

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-III

MAX MARKS: 30

TIME: 90Mts

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| 1 | State Hooke's Law. Also give the equation representing the same. | P123 | 2 |
| 2 | Derive an expression to find the work done by the spring when the block attached to the spring is pulled through a distance of x_m . also give the plot showing the variation of F_s versus x | P123 | 3 |
| 3 | Plot the graph showing the variation of Potential energy and kinetic energy of a block attached to a spring obeying Hooke's law. Also show that the total mechanical energy remains constant in the case of the spring. | P124 | 3 |
| 4 | Show that spring force is a conservative force. | P123 | 3 |
| 5 | Consider a car of mass 1000kg moving with a speed 18.0km/hr on a smooth road and colliding with a horizontally mounted spring of spring constant $6.25 \times 10^3 \text{ N m}^{-1}$. What is the maximum compression of the spring? | P124 | 3 |
| 6 | By taking the value of coefficient of friction to be 0.5 Calculate the maximum compression of the spring in the Q No. 5 | P125 | 3 |
| 7 | What are exothermic and endothermic reactions? | P126 | 2 |
| 8 | Give the relationship between mass and energy. Also calculate energy associated with one kilogram of matter. | P126 | 2 |
| 9 | (a) Express the energy required to break one bond in DNA in eV
(b) The kinetic energy of an air molecule(10^{-21}) in eV | P127 | 2 |
| 10 | State the principle of conservation of energy | P128 | 1 |
| 11 | Define power. What is the expression to find the power? Give the dimensional formula of Power? What is the value of 1hp in terms of and watts | P128 | 3 |
| 12 | An elevator can carry a maximum load of 1800kg is moving up with a constant speed of 2ms^{-1} . The frictional force opposing the motion is 4000N. Determine | P128 | 2 |

the minimum power delivered by the motor to the elevator in watts as well as in horse power.

- 13 What is the unit of measurement of energy used in our electricity bills? P128 1