

PHY1FM105:Physics in daily life

Section-A-Mark-2

1. Define frequency and give its SI unit.
2. Describe the role of the pendulum in a pendulum clock.
3. List the characteristics of the most accurate timekeepers.
4. Analyze why a pendulum works best when it swings with almost perfect freedom.
5. Explain how the escapement mechanism keeps the pendulum swinging.
6. Explain why many modern clocks use quartz oscillators.
7. Explain how a quartz oscillator is considered a harmonic oscillator.
8. Identify the materials typically used for toner in xerographic copiers.
9. List the two standard techniques for exposing the photoconductor to light?
10. Identify and explain the ' effect ' behind the Banana kick.
11. Detect how a tail wind influences the range of a goal kick.
12. Distinguish between the effects of a head wind and a tail wind on football ball flight.
13. Examine how a goalkeeper might misjudge the flight of a ball due to the effect of wind.
14. Explain the key factors that influence the range of a football during flight.
15. Distinguish between the range and time of flight of a football during its flight.
16. Draw a graph illustrating how the horizontal velocity of a football changes over time during its flight, with and without air drag.
17. Explain the term streamlines in relation to the airflow around a football.
18. Determine the role of viscosity in the airflow around a ball during its flight.
19. Examine the Bernoulli Effect in football and how it affects the airflow around the ball.
20. Distinguish between the boundary layer and the separation point when a football is moving through the air.

21. Analyse the technique of trapping a football underfoot.
22. Analyze the technique for receiving a soccer ball.
23. Identify the two types of catches made by goalkeepers in soccer.
24. Analyse the mechanics of Goalkeeper's throw in football.
25. Define frequency and give its SI unit
26. Discuss about the term Punch in football.
27. Discuss the significance of the term "punch" in football and how it impacts gameplay.
28. Distinguish between Oscillational and Vibrational motion.
29. Explain the mechanisms by which a football impact can lead to unconsciousness in a player?
30. Explain the difference between a slow but accurate pass and a powerful hard shot in football kick.
31. Describe the effect of pushing a child forward each time they swing toward you on a playground swing.
32. Explain the mechanics behind the Kick.
33. Define simple harmonic motion.
34. Explain the difference between harmonic and anharmonic oscillator.
35. Give an expression for the time period of the Simple pendulum
36. Describe the concept of an escapement.
37. Explain why crystalline quartz is ideal for making electronic clocks.
38. Define the characteristics and functions of photoconductors.
39. Briefly explain the concept of corona discharge.
40. State the relationship connecting electrostatic force (\mathbf{F}) and electric field (\mathbf{E}).
41. List the different types of forces on the foot while playing football.
42. Explain how the power developed in a fast kick is calculated?

43. Identify the type of spin that causes a ball to curl to the right when viewed from above, and the type that causes it to curl to the left.
44. Define the term "power" in relation to a kick and provide the corresponding mathematical expression.
45. Examine the impact of air drag on the throw - in of a football.
46. Illustrate how the airflow around a football shapes its trajectory during flight.
47. Analyze the factors that contribute to a successful long throw in football.
48. Discuss the impact of the duration of contact with the ball during a throw on the distance the ball can travel.
49. Explain the different types of heading techniques in football.
50. Describe the differences among various types of headers in football.
51. Identify type of header is characterized by the player diving towards the ball?
52. Define natural resonance and explain how it functions in timekeeping.
53. List at least three everyday objects that exhibit natural resonances.
54. Analyze the two main factors that determine the period of a harmonic oscillator.
55. Explain why the amplitude of a harmonic oscillator does not influence its period.
56. Describe the effect of the seam on the ball's trajectory.
57. Analyze the effect of a hard pitch on the speed of a pace bowler's deliveries.
58. Discuss the advantages that make hard pitches more favorable for fast bowlers compared to soft pitches.
59. Determine the type of pitch that tends to provide consistent carry to the wicketkeeper for pace bowlers and explain why.
60. Describe the differences between heartwood and sapwood regarding their appearance and density.
61. Identify a advantage and disadvantage of using LPG in the kitchen?
62. Describe how induction cooktops generate heat?
63. List two advantages of using induction cooktops over traditional gas stoves?

64. Determine the principle behind microwave cooking?
65. Examine how microwaves heat food differently than conventional ovens?
66. Identify the main purpose of a smoke detector in a household setting?
67. Explain how a fresh air fan can contribute to indoor air quality?
68. Define piezoelectric materials. Cite an example using the phenomenon of piezoelectricity.
69. Explain the reason for low-temperature breakage.
70. Distinguish between pace bowling and spin bowling?
71. Illustrate how the seam of the ball help pace bowling?
72. Explain pitch in cricket?
73. Determine the peculiarities of spin bowling?
74. Examine magnus effect in spin bowling?
75. Provide reason for choosing willow wood for making cricket bat?
76. Identify the sweet spot of a cricket bat and evaluate its significance in enhancing batting performance.
77. Mention the use of Hawkeye in cricket?
78. Identify peculiarities of hotspot in cricket?
79. Describe how snicko helps in cricket?
80. Describe Super SloMo in cricket?
81. Explain defrosting of the fridge?
82. Explain why the vegetable drawer is placed at the bottom of the fridge.
83. Identify two common sources of noise in the kitchen and explain how each source contributes to the overall noise level?
84. State Bernoulli's Principle?
85. Describe the importance of the seam on a cricket ball and illustrate how it affects bowling performance?

86. Explain the reasons for a cricket ball to spin more as the day progresses. Include at least two factors that contribute to this phenomenon?
87. Describe the effects of a cricket ball hitting the sweet spot of the bat. Include at least two key outcomes of this contact?
88. Analyze how hotspot technology in cricket is related to temperature changes. Include at least two key points in your response?
89. Name the audio input from the very sensitive stump microphone in cricket? Mention how it helps in cricket?
90. Name the three types of cameras used in cricket technology? Mention the role of it?
91. Draw the ball's trajectory in spin bowling? Explain how pressure and velocity variations leads its trajectory?
92. Select the type of bowling you like to prefer more in cricket and substantiate your answer?
93. Identify the uses of willow wood in manufacturing purposes and explain how it is beneficial?
94. Discuss the various types of pitches in cricket.
95. Distinguish between hard pitch and soft pitch.
96. Explain the various types of spin bowling in cricket.
97. Distinguish between backspin and topspin.
98. Analyze how the Magnus effect affects the trajectory of a cricket ball.
99. List the properties of willow wood that make it suitable for cricket bats.
100. Explain how the grain structure of willow wood impacts the performance of a cricket bat.
101. Explain why Aluminium, copper, and thin steel pots and pans are ideal for cooking using gas hobs.
102. What is the typical Gas: Air mixing ratio
103. Explain why it is suggested to place a gas bottle under shade, away from sunlight?

104. Explain the working principle behind electrical cook tops?
105. Discuss the difference between traditional and black glass-ceramic topped electrically heated ranges
106. What is the working principle behind induction heating?
107. Copper, aluminium, and even certain types of steel pots and pans cannot be used with induction hobs. Why?
108. Give any two advantages and two disadvantages of induction hobs.
109. What type of materials are preferred for making induction pots and pans?
110. Why is it that microwaves cannot penetrate any metallic material, no matter how thin it is?
111. Why do we need smoke detectors
112. Discuss the working of ionisation detectors
113. Discuss the basic principle of refrigerator
114. Explain the working principle behind modern weighing scales

Section-B-Mark-6

1. Explain how the photoconductor works and how it becomes conductive when exposed to light
2. Briefly explain the structure and working of a Photocopier.
3. Adapt the principles of the Magnus effect to explain the influence of spin on a football's flight path.
4. Apply the relationship between wind speed and ball deflection to explain how a side wind affects a penalty kick.
5. Compare the effects of a head wind and a side wind on the flight of a football in terms of range and direction.
6. Explain the concept of the boundary layer in the flight of a football with suitable diagram .
7. Analyse how the Bernoulli effect creates pressure differences around a football while it is flying.

8. Define the term turbulent wake and illustrate your explanation with a clear diagram.
9. Analyze how critical speed is related to the surface of a football, and how do features like stitching affect the critical speed?
10. Compare the two types of catches made by goalkeepers in soccer.
11. The ball is moving at a speed of 25 miles per hour and the coefficient of restitution is $\frac{2}{3}$, then calculate move back speed of foot ?
12. Illustrate trapping in football with the help of diagrams.
13. Illustrate the fascinating mechanics behind the operation of a quartz clock.
14. A child swinging on a swing set travels back and forth at a steady pace. Explain the factors that determine the period of the child's motion.
15. When the copies emerge from Xerographic copier, they tend to stick to things and attract lint. Find the reason behind this effect?
16. Describe how the power generated during a fast kick is determined, considering the roles of kinetic energy and time in the calculation.
17. Discuss the various factors that influence the amount of curve or bend in the ball's flight after a kick.
18. Explain the reasons goalkeepers often prefer throwing the ball over kicking it, and discuss the advantages that throwing offers in gameplay.
19. Explain the two circumstances in which a goalkeeper cannot catch the ball?
20. Compare the roles of a goalkeeper and an attacking player in relation to the punching action. Under what circumstances might an attacking player score a goal with a punch?
21. Explain the role of potential and kinetic energy in the oscillation of a pendulum.
22. Compare the roles of heartwood and sapwood in a tree's life cycle and their uses in making bats.
23. Describe the principle of xerography, emphasizing the role of static electricity. How do the photoconductor, toner, and transfer mechanism work together to create a copy?

24. Explain the Magnus effect and its influence on the trajectory of a cricket ball when it is bowled with spin.
25. Provide the advantages and disadvantages of using LPG and electricity as energy sources for cooking in terms of efficiency, cost, and environmental impact.
26. Describe the mechanism by which microwave ovens cook food and compare this process to traditional cooking methods in terms of energy usage and cooking time.
27. Execute the impact of dishwashers on kitchen hygiene. Consider how effective they are at sanitizing dishes compared to traditional washing methods.
28. Determine the various ways energy is wasted in a typical kitchen. Discuss at least three specific appliances or practices that contribute to this wastage and suggest effective solutions for each.
29. Illustrate various materials like stainless steel, aluminium, copper and brass and cast iron and its peculiarities as kitchen utensils
30. Describe the role of piezoelectricity in modern gas lighters. In your response, analyze the process of how the spark is generated and evaluate the advantages of using piezoelectric mechanisms compared to traditional ignition methods.
31. Describe the use of dishwasher by explaining its internal parts?
32. Mention electromagnetic waves? Provide the use of microwave in the kitchen?
33. Extrapolate smoke detectors? Classify its types?
34. Explain the benefits of using a fresh air fan in indoor spaces. Discuss its role in improving air quality?
35. Analyse the effect of pace bowling and spin bowling in cricket.
36. Analyse the differences between hard and soft pitches in cricket. Discuss how each type of pitch influences batting and bowling strategies, including specific challenges and advantages for players?
37. Analyze how the Magnus effect influences the trajectory of a spinning cricket ball?
38. Discuss the selection of willow wood for manufacturing cricket bats by discussing its unique properties?

39. Explain the role of Hawkeye technology in cricket and draw the model of hawkeye system ?
40. Describe the function of Hotspot technology in cricket and analyze its effectiveness in identifying ball contact with the bat or pads?
41. Explain the operation of Snicko technology in cricket and evaluate its role in determining edges and bat contact with the ball. Discuss specific instances where Snicko has played a crucial role in decision-making during matches?
42. Analyze the benefits of Super SloMo technology in cricket broadcasting. Discuss how it enhances the viewer's understanding of key moments and player techniques?
43. Discuss the influence of Bernoulli's effect in sports, focusing on how it affects the trajectory of cricket ball.
44. Compare the technology of hawkeye with Super SloMo?
45. Examine the functions and applications of three types of cameras used in cricket technology. Provide specific examples of how each type contributes to the analysis and enjoyment of the game?
46. Determine the essential considerations for safe and effective microwave cooking, including recommended vessels and key tips to remember?
47. Provide the advantages and disadvantages of using an induction cooktop, and evaluate its impact on cooking efficiency and safety?
48. Estimate the role of LPG as a fuel source in modern households, discussing its advantages, disadvantages, and environmental impact?
49. Determine the key advantages and disadvantages of using electricity as a cooking source?
50. Describe how a simple pendulum can be modeled as a harmonic oscillator? Explain the relationship between the period of a simple pendulum and its length?
51. Explain the role of the quartz crystal in the functioning of a quartz clock? List two advantages of quartz clocks compared to traditional mechanical clocks?
52. Identify the key components of Pendulum clock and electronic clock and their functions? Discuss the performance of both clock types?

53. Describe the key steps involved in the xerographic process, including the role of the photoconductor?
54. Define each term— Oscillation, and harmonic motion—highlighting their key features? Identify and describe one example of each type of motion.
55. Draw a flowchart to demonstrate the working of microwave oven.
56. Discuss how microwaves are produced?

Section-C-Mark-10

1. How does a pendulum clock work? Explain the role of the escapement mechanism and how energy keeps the pendulum swinging. What features help make the clock more accurate?
2. Discuss the role of boundary layers and flow separation in the Magnus effect. Explain how do these phenomena contribute to the curved flight of a ball in Banana kick with suitable diagram.
3. Explain the following concepts with clear diagrams: (i) The Bernoulli Effect (ii) Flow Separation and the Formation of a Turbulent Wake. Illustrate how these phenomena impact the behavior of air around a moving football.
4. With a neat diagram, illustrate the functioning of a pendulum clock.
5. Analyze the operation of an electronic clock, accompanied by a detailed diagram.
6. Examine the underlying principles and operational mechanics of a photocopier in detail.
7. Explain the Bernoulli effect and the concept of flow separation, and discuss their relevance to the flight dynamics of a football, including how these principles influence the ball's trajectory.
8. Analyze the principles of harmonic oscillation and how they apply to the design of clocks. Discuss why harmonic oscillators are preferred in timekeeping devices.
9. Explain how a pendulum clock works, focusing on the roles of the pendulum, escapement, and toothed wheel in keeping accurate time.
10. Describe the steps involved in making a copy using a xerographic copier. How does light affect the photoconductor in this process?

11. Demonstrate the impact of using LPG and electricity as energy sources in the kitchen?
12. Discuss the significance of the Magnus effect in various sports, including cricket, soccer, and tennis. Analyze how this phenomenon affects the trajectory and behavior of balls during play, and evaluate its implications for athletes' strategies and performance?
13. Explain the working principle of a refrigerator, focusing on the refrigeration cycle. Draw diagram of coils and compressor in a fridge. Finally, assess the food storage and odour removal in the fridge?
14. Estimate the energy wastage in the kitchen and its solutions?
15. Compare and contrast pace bowling and spin bowling in cricket, focusing on their techniques, strategies, and roles within a team. Evaluate how different pitch conditions and match situations influence the effectiveness of each bowling style?
16. Examine the impact of technology on the game of cricket? Analyze how these technologies enhance fairness, accuracy and viewer engagement in the sport?
17. Detect how the Magnus effect affects spin bowling in cricket. In your response, analyze the physics behind the Magnus effect, illustrate its impact on the ball's trajectory, and discuss its implications for both bowlers and batsmen?
18. Analyze how Bernoulli's principle and the Magnus effect influence the trajectory of a ball, and discuss additional applications of Bernoulli's effect in various fields?
19. Determine the advantages and disadvantages of using LPG versus electricity as energy sources for household applications, and evaluate their impact on the environment?
20. Determine the importance of refrigerators for household purposes, and examine their impact on food preservation and energy consumption?
21. Examine the various types of cricket technologies and analyze how they contribute to the reliability and fairness of the game?
22. Explain the roles of Hawk-Eye, Hotspot, Snicko, and Super Slow-Mo in cricket.