9th Class Work, Energy and Power MCQ

1. Is it possible to do work on an object that remains at rest?

1)Yes 2) No

2. A box is being pulled across a rough floor at a constant speed. What can you say about the work done by friction?

1) friction does no work at all 2) friction does negative work 3) friction does positive work

3. In a baseball game, the catcher stops a 90-mph pitch. What can you say about the work done by the catcher on the ball?

1) catcher has done positive work 2) catcher has done negative work 3) catcher has done zero work

4. A ball tied to a string is being whirled around in a circle. What can you say about the work done by tension?

1) tension does no work at all 2) tension does negative work 3) tension does positive work

5. A box is being pulled up a rough incline by a rope connected to a pulley. How many forces are doing work on the box?

1) one force 2) two forces 3) three forces 4) four forces 5) no forces are doing work

6. You lift a book with your hand in such a way that it moves up at constant speed. While it is moving, what is the total work done on the book?

1) $mg \times \Delta r$ 2) $F_{HAND} \times \Delta r$ *3)* $(F_{HAND} + mg) \times \Delta r$ 4) zero 5) none of the above

7. By what factor does the kinetic energy of a car change when its speed is tripled?

1) no change at all 2) factor of 3 3) factor of 6 4) factor of 9 5) factor of 12

8. Car #1 has twice the mass of car #2, but they both have the same kinetic energy. How do their speeds compare?

1) $2\,v1 = v2$ 2) $\sqrt{2}\,v1 = v2$ 3) $4\,v1 = v2$ 4) $v1 = v2$ 5) $8\,v1 = v2$

9. Two stones, one twice the mass of the other, are dropped from a cliff. Just before hitting the ground, what is the kinetic energy of the heavy stone compared to the light one?

1) quarter as much 2) half as much 3) the same 4) twice as much 5) four times as much

10. In the previous question, just before hitting the ground, what is the final speed of the heavy stone compared to the light one?

1) quarter as much 2) half as much 3) the same 4) twice as much 5) four times as much

11. A child on a skateboard is moving at a speed of 2 m/s. After a force acts on the child, her speed is 3 m/s. What can you say about the work done by the external force on the child?

1) positive work was done 2) negative work was done 3) zero work was done

12. A car starts from rest and accelerates to 30 mph. Later, it gets on a highway and accelerates to 60 mph. Which takes more energy, the 0→30 mph, or the 30→60 mph?

1) 0 → 30 mph 2) 30 → 60 mph 3) both the same

13. Is it possible for the kinetic energy of an object to be negative?

1) yes 2) no

14. Is it possible for the gravitational potential energy of an object to be negative?

1) yes 2) no

15. Two paths lead to the top of a big hill. One is steep and direct, while the other is twice as long but less steep. How much more potential energy would you gain if you take the longer path?

1) the same 2) twice as much 3) four times as much 4) half as much
5) you gain no PE in either case
16. How does the work required to stretch a spring 2 cm compare with the work required to stretch it 1 cm?
1) same amount of work 2) twice the work 3) 4 times the work 4) 8 times the work
17. A mass attached to a vertical spring causes the spring to stretch and the mass to move downwards. What can you say about the spring's potential energy (PEs) and the gravitational potential energy (PEg) of the mass?
1) both PEs and PEg decrease 2) PEs increases and PEg decreases
3) both PEs and PEg increase 4) PEs decreases and PEg increases
5) PEs increases and PEg is constant
18. Three balls of equal mass start from rest and roll down different ramps. All ramps have the same height. Which ball has the greater speed at the bottom of its ramp?
1) 2) 3) 4) same speed for all balls
19. A box sliding on a frictionless flat surface runs into a fixed spring, which compresses a distance *x* to stop the box. If the initial *speed* of the box were *doubled*, how much would the spring compress in this case?
1) half as much 2) the same amount 3) $\sqrt{2}$ times as much 4) twice as much 5) four times as much
20. You see a leaf falling to the ground with *constant speed*. When you first notice it, the leaf has initial total energy PEi + KEi. You watch the leaf until just before it hits the ground, at which point it has final total energy PEf + KEf. How do these total energies compare?
1) PEi + KEi > PEf + Kef 2) PEi + KEi = PEf + KEf
3) PEi + KEi < PEf + Kef 4) impossible to tell from the information provided
21. Mike applied 10 N of force over 3 m in 10 seconds. Joe applied the same force over the same distance in 1 minute. Who did more work?
1) Mike 2) Joe 3) both did the same work
22. Mike performed 5 J of work in 10 secs. Joe did 3 J of work in 5 sec. Who produced the greater power?
1) Mike produced more power 2) Joe produced more power
3) both produced the same amount of power
Answers:
1. 2 2. 2 3. 2 4. 1 5. 3 6. 4 7. 4 8. 2 9. 4 10. 3 11. 1
12. 2 13. 2 14. 1 15. 1 16. 3 17. 2 18. 4 19. 4 20. 1 21. 3 22. 2