Maximum Marks: 40 Time Allowed: 1:30 hours.

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| Q1.) | A freely falling object travels 4.9 m in 1st second, 14.7 m in 2nd second, 24.5 m in 3rd second, and so on. This data shows that the motion of a freely falling object is a case of :<br>(a) uniform motion (b) uniform acceleration (c) no acceleration (d) uniform velocity | **(1)** |
| Q2.) | When a car runs on a circular track with a uniform speed, its velocity is said to be changing. This is because :<br>(a) the car has a uniform acceleration (b) the direction of car varies continuously<br>(c) the car travels unequal distances in equal time intervals<br>(d) the car travels equal distances in unequal time intervals | **(1)** |
| Q3.) | Which of the following statement is correct regarding velocity and speed of a moving body ?<br>(a) velocity of a moving body is always higher than its speed<br>(b) speed of a moving body is always higher than its velocity<br>(c) speed of a moving body is its velocity in a given direction<br>(d) velocity of a moving body is its speed in a given direction | **(1)** |
| Q4.) | A sprinter is running along the circumference of a big sports stadium with constant speed. Which of the following do you think is changing in this case ?<br>(a) magnitude of acceleration being produced<br>(b) distance covered by the sprinter per second<br>(c) direction in which the sprinter is running<br>(d) centripetal force acting on the sprinter | **(1)** |
| Q5.) | The inertia of a moving object depends on :<br>(a) momentum of the object (b) speed of the object (c) mass of the object (d) shape of the object | **(1)** |
| Q6.) | When a rubber balloon held between the hands is pressed, its shape changes. This happens because :<br>(a) balanced forces act on the balloon (b) unbalanced forces act on the balloon<br>(c) frictional forces act on the balloon (d) gravitational forces act on the balloon | **(1)** |

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| Q7.) | Which of the following effect cannot be produced by an unbalanced force acting on a body ?<br>(a) change in speed of the body (b) change in shape of the body<br>(c) change in direction of motion of the body<br>(d) change in state of rest of the body | **(1)** |
| Q8.) | A rectangular wooden block has length, breadth and height of 50 cm, 25 cm and 10 cm, respectively. This wooden block is kept on ground in three different ways, turn by turn. Which of the following is the correct statement about the pressure exerted by this block on the ground ?<br>(a) the maximum pressure is exerted when the length and breadth form the base<br>(b) the maximum pressure is exerted when length and height form the base<br>(c) the maximum pressure is exerted when breadth and height form the base<br>(d) the minimum pressure is exerted when length and height form the base | **(1)** |
| Q9.) | Each of the following statement describes a force acting. Which force is causing work to be done ?<br>(a) the weight of a book at rest on a table<br>(b) the pull of a moving railway engine on its coaches<br>(c) the tension in an elastic band wrapped around a parcel<br>(d) the push of a person's feet when standing on the floor | **(1)** |
| Q10.) | A girl weighing 400 N climbs a vertical ladder. If the value of g be 10 m $s^{-2}$ , the work done by her after climbing 2 m will be :<br>(a) 200 J (b) 800 J (c) 8000 J (d) 2000 J | **(1)** |
| Q11.) | Which of the following does not possess the ability to do work not because of motion ?<br>(a) a sparrow flying in the sky (b) a sparrow moving slowly on the ground<br>(c) a sparrow in the nest on a tree (d) a squirrel going up a tree | **(1)** |
| Q12.) | The maximum speed of vibrations which produce audible sound will be in :<br>(a) dry air (b) sea water (c) ground glass (d) human blood | **(1)** |
| Q13.) | The sound waves travel fastest :<br>(a) in solids (b) in liquids (c) in gases (d) in vacuum. | **(1)** |

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| Q14.) | The speeds of sound in four different media are given below. Which of the following is the most likely speed in m/s with which the two under water whales in a sea talk to each other when separated by a large distance ?<br>(a) 340 (b) 5170 (c) 1280 (d) 1530 | (1) |
| Q15.) | When the pitch of note produced by a harmonium is lowered, then the wavelength of the note :<br>(a) decreases (b) first decreases and then increases (c) increases (d) remains the same | (1) |
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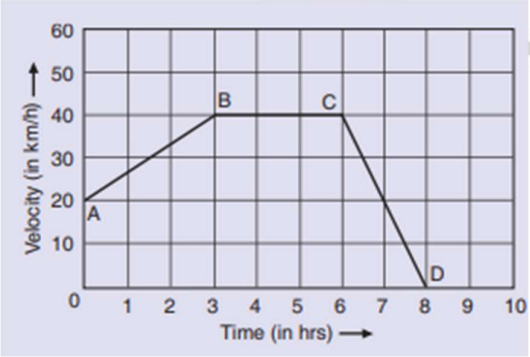
| Q16.) | The velocities of sound waves in four media P, Q, R and S are 18,000 km/h, 900 km/h, 0 km/h, and 1200 km/h respectively. Which medium could be a liquid substance ?<br>(a) P (b) Q (c) R (d) S | 1 |
| Q17.) | Which of the following can produce longitudinal waves as well as transverse waves under different conditions ?<br>(a) water (b) TV transmitter (c) slinky (d) tuning fork | 1 |
| Q18.) | Which one of the following does not consist of transverse waves ?<br>(a) light emitted by a CFL (b) TV signals from a satellite (c) ripples on the surface of a pond (d) musical notes of an orchestra | 1 |
| Q19.) | (a) What is the difference between 'distance travelled' by a body and its 'displacement' ? Explain with the help of a diagram.<br>(b) An ant travels a distance of 8 cm from P to Q and then moves a distance of 6 cm at right angles to PQ. Find its resultant displacement. Draw appropriate diagram | 2 |
| Q20.) | Derive equation of motion graphically ( 2nd equation of motion) | 2 |
| Q21.) | Given alongside is the velocity-time graph for a moving body : Find : (i) Velocity of the body at point C. (ii) Acceleration acting on the body between A and B. (iii) Acceleration acting on the body between B and C.<br>  <br> | 2 |

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| Q22.) | Ramesh and Sandeep are two very close friends who study in classes IX and X respectively. One day Ramesh and Sandeep had to go to a neighbouring town on their bicycles for some work. They had to cross a railway line on the way to the neighbouring town. When Ramesh and Sandeep were going in the afternoon, the railway crossing barrier was open, so they did not have to wait for going across it. Their work in the neighbouring town kept Ramesh and Sandeep busy till late in the evening. On their way back home, when Ramesh and Sandeep reached the same railway crossing, it was quite dark in the night and the railway crossing barrier was down (or closed) indicating that some train was expected to pass through soon. Ramesh was in a hurry to go back home. Ramesh told Sandeep that since he could not hear the sound of approaching train, so they did not know when the train would pass through the crossing and barrier would open. He suggested that instead of keeping on waiting, they should cross the railway tracks by going below the closed barrier by tilting their bicycles and lowering their heads. Sandeep did not agree with Ramesh. Sandeep said that they would not cross the railway tracks as long as the barrier was closed. Suddenly, Ramesh slipped through the barrier and put his ear on the railway track. Sandeep pulled him away from the railway track quickly. As soon as Ramesh was pulled away from the railway track, a super-fast train passed through the same track in the darkness of night without blowing any horn. Sandeep was very angry with Ramesh and scolded him for the risk he had taken. After the train passed through the crossing, the barrier was opened by railway staff. Ramesh and Sandeep then crossed the railway track alongwith their bicycles and reached home safely.<br>(a) How many times more is the speed of sound in railway track than the speed of sound in air ?<br>(b) Why did Sandeep not allow Ramesh to cross the closed barrier of railway crossing ?<br>(c) Why did Ramesh put his ear to the railway track ?<br>(d) Why did Sandeep pull Ramesh away from the railway track ? | 4 |

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| Q23.) | Veena's elder sister Rashmi, who is four months pregnant, has come to stay with them for a week. Veena's mother, Mrs. Nirmala, wanted to take Rashmi to a gynaecologist for a prenatal (before birth) medical check-up. Veena also accompanied them to the hospital. The gynaecologist carried out the required physical examination of Rashmi and then recommended a particular scan to be done. While going to the Imaging Department of the hospital, Mrs. Nirmala said that after the scan is done, she would ask the doctor doing the scan a specific question about the foetus. Veena is a student of class X who has studied the reproductive systems of humans in the class. She could make out what her mother was going to ask the doctor about the developing foetus. Veena asked her mother not to ask any irrelevant question based on the scan to be done and explained the reason for it. Mrs. Nirmala agreed to what Veena had said. After the required scan was done, all of them visited the gynaecologist again. The gynaecologist studied the scan carefully and said that everything was okay. Everyone was happy. While coming back home, Mrs. Nirmala said that instead of going to a far off hospital the same purpose could have been served by getting an X-ray done on Rashmi at the neighbourhood X-ray clinic. Veena did not agree with her mother. She said a firm 'No' to X-ray on Rashmi at this stage.<br><br>(a) What type of scan was recommended by gynaecologist for Rashmi ? Name the machine used for this purpose.<br>(b) Why was the above scan recommended ?<br>(c) Describe the principle of working of the scanning machine briefly. What is this technique known as ?<br>(d) What do you think was the irrelevant question which Mrs. Nirmala wanted to ask the doctor after the scan was done ? | **(4)** |
| Q24.) | Give one example each where :<br>(a) a force moves a stationary body. (b) a force stops a moving body.<br>(c) a force changes the speed of a moving body.<br>(d) a force changes the direction of a moving body.<br>(e) a force changes the shape (and size) of a body. Any 4 | **2** |
| Q25.) | (a) Explain the terms 'compressions' and 'rarefactions' of a wave. What type of waves consist of compressions and rarefactions ?<br>(b) A worker lives at a distance of 1.32 km from the factory. If the speed of sound in air be 330 m/s, how much time will the sound of factory siren take to reach the worker ?<br>( c ) Draw the sketches of two waves A and B such that wave A has twice the | **6** |

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| | wavelength and half the amplitude of wave B.<br>( d ) A device called oscillator is used to send waves along a stretched string. The string is 20 cm long, and four complete waves fit along its length when the oscillator vibrates 30 times per second. For the waves on the string :<br>(a) what is their wavelength ? (b) what is their frequency ? (c) what is their speed ? | |