Module-Test-11
(Physics-JEE)

January 18, 2023

Section-A
(One Options Correct Type)

This section contains 20 multiple choice questions. Each question has four choices (A), (B), (C) and (D), out of which ONLY ONE option is correct.

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1. The total work done on a particle is equal to the change in its kinetic energy

   a) always *Ans.*
   b) only if the forces acting on the body are conservative
   c) only in the inertial frame
   d) only if no external force is acting

2. Identify, which of the following energies can be positive (or zero) only?

   a) Kinetic energy *Ans.*
   b) Potential energy
   c) Mechanical energy
   d) Both kinetic and mechanical energies

3. A pump is required to lift 800 kg of water per minute from a 10 m deep well and eject it with speed of $20\,\mathrm{m\,s^{-1}}$. The required power in watts of the pump will be

   a) 6000
   b) 4000 *Ans.*
   c) 5000
   d) 8000

4. A particle of mass m moves from rest under the action of a constant force F which acts for two seconds. The maximum power attained is

   a) $2Fm$
   b) $\dfrac{F^2}{m}$
   c) $\dfrac{2F}{m}$
   d) $\dfrac{2F^2}{m}$ *Ans.*

5. A bullet moving with a speed of $100\,\mathrm{m\,s^{-1}}$ can just penetrate into two planks of equal thickness. Then the number of such planks, if speed is doubled will be

   a) 6
   b) 10
   c) 4
   d) 8 *Ans.*

6. Power applied to a particle varies with time as $P=(3t^2-2t+1)\mathrm{W}$, where t is in second. Find the change in its kinetic energy between time $t=2\,\mathrm{s}$ and $t=4\,\mathrm{s}$

   a) 32 J
   b) 46 J *Ans.*
   c) 61 J
   d) 102 J

7. A block of mass 10 kg is moving in x-direction with a constant speed of $10\,\mathrm{m\,s^{-1}}$. It is subjected to a retarding force $F=-0.1x\,\mathrm{J/m}$ during its travel from $x=20\,\mathrm{m}$ to $x=30\,\mathrm{m}$. Its final kinetic energy will be

a) 475 J *Ans.*

b) 450 J

c) 275 J

d) 250 J

8. The kinetic energy of a projectile at its highest position is K. If the range of the projectile is four times the height of the projectile($R = 4H$), then the initial kinetic energy of the projectile is

a) $\sqrt{2}K$

b) $2K$ *Ans.*

c) $4K$

d) $2\sqrt{2}K$

9.

Section-B
(Numerical Answer Type)

This section contains 10 questions. The answer to each question is a NUMERICAL VALUE. For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to the second decimal place).
Do any 5 questions out of 10 Questions.

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21. This is Section-B. [0]