

WORK, ENERGY AND POWER

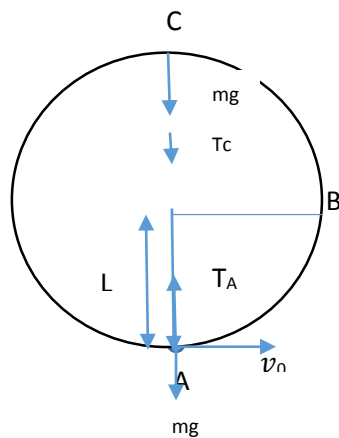
General Instructions: Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer.

Test Paper-II

MAX MARKS: 30

TIME: 90Mts

- 1 A woman pushes a trunk on a railway platform which has a rough surface. She applies a force of 100 N over a distance of 10m. Thereafter, she gets progressively tired and her applied force reduces linearly with distance 50 N. The total distance through which the trunk has been moved is 20m. Plot the force applied by the woman and the frictional force, which is 50 N versus displacement. Calculate the work done by the two forces over 20m. P119 3
- 2 Prove Work-Energy theorem for a variable force. P119 3
- 3 A block of mass $m=1\text{kg}$ moving on a horizontal surface with speed $v_f = 1\text{ kg}$, moving on a horizontal surface with speed $v_i = 2\text{ms}^{-1}$ enters a rough patch ranging from $x = 0.10\text{m}$ to $x = 2.01\text{m}$. The retarding force F_r , on the block in this range is inversely proportional to x over this range.
 $F_r = \frac{-k}{x}$ for $0.1 < x < 2.01\text{m}$
 $=0$ for $x < 0.1\text{m}$ and $x > 2.01\text{m}$ where $k = 0.5\text{J}$. What is the final kinetic energy and speed v_f of the block as it crosses this patch? P120 3
- 4 Define Potential energy of a body. Give an example. Give the dimensional formula of Potential energy. P120 2
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- 5 Derive an expression to find the potential energy of a body. P120 2
- 6 What is Gravitational potential energy of a body? What type of energy is possessed by a body at certain height from the surface of the earth? Name the type of energy possessed by the body when the body strikes the surface of the earth. P121 2
- 7 Give the differences between conservative and non-conservative forces. P121 3
- 8 State and prove the law of conservation of Mechanical energy P121 3
- 9 A bob of mass m is suspended by a light string of length L . It is imparted a horizontal velocity v_0 at the lowest point A such that it completes semicircular trajectory in the vertical plane with the string becoming slack only on reaching the topmost point C. This is shown in fig. (a) Obtain an expression for v_0 . (b) the speeds at points B and C. P122 3
P122 3



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| 10 | Find the ratio of the kinetic energies at the points B and C. Comment on the nature of the trajectory of the bob after the bob reaches the point C. | P123 | 2 |
| 11 | Mention the forces that are acting on the body in the Q No.10 at the Point A | P122 | 1 |