray through the glass prism of critical angle 42° till it emerges out of the prism. 2 marks



(ii) (a) The refractive index of water is 1.33 at a certain temperature. When the [3]

Q21. Based on the principle of moments, write a mathematical relation that can be used to determine the weight (W) of Sachin's bag, given that the weight of Sumit's bag is 18 kgf. 2 marks

Q22. 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}] 2 marks

Q23. Calculate the distance of the image from the lens. 2 marks

Q24. 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. 3 marks

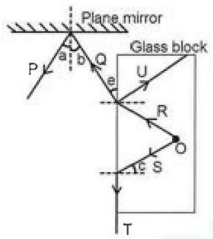
Q25. Calculate the total amount of heat energy required to melt 200 g of ice at 0°C to water at 100°C. (Specific latent heat of ice = 336 J g^{-1}, specific heat capacity of water = 4.2 J g^{-1} °C^{-1}) 3 marks

Q26. 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}.) 3 marks

Section B

Attempt any four of the seven questions; each question is about 10 marks made up of short derivations, numericals and reasoning sub-parts.

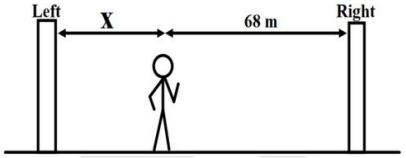
Q27. O is a luminescent particle trapped inside a glass block. A student traces the path of rays coming out of it and reflecting over a plane mirror. Complete the table using the labels from the figure (first label 'a' done): b. a partially reflected ray in the glass slab; c. a critical angle; d. a refracted ray; e. an angle of refraction of the ray R. 4 marks



Q28. 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 $Jg^{-1}°C^{-1}$] 4 marks

Q29. Draw a ray diagram to show the formation of an image by a concave lens when the object is placed between F and 2F. 4 marks

Q30. A boy is located asymmetrically between two parallel walls, closer to the left wall than the right. If he claps, the time interval between successive echoes is 0.25 s, then find the value of X in metres. [speed of sound in air = 340 m/s.] 4 marks

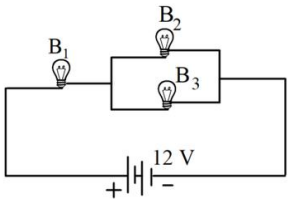


[Application]

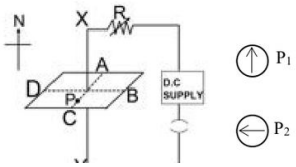
Q31. Akash takes a uniform meter scale and suspends a weight of 2 N at one end 'X' and a weight of 5 N on the other end 'Y'. He then balances the ruler horizontally on a knife edge placed at 70 cm from X. Draw a diagram of the arrangement and calculate the weight of the ruler. 4 marks

Q32. Three identical bulbs B1, B2 and B3 each of power rating 18 W, 12 V are connected to a battery of 12 V. Calculate: 1. the resistance of each bulb 2. the current drawn from the cell. 4 marks

(iii) [4]



Q33. In a circuit studying the magnetic effect of current, ABCD is a cardboard perpendicular to conductor XY; a compass at P moves from P1 to P2 when current flows. 1. Name the rule used to predict the direction of deflection of the magnetic compass. 2. State the direction of current in the conductor (X to Y or Y to X) when the circuit is complete. 3. If resistance R is increased, then what will be the effect on the magnetic lines of force around the conductor? 4 marks



Q34. Calculate the current through the 3 Ω resistance when the circuit is complete. 4 marks

Q35. 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. 4 marks



Q36. Write two reasons, supported by mathematical calculations where applicable, to justify your choice of the safest circuit. 4 marks

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