

535/1
PHYSICS
Paper 1
Tue 2nd Feb. 2021

Uganda Certificate of Education
TOPICAL REVISION QUESTIONS SET 2
OLEVEL PHYSICS

Paper 1

Topic: Work, Energy & Power

NAME: _____ **STREAM:** _____

INSTRUCTIONS:

Answer all questions in this paper.

Mathematical tables, side rulers and silent non-programmable calculators may be used.

These values of physical quantities may be useful to you.

Acceleration due to gravity	=	10 m s^{-2}
Specific heat capacity of water	=	$4200 \text{ J kg}^{-1} \text{ K}^{-1}$

SECTION A: (71 Marks)

Answer all questions in this section.

Question 1:

A person pushes a toy cart along a level road and lets it to go. Which one of the following presents the correct order of energy changes which occur when the cart slows down to rest?

- A. Heat energy $\rightarrow$ Kinetic energy + Sound energy.
- B. Kinetic energy $\rightarrow$ Heat energy + Sound energy.
- C. Kinetic energy $\rightarrow$ Potential energy + Sound energy.
- D. Potential energy $\rightarrow$ Heat energy + Sound energy.

☐

Question 2:

Find the power expended when a pump lifts 200 kg of water through a vertical height of 0.6 m in 1 s.

- A. 33.3 W
- B. 120.0 W
- C. 333.3 W
- D. 1200.0 W

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Question 3:

The energy transferred from one point to another by moving charges is

- A. light energy.
- B. electrical energy.
- C. sound energy.
- D. chemical energy.

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Question 4:

An engine rated 10,000 watts raises a body vertically at a velocity of 20 m s^{-1} . Find the mass of the body in kg.

- A. 5.0×10^1
- B. 5.0×10^2
- C. 2.0×10^4
- D. 2.0×10^5

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Question 5:

The energy stored in a moving body depends on its

- (i). mass.
- (ii). volume.
- (iii). velocity.

- A. (i) only.
- B. (i) and (ii) only.
- C. (i) and (iii) only.
- D. (i), (ii) and (iii).

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Question 6:

The following devices convert electric energy to heat energy.

- (i). Cooker.
- (ii). Electric iron.
- (iii). Electric fan.
- (iv). Refrigerator.

- A. (i), (ii) and (iii) only.
- B. (i) and (ii) only.
- C. (i) and (iii) only.
- D. (iii) and (iv) only.

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Question 7:

A 10 kg bag is raised from a height of 0.5 m to a height of 2 m in 2 s. Find the power expended in lifting the bag.

- A. 100 W.
- B. 75 W.
- C. 10 W.
- D. 7.5 W.

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Question 8:

The energy stored in a battery in a solar system is

- A. solar energy.
- B. chemical energy.
- C. electrical energy.
- D. nuclear energy.

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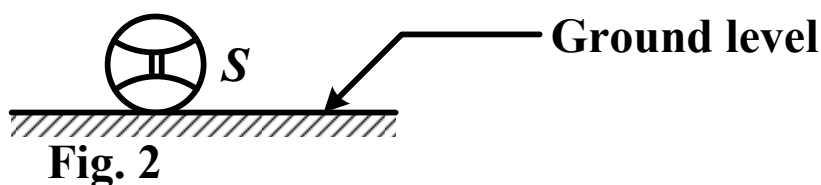
Question 9:

Figure 2 shows a ball falling vertically downwards.

Ball →  *P* Highest point

 *Q*

 *R*



Which **one** of the following statements is **true** about the kinetic energy of the ball?

- A. Kinetic energy at *Q* is equal to kinetic energy at *R*.
- B. Kinetic energy at *Q* is less than kinetic energy at *P*.
- C. Kinetic energy at *R* is greater than kinetic energy at *S*.
- D. Kinetic energy at *P* is less than kinetic energy at *S*.

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Question 10:

Which one of the following is **not** a primary source of energy?

- A. Dry cell.
- B. The sun.
- C. Water.
- D. Wind.

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Question 11:

Figure 1 shows energy changes by two devices *P* and *Q*

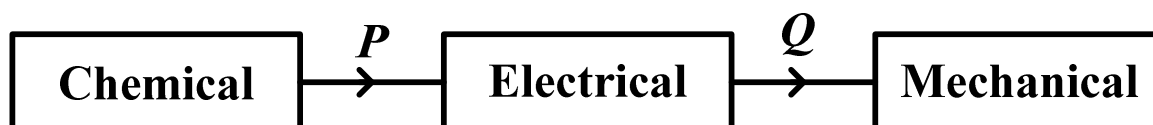


Fig. 1

P and *Q* are

- P*
- A. dynamo
 - B. battery
 - C. battery
 - D. dynamo

- Q*
- motor
 - dynamo
 - motor
 - battery

☐

Question 12:

A car travelling at a speed of 72 km h^{-1} overcomes a resistance of 30 N . Find the power developed by the engine of the car in watts.

A. $\frac{72 \times 30 \times 1000}{3600}$

B. $\frac{30 \times 3600 \times 72}{1000}$

C. $\frac{30 \times 3600 \times 1000}{72}$

D. $72 \times 3600 \times 1000$

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Question 13:

The source of geothermal energy is

- A. sun.
- B. earth.
- C. moon.
- D. water.

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Question 14:

A person of mass 20 kg develops a power of 20 W on climbing steps in 120 s . If each step is 0.2 m high, find the number of steps.

A. $\frac{20 \times 20}{20 \times 0.2}$

B. $\frac{20 \times 0.2}{20 \times 120}$

C. $\frac{20 \times 120}{200 \times 0.2}$

D. $\frac{0.2 \times 200}{20 \times 120}$

☐

Question 15:

The energy changes that take place when a stone is fired using a catapult and hits glass are

- A. Kinetic $\rightarrow$ heat + sound $\rightarrow$ elastic potential energy.
- B. Kinetic $\rightarrow$ elastic potential energy $\rightarrow$ heat + sound energy.
- C. Elastic potential energy $\rightarrow$ sound + heat $\rightarrow$ kinetic energy.

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- D. Elastic potential energy $\rightarrow$ kinetic energy $\rightarrow$ heat + sound energy.

Question 16:

Which of the following forms of energy is conserved in biogas?

- A. Chemical energy.
B. Potential energy.
C. Kinetic energy.
D. Heat energy.

☐

Question 17:

The energy change that takes place when a hot metal releases an electron is

- A. Heat energy $\rightarrow$ Potential energy.
B. Potential energy $\rightarrow$ Kinetic energy.
C. Heat energy $\rightarrow$ Kinetic energy.
D. Heat energy $\rightarrow$ Electrical energy.

☐

Question 18:

A power of 0.5 W is developed when a body of mass 200 g is raised to the top of a wall in 20 s. Find the height of the wall.

- A. 5.0×10^{-3} m.
B. 5.0×10^{-2} m.
C. 5.0×10^{-1} m.
D. 5.0×10^0 m.

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Question 19:

Which one of the following sources of energy is/are non-renewable?

- (i). Solar energy.
(ii). Fossil fuels.
(iii). Tidal power.

- A. (i) only.
B. (ii) and (iii) only.
C. (ii) only.
D. (i) and (iii) only.

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Question 20:

An engine rated 1000 W raises water through a vertical height of 50 m in 10 s. Find the weight of water raised.

- A. 5.0×10^{-1} N.
B. 2.0×10^1 N.
C. 2.0×10^2 N.

D. $5.0 \times 10^3 \text{ N}$.

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Question 21:

The energy stored in an accumulator is

- A. heat energy.
- B. chemical energy.
- C. electrical energy.
- D. mechanical energy.

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Question 22:

The energy which a body has by reason of its motion is

- A. Potential energy.
- B. Kinetic energy.
- C. Chemical energy.
- D. Internal energy.

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Question 23:

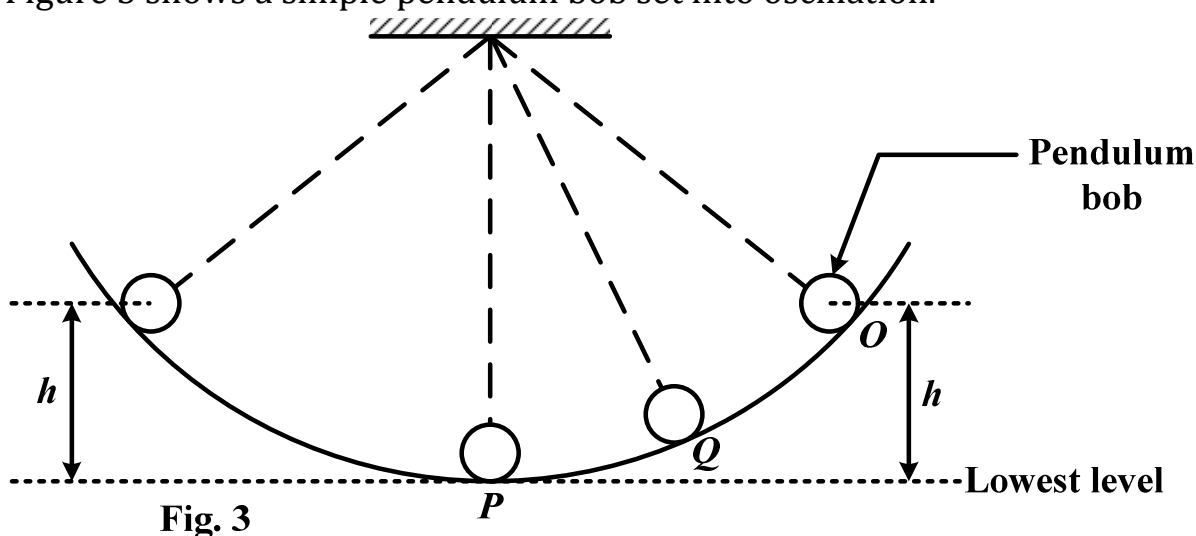
A boy of mass 20 kg develops a power of 20 W after climbing steps for 80 s. If each step is 20 cm high, find the number of steps climbed.

- A. 400 steps.
- B. 100 steps.
- C. 40 steps.
- D. 4 steps.

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Question 24:

Figure 3 shows a simple pendulum bob set into oscillation.



Which of the following statements is true about its energy changes during the motion?

- A. Kinetic energy at **P** is less than potential energy at **Q**.
- B. Potential energy at **P** is greater than Kinetic energy at **Q**.
- C. Kinetic energy at **P** is equal to potential energy at **Q**.
- D. Potential energy at **P** is equal to Kinetic energy at **Q**.

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Question 25:

The energy change that occurs in a loud speaker is

- A. Electrical to sound energy.
- B. Kinetic to sound energy.
- C. Sound to electrical energy.
- D. Potential to sound energy.

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Question 26:

A crane lifts a mass of 500 kg through a height of 12 m in 5 s. Find the power output.

- A. $500 \times 5 \times 12 \text{ W}$
- B. $\frac{500 \times 12 \times 5}{10} \text{ W}$
- C. $\frac{500 \times 10 \times 12}{5} \text{ W}$
- D. $\frac{500 \times 12}{10 \times 5} \text{ W}$

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Question 27:

During the power stroke of a petrol engine, the

- A. inlet valve opens.
- B. piston moves down.
- C. expanding gas pushes the piston down.
- D. burnt gas is pushed out from the cylinder.

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Question 28:

When a body is raised above the ground its gravitational potential energy

- A. is raised.
- B. is lowered.
- C. remains constant.
- D. changes to kinetic energy.

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Question 29:

Which one of the following devices converts electrical energy to mechanical energy?

- A. Thermopile.
- B. Battery.
- C. Dynamo.
- D. Motor.

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Question 30:

A car engine exerts a force of 500 N in moving 1000 m in 200 s. Calculate the power developed by the engine.

- A. 200 W.
- B. 500 W.
- C. 1000 W.
- D. 2500 W.

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Question 31:

The possible energy transfer in an electric bulb is

- A. light energy to heat energy.
- B. heat energy to electrical energy.
- C. electrical energy to light energy.
- D. light energy to electrical energy.

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Question 32:

The principle of conservation of energy states that

- A. energy is the ability to do work.
- B. energy is composed of kinetic and potential energy.
- C. energy will always be converted from one form to another.
- D. energy cannot be created or destroyed but it can be changed from one form into another.

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Question 33:

A man takes one minute to lift 4 bags of sugar each of weight 50 N through a height of 1.5 m. Calculate the power expended.

- A. 1.25 W
- B. 5.00 W
- C. 75.00 W
- D. 300.00 W

☐

Question 34:

During the power stroke of a four stroke petrol engine

- (i). the plug sparks.
- (ii). the piston moves up.
- (iii). both valves remain closed.

(iv). the piston moves down wards.

- A. (i) and (ii) only
- B. (i) and (ii) only.
- C. (i), (ii) and (iii) only.
- D. (i), (iii) and (iv) only.

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Question 35:

A man lifts a mass of 300 kg through a vertical height of 10 m in 12 s. What power does he expend?

- A. 200 W
- B. 360 W
- C. 2500 W
- D. 36000 W

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Question 36:

When a force F , acts on a body, its kinetic energy increases by 800 J over a distance of 2 m. What is the value of the force?

- A. 1600 N
- B. 80 N
- C. 400 N
- D. 2.5×10^{-3} N

☐

Question 37:

Which of the following shows the correct stages in an internal combustion engine?

- A. compression $\rightarrow$ power $\rightarrow$ exhaust $\rightarrow$ induction
- B. exhaust $\rightarrow$ induction $\rightarrow$ compression $\rightarrow$ power
- C. induction $\rightarrow$ power $\rightarrow$ compression $\rightarrow$ exhaust
- D. induction $\rightarrow$ compression $\rightarrow$ power $\rightarrow$ exhaust

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Question 38:

A crane lifts 4 bricks per minute through a height of 1.5 m. Find the power that is expended if each weighs 100 N.

- A. 2.5 W
- B. 10.0 W
- C. 150.0 W
- D. 600.0 W.

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Question 39:

In a four-stroke combustion engine, the correct order of strokes is

- A. compression $\rightarrow$ power $\rightarrow$ exhaust $\rightarrow$ induction
- B. exhaust $\rightarrow$ compression $\rightarrow$ power $\rightarrow$ induction
- C. induction $\rightarrow$ compression $\rightarrow$ power $\rightarrow$ exhaust
- D. induction $\rightarrow$ power $\rightarrow$ compression $\rightarrow$ exhaust

☐**Question 40:**

A crane raises a mass of 500 kg vertically upwards at a speed of 10 m s^{-1} , find the power developed.

- A. 5.0×10^0
- B. 5.0×10^1
- C. 5.0×10^2
- D. 5.0×10^4

☐**Question 41:**

A girl whose mass is 50 kg runs up a stair case 25 m high in 4 s. Find the power she develops.

- A. $\frac{50 \times 4}{25} \text{ W}$
- B. $\frac{50 \times 10}{25 \times 4} \text{ W}$
- C. $\frac{50 \times 25}{4} \text{ W}$
- D. $\frac{50 \times 10 \times 25}{4} \text{ W}$

☐**Question 42:**

A body of mass m kg and height h m from the ground has

- A. total gravitation potential energy = mh
- B. the greatest gravitational potential energy when at height, h
- C. the greatest potential energy when it just drops to the ground
- D. the least potential energy when at height $\frac{1}{2}h$ to the ground

☐**Question 43:**

A man lifts a weight of 300 N through a height of 2 m in 6 s. Determine the power he develops

- A. 25 W
- B. 100 W

- C. 600 W
- D. 900 W

☐

Question 44:

A train traveling at a constant speed of 20 m s^{-1} overcomes a resistive force of 8 kN. The power of the train is

- A. $(8 \times 20) \text{ W}$.
- B. $(8 \times 10 \times 20) \text{ W}$.
- C. $(8 \times 100 \times 20) \text{ W}$.
- D. $(8 \times 1000 \times 20) \text{ W}$.

☐

Question 45:

A pump is rated at 400 W. How many kilograms of water can it raise in one hour through a height of 72 m?

- A. 0.8 kg
- B. 5.6 kg
- C. 33.3 kg
- D. 2000 kg.

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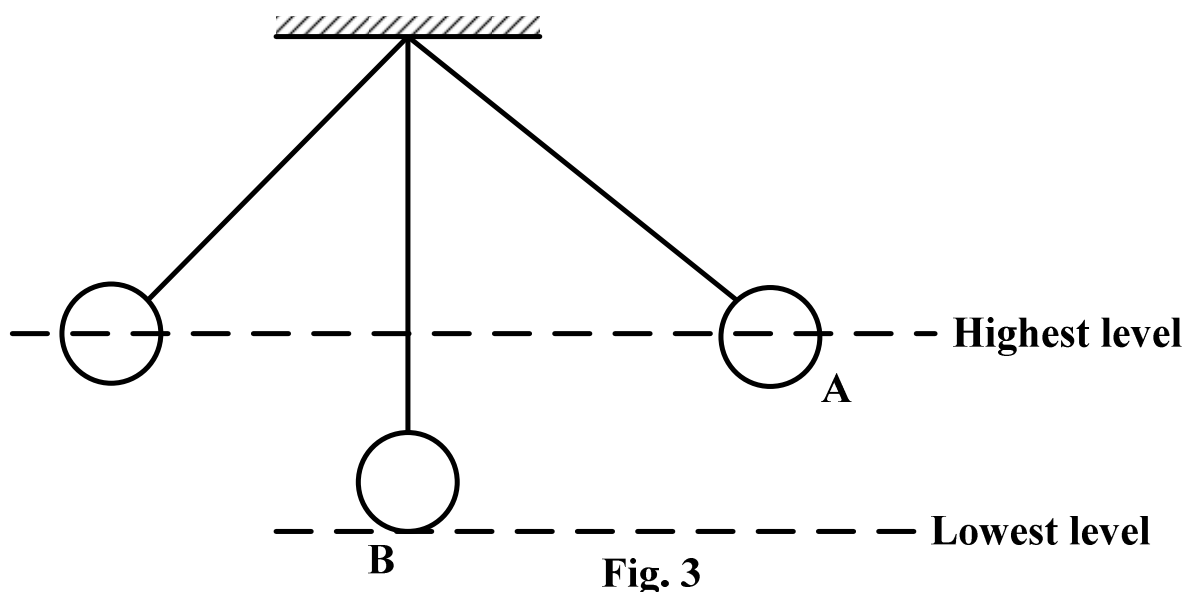
Question 46:

Which one of the following statements is true about energy transformation?

- A. A steam engine changes heat energy to mechanical energy
- B. A thermopile changes electrical energy to heat energy
- C. A dynamo changes electrical energy to mechanical energy
- D. A microphone changes electrical energy to sound energy

☐

Question 47:



The diagram in the figure 3 shows an oscillation pendulum lob. Which of the following statements is true about its motion?

- A. the kinetic energy at B is equal to the kinetic energy at A
- B. the kinetic energy at B is less than the potential energy at A
- C. the kinetic energy at B is equal to the potential energy at A.
- D. the kinetic energy at B is greater than the potential energy at Z

☐

Question 48:

An engine exerts a force of 2000 N at a speed of 15 m s^{-1} . Find the power developed by the engine in kW

- A. 30000
- B. 3000
- C. 300
- D. 30

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Question 49:

Which of the following forms mechanical energy

- A. electrical energy and kinetic energy
- B. potential energy and nuclear energy
- C. nuclear energy and kinetic energy
- D. potential energy and kinetic energy

☐

Question 50:

A constant force of 5 N acts on a body and moves it through a distance of 20 m in 10 seconds. Calculate its power.

- A. 2.5 W
- B. 10 W
- C. 40 W
- D. 100 W

Question 51:

A mouse of mass 0.03 kg climbs through a distance of 2 m up a wall in 4 s. The power expended in watts is

- A. $0.03 \times 2 \times 4 \times 10$
- B. $\frac{0.03 \times 4 \times 2}{10}$
- C. $\frac{0.03 \times 4 \times 10}{2}$
- D. $\frac{0.03 \times 2 \times 10}{4}$

Question 52:

A bullet of mass 0.02 kg is fired with a speed of 40 m s^{-1} . Calculate its kinetic energy.

- A. 0.4 J
- B. 0.8 J
- C. 16 J
- D. 32 J

Question 53:

A water pump rises 2000 kg of water through a vertical height of 72 m in one hour. Calculate the power of the pump

- A. 40,000 W
- B. 4,000 W
- C. 400 W
- D. 40 W

Question 54:

A body pulls a block of wood with a force of 30 N through a distance of 300 m in 2 minutes. Find the power he develops, if he pulls the block at a constant speed.

- A. $\frac{30 \times 300}{2}$
- B. $\frac{30 \times 300}{2 \times 60}$
- C. $\frac{30 \times 2 \times 60}{300}$
- D. $\frac{300}{2 \times 60 \times 30}$

Question 55:

A bullet of mass 5 g is fired at a speed of 400 m s^{-1} . How much energy does it have?

- A. $\frac{1}{2} \times 5 \times 10^2 \times 400$ joules
- B. $\frac{1}{2} \times 5 \times 10^3 \times 400$ joules
- C. $\frac{1}{2} \times 5 \times 10^{-3} \times 400 \times 400$ joules
- D. $\frac{1}{2} \times 5 \times 10^2 \times 400 \times 400$ joules

☐

Question 56:

An object of mass 2 kg dropped from a top of a building hits the ground with a kinetic energy of 900 J. The height of the building is

- A. 30 m
- B. 45 m
- C. 90 m
- D. 180 m

☐

Question 57:

A force of 50 N moves an object through a distance of 200 m in 40 s. Find the power expended

- A. 100 W
- B. 160 W
- C. 200 W
- D. 250 W

☐

Question 58:

A car of mass 1.5×10^3 kg climbs a hill in 900 s. If the top of the hill is 50 m above the starting point find the average power output of the engine.

- A. 1.38×10 W
- B. 8.33×10^2 W
- C. 5.00×10^3 W
- D. 5.0×10^5 W

☐

Question 59:

A man of mass 50 kg climbs 40 steps up stairs. If each step is 0.2 m high the potential energy gained is

- A. 100 J
- B. 400 J

- C. 4,000 J
- D. 20,000 J



Question 60:

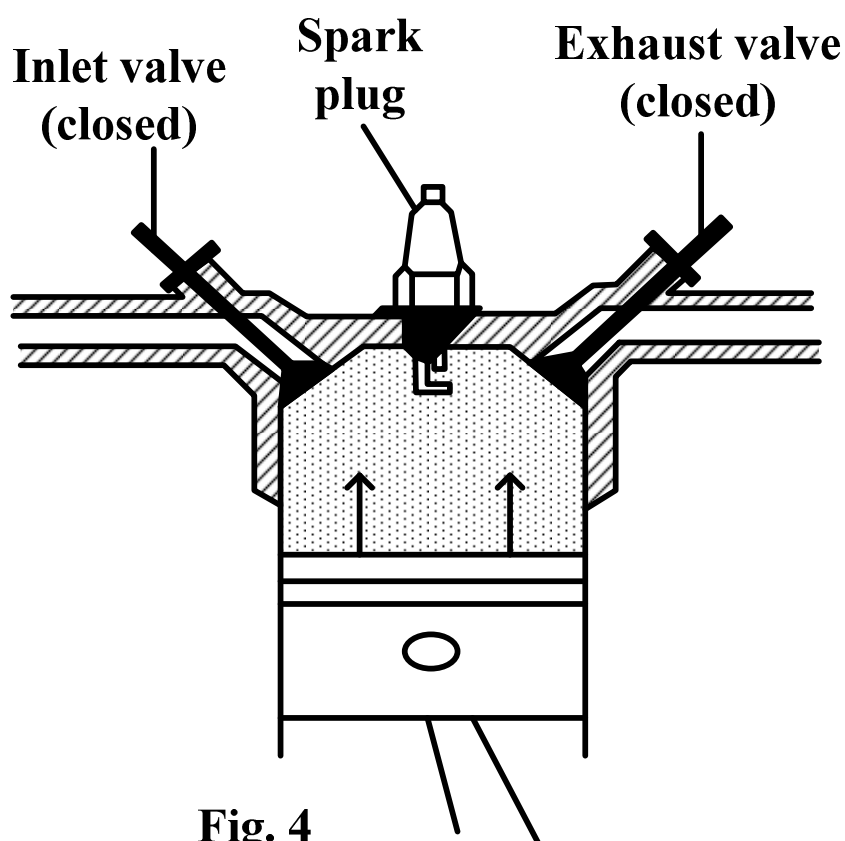


Fig. 4

The diagram in figure 4 shows part of a combustion engine. What is the likely stroke in the bicycle?

- A. Inlet stroke
- B. Power stroke
- C. Exhaust stroke
- D. Compression stroke



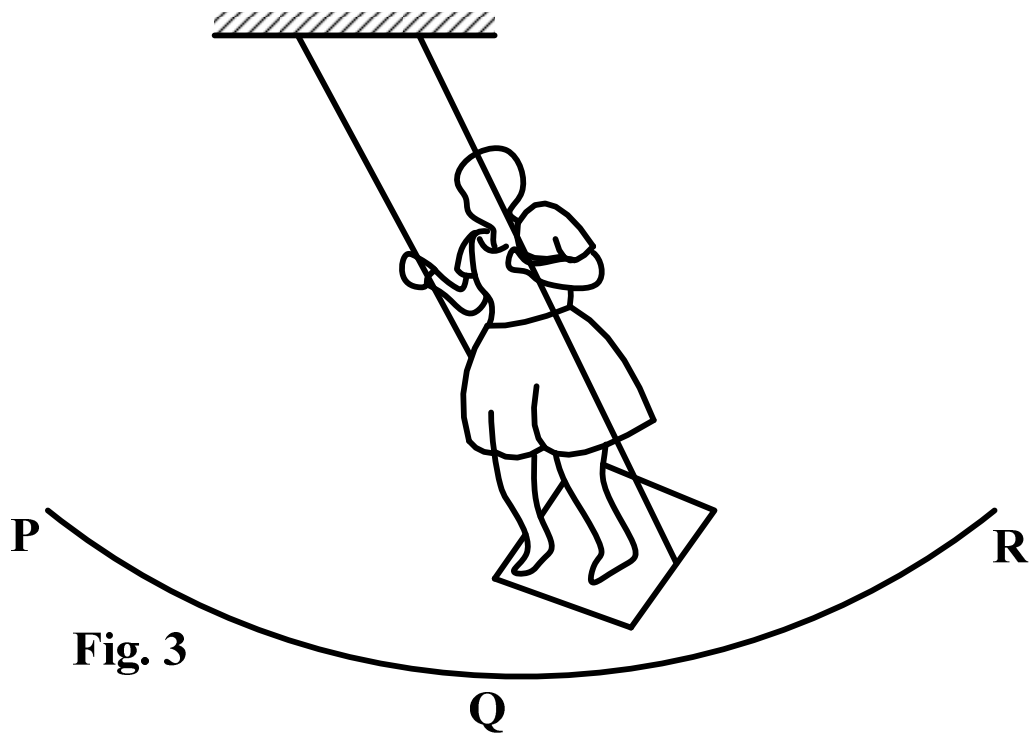
Question 61:

10^6 kg of water falls from a height of 50 m every second. Calculate the power generated

- A. 2.0×10^4 W
- B. 2.0×10^5 W
- C. 5.0×10^7 W
- D. 5.0×10^8 W



Question 62:



The diagram in figure 3 shows a child on a swing . The child will have

- A. maximum potential energy at P and R
- B. maximum potential energy at Q
- C. maximum kinetic energy at P
- D. no kinetic energy at Q

☐

Question 63:

Which of the following represents the firing order of 4 stroke petro engine?

- A. exhaust ,inlet , compression and power strokes
- B. inlet, power, compression and exhaust strokes
- C. power, compression, inlet and exhaust strikes
- D. inlet, power, exhaust and compression strokes

☐

Question 64:

A machine which is 80% efficient is run by an engine with an output of 40 W. The time taken to raise a load of 1500 N through 0.15 m will be

- A. 4.5 s
- B. 5.6 s
- C. 7.0 s
- D. 28.1 s

☐

Question 65:

In a four stroke internal combustion engine, the work required for initial induction and compression comes from

- A. rotation K.E stored in the flywheel
- B. movement of the steering wheel
- C. separate starter motor
- D. sparking plug

☐

Question 66:

A stone of mass 20 g falls through a distance of 10 m. Calculate the kinetic energy it loses.

- A. 0 J
- B. 2 J
- C. 200 J
- D. 2000 J

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Question 67:

A fly wheel connected to an internal combustion engine is made heavy in order to

- A. store rotational kinetic energy
- B. store kinetic energy
- C. produce a spark
- D. helps valves to open at regular intervals

☐

Question 68:

In a four-stroke internal combustion engine, the work required for initial induction and compression comes from

- A. the rotational kinetic energy stored in the fly wheel
- B. the movement of the steering wheel
- C. the separate starter motor
- D. the sparking plug

☐

Question 69:

When a force of 30 N is applied to a trolley, the trolley moves through a distance of 10 m in 20 s in the direction of the force. The average power developed by the trolley is

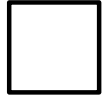
- A. 6.67 W
- B. 60 W
- C. 15 W
- D. 7.5 W

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Question 70:

A machine lifts a load of 5000 N through a distance of 10 m in 5 s. The average power of the machine is

- A. 0.1 kW
- B. 10 kW
- C. 50 kW
- D. 250 kW



Question 71:

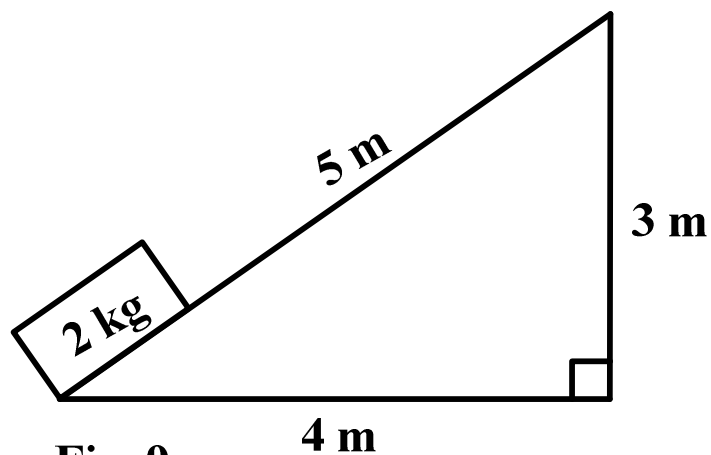
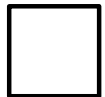


Fig. 9

A brick of mass 2 kg is lifted to a height of 3 m along a smooth, inclined plane 5 m long, as shown in figure 9. The work done is

- A. 10 J
- B. 60 J
- C. 6 J
- D. 100 J



*****END*****

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