SAT Physics Practice Test 23
Part E

1. A radioactive substance is observed to have a count rate of 500 counts/sec. Two hours later the count rate is 62.5 counts/sec. What is the half-life of the substance?
A. 10 min
B. 20 min
C. 30 min
D. 40 min
E. 50 min

2. A 2.5 kg ball is dropped onto a concrete floor. It strikes the floor with a momentum of 20 kg·m/s and bounces away from the floor with a momentum of 16 kg·m/s.
What is the change of momentum of the ball?
A. 4 kg·m/s
B. 8 kg·m/s
C. 32 kg·m/s
D. 36 kg·m/s
E. 40 kg·m/s

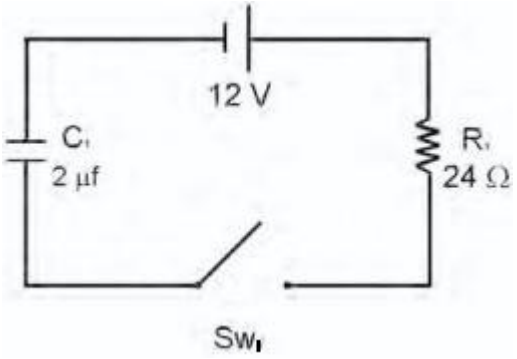
3. Firefighters attempt to squirt water from a hose into a third-story window 15 m above the ground. For safety purposes, they stand 25 m from the burning building. The water from the hose can only reach the window if
A. $t_y > t_x$
B. $t_x > t_y$
C. $t_y < t_x$
D. $t_x < t_y$
E. Time has no effect in this case.

4. A 75 g ice cube is added to 450 g of boiling water. The water stops boiling immediately because:
I. Heat is melting the ice.
II. Condensation is occurring.
III. Phase change occurs.
A. I only
B. II only
C. I and III only
D. II and III only
E. I, II, and III

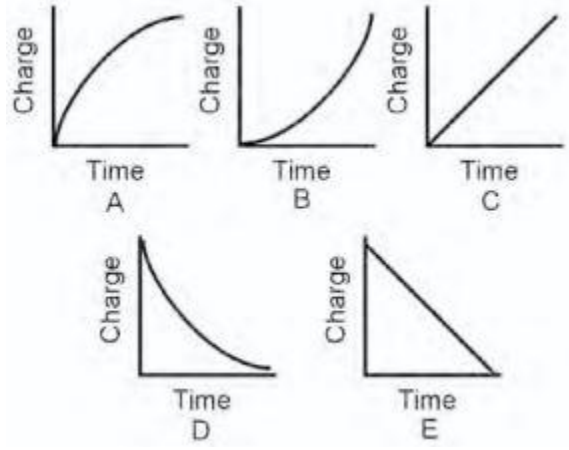
5. A spring accelerates a 2 kg cart from rest in a time of .8 seconds, giving it a momentum of 4 kg·m/s. With what force did the spring accelerate the cart?
A. .5N
B. 1.6N

C. 3.2N
D. 5N
E. 8N

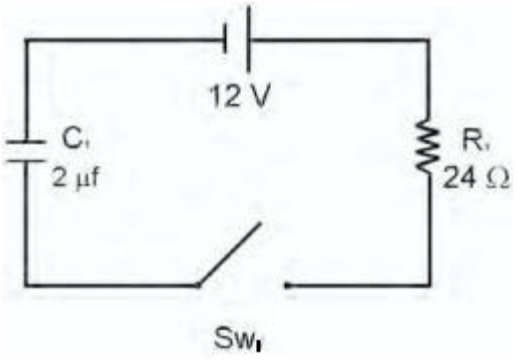
6. New thermos bottles have the ability to keep hot substances hot for several days. The thermos bottles have a highly polished interior made of stainless steel, which makes them almost unbreakable. These thermos bottles keep substances hot by reducing heat loss due to
A. absorption
B. conduction
C. convection
D. radiation
E. evaporation



7.
C_1 is an uncharged capacitor (shown in the circuit above). At t = 0 the switch (SW1) is closed, and C_1 begins to charge.

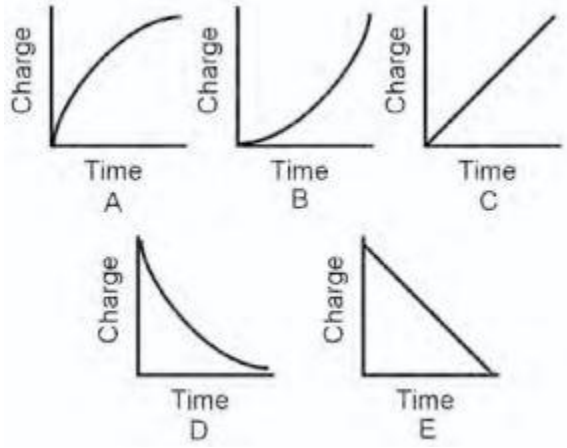


Which of the graphs above best represents the charge on the capacitor as time passes?
A. Time A
B. Time B
C. Time C
D. Time D
E. Time E



8.

C_1 is an uncharged capacitor (shown in the circuit above). At t = 0 the switch (SW1) is closed, and C_1 begins to charge.



What does graph D show?

A. The value of the current in the circuit as time passes.
B. The value of the voltage across the terminals as time passes.
C. The total value of the resistance as time passes.
D. The total value of the capacitance as time passes.
E. None of the above.

9. An object at rest is placed into free fall at a height of20 m. What is the velocity of the object when the potential energy equals the kinetic energy?

A. 8 m/s
B. 11 m/s
C. 14 m/s
D. 17 m/s
E. There is not enough information to determine the velocity.

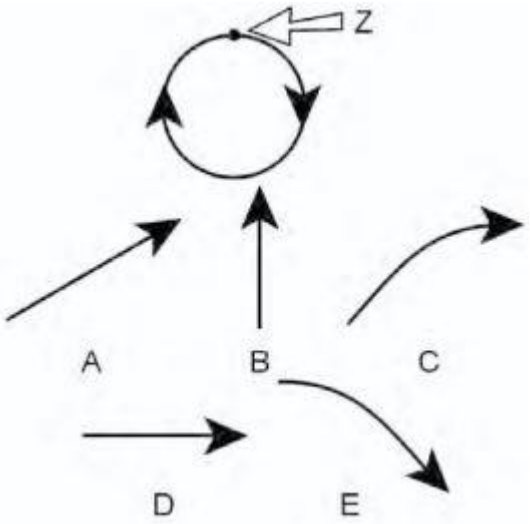
10. A rocket sled rides on a frictionless track while a 1000N force from the rockets accelerates the sled. Suddenly the retrorockets accidentally fire, applying a 1000N force in the opposite direction. The sled will

A. slow down gradually to a stop.
B. continue to accelerate.
C. move at a constant speed.

D. reverse direction.
E. not be affected at all.

11. An unknown particle is being studied in a magnetic field of variable intensity and direction. When the magnetic field is turned off, the particle is observed to move toward the earth. When the magnetic field is turned on, the particle is observed to continue to move toward the earth, no matter the strength or the direction of the magnetic field. Which of the particles listed below is most likely the unknown particle?
A. Beta particle
B. Alpha particle
C. Positron
D. Neutron
E. Gamma ray

12. Which of the following is an example of a compressional wave?
A. X-ray
B. Cosmic ray
C. Radio wave
D. Lightwave
E. Sound wave



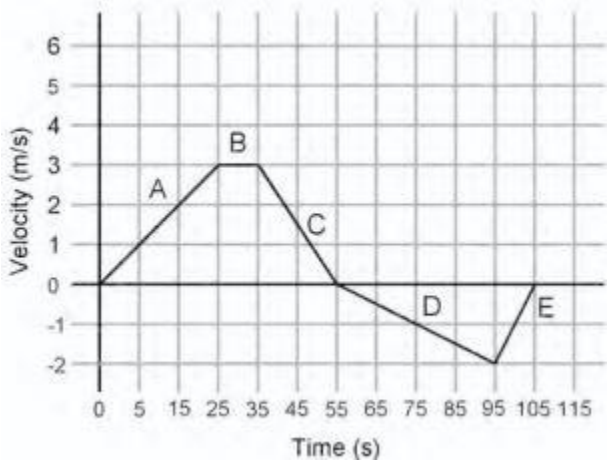
13.
An object on a string is traveling in a circular path as shown. If the string breaks when the object is at point Z, which pathway will the object follow?
A. Pathway A
B. Pathway B
C. Pathway C
D. Pathway D
E. Pathway E

14. Refrigeration is a process through which
A. heat is removed from the inside of the refrigerator.
B. cold air is produced inside the refrigerator.
C. hot air is removed from the inside of the refrigerator.
D. hot air is changed to a cold condensate inside the refrigerator.
E. hot air inside the refrigerator is expanded to remove its heat.

15. An object is thrown from a moving vehicle. Which of the following statements is not true?
I. The velocity of the object changes.
II. The acceleration of the object changes.
III. The direction of motion of the object changes.
A. I only
B. II only
C. I and III only
D. II and III only
E. I, II, and III

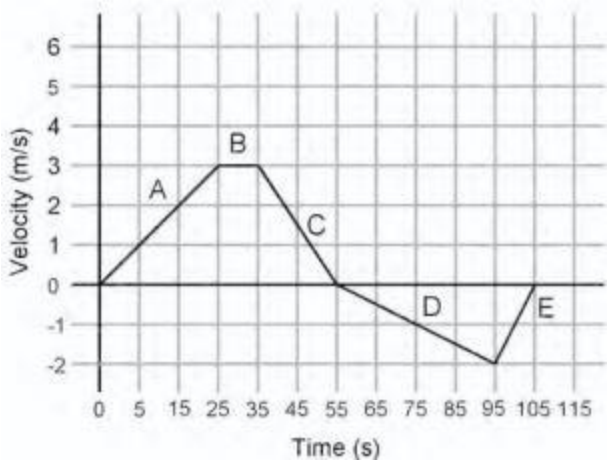
Part A

1. This question relates to the velocity-time graph shown below. Select the answer that is most representative of the physical quantity named.



At which point on the graph is no net force applied?
A. A
B. B
C. C
D. D
E. E

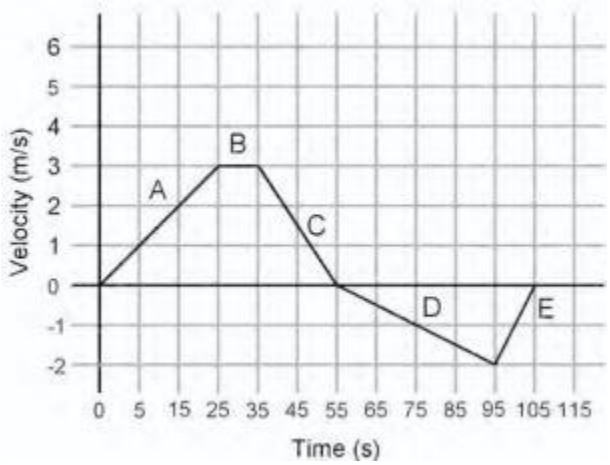
2. This question relates to the velocity-time graph shown below. Select the answer that is most representative of the physical quantity named.



At which point on the graph is the acceleration greatest?

A. A
B. B
C. C
D. D
E. E

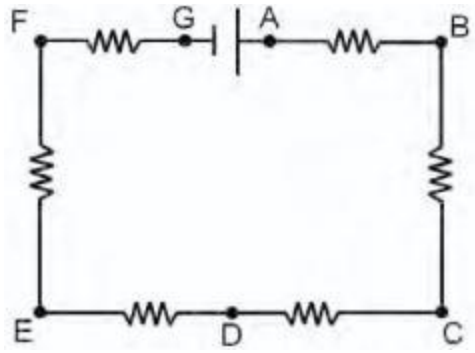
3. This question relates to the velocity-time graph shown below. Select the answer that is most representative of the physical quantity named.



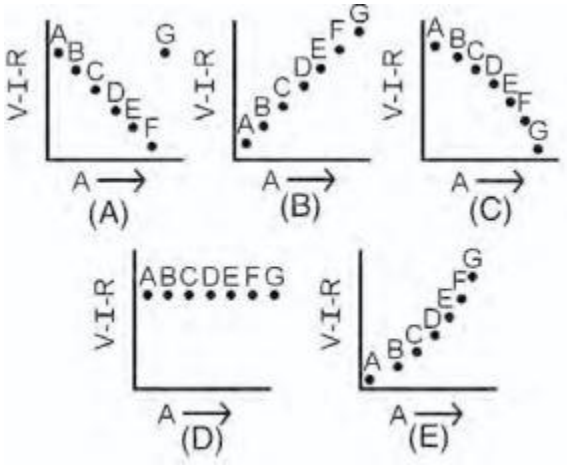
At which point on the graph does the object move the greatest distance?

A. A
B. B
C. C
D. D
E. E

4. This question relates to the DC circuit shown below.



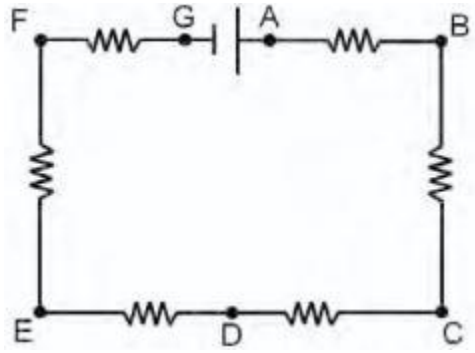
The values for current, voltage and resistance in the circuit are graphed from point A through point G in the graphs directly below.



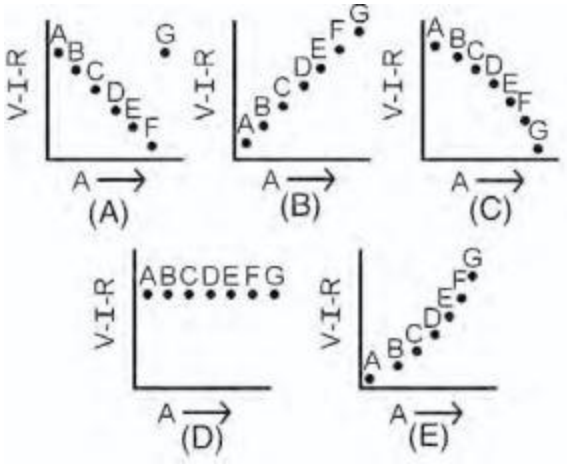
Which of the graphs shows the current from point A to point G?

A. A
B. B
C. C
D. D
E. E

5. This question relates to the DC circuit shown below.



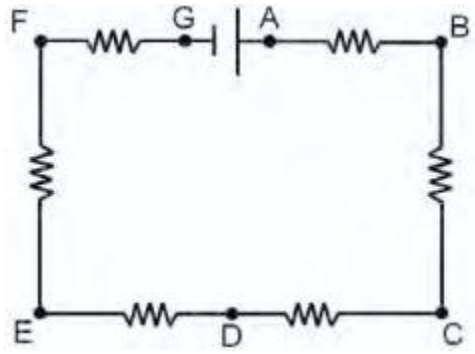
The values for current, voltage and resistance in the circuit are graphed from point A through point G in the graphs directly below.



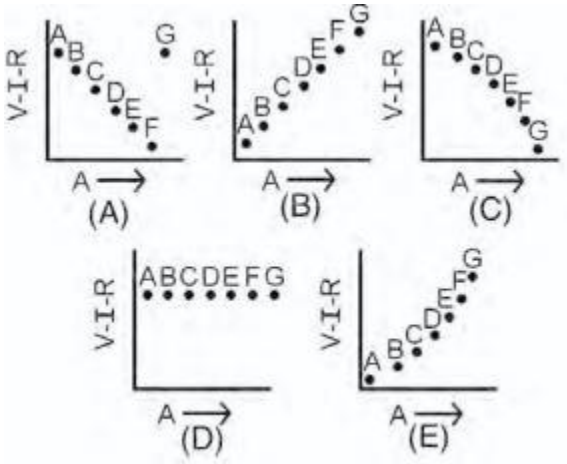
Which of the graphs shows the resistance from point A to point G?

A. A
B. B
C. C
D. D
E. E

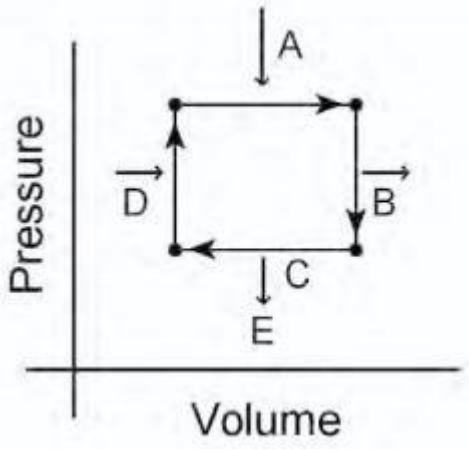
6. This question relates to the DC circuit shown below.



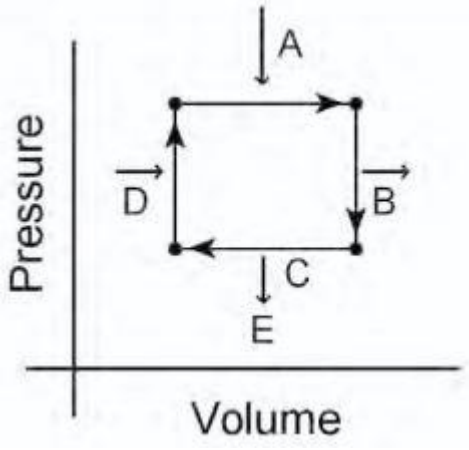
The values for current, voltage and resistance in the circuit are graphed from point A through point G in the graphs directly below.



Which of the graphs shows the voltage from point A to point G?
A. A
B. B
C. C
D. D
E. E

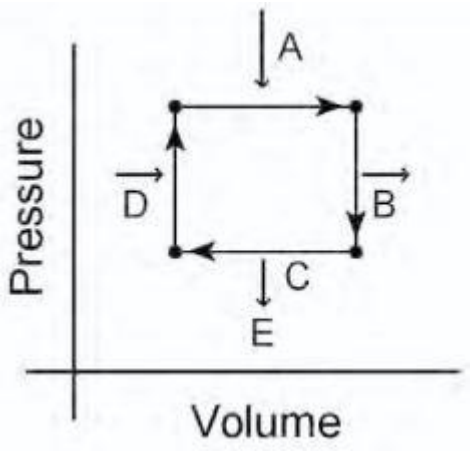


7.
The idealized P-V diagram above shows a complete cycle through compression and expansion of a gas. The questions below relate to the processes within the cycle.
Which letter shows isothermal compression?
A. A
B. B
C. C
D. D
E. E

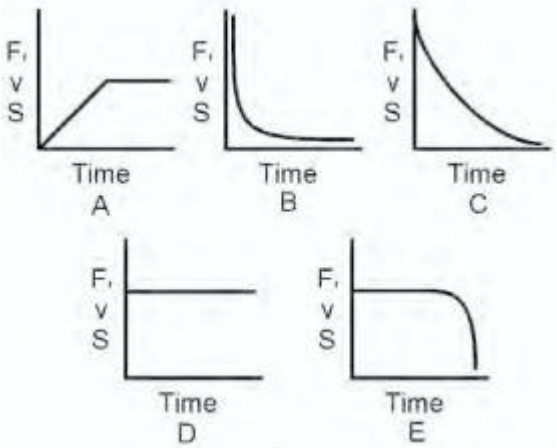


8.
The idealized P-V diagram above shows a complete cycle through compression and expansion of a gas. The questions below relate to the processes within the cycle.

Which letter shows work done?
A. A
B. B
C. C
D. D
E. E



9.
The idealized P-V diagram above shows a complete cycle through compression and expansion of a gas. The questions below relate to the processes within the cycle.
Which letter shows an adiabatic expansion?
A. A
B. B
C. C
D. D
E. E



10.
A 50 kg object slides to a stop over a period of time. Which of the graphs represents each of the described factors?

The frictional force on the object

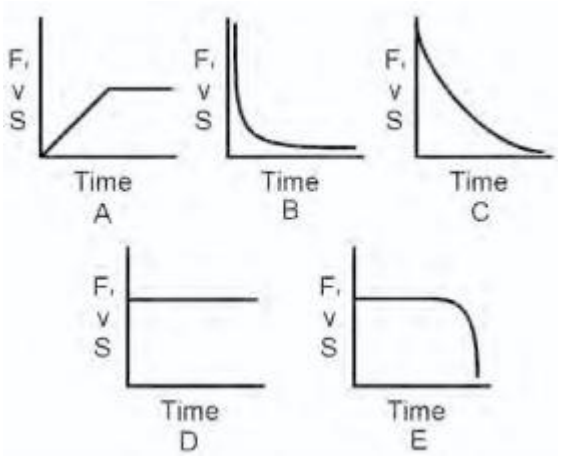
A. A

B. B

C. C

D. D

E. E

11. 

A 50 kg object slides to a stop over a period of time. Which of the graphs represents each of the described factors?

The velocity of the object

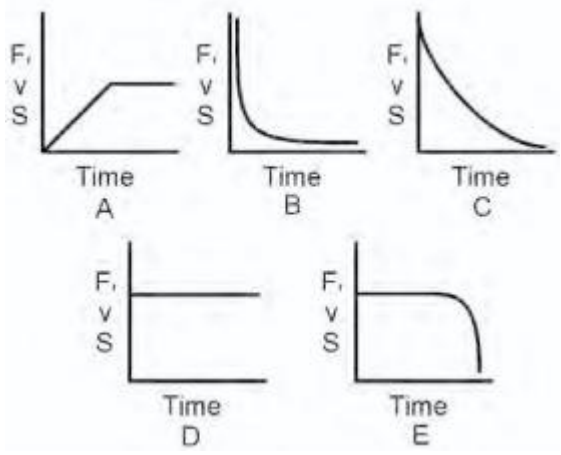
A. A

B. B

C. C

D. D

E. E

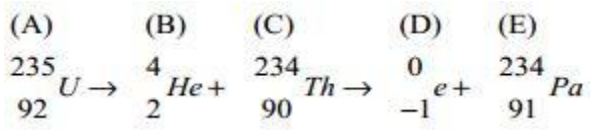
12. 

A 50 kg object slides to a stop over a period of time. Which of the graphs represents each of the described factors?

Displacement of the object

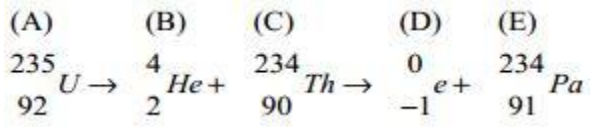
A. A
B. B
C. C
D. D
E. E

13. This question relates to the nuclear equation shown below.



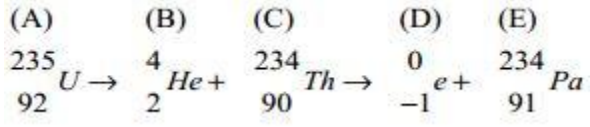
Identify the parent nucleus.
A. A
B. B
C. C
D. D
E. E

14. This question relates to the nuclear equation shown below.



Identify the alpha particle.
A. A
B. B
C. C
D. D
E. E

15. This question relates to the nuclear equation shown below.



Identify the beta particle.
A. A
B. B
C. C
D. D
E. E