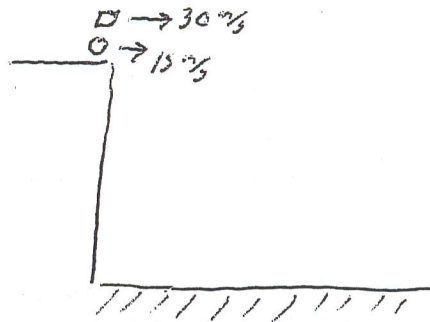


① Two projectiles are fired horizontally off the top of a building one at 15 m/s, the other at 30 m/s. Which of the following is *not* true -

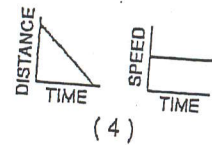
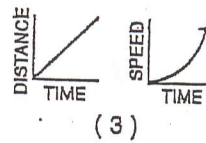
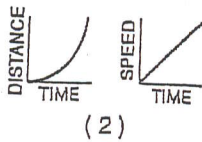
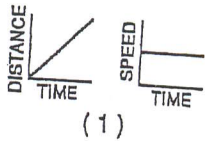
- 1) Both hit the ground at the same time.
- 2) The 30 m/s stays in the air twice as long as the 15 m/s projectile.
- 3) The 30 m/s land twice the distance from the base of the building as the 15 m/s.
- 4) The 30 m/s strikes ground with a greater total velocity than the 15 m/s.



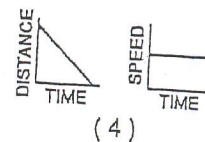
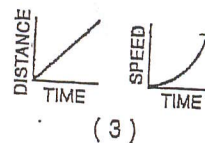
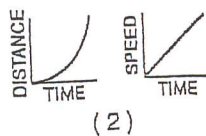
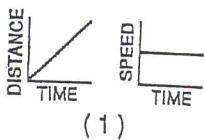
263 A bomb is dropped from the bottom of a jet plane traveling 200 m/s forwards.



② - Which set of graphs best represent the bombs *forward* motion ?



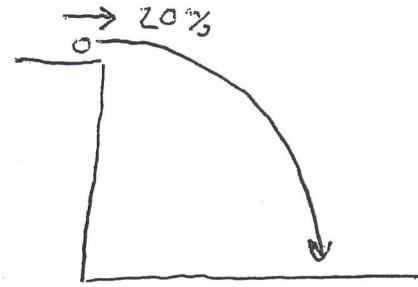
③ - Which set of graphs best represent the bombs *downward* motion ?



465

A rock is thrown horizontally from a building with a horizontal velocity of 20 m/s. The rock stays in the air for 1.5 seconds.

- (4) How tall is the building? (approximately)
- (1) 10 meters (c) 15 meters
(2) 11.25 meters (d) 30 meters

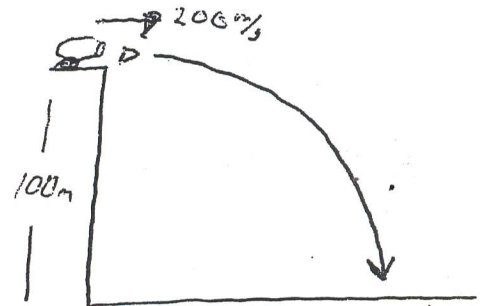


- (5) How far does the rock travel in the forward direction?
- (1) 10 meters (c) 15 meters
(2) 11.25 meters (d) 30 meters

6 & 7

A cannon is horizontally fired from the top of a cliff 100 meters tall at a velocity 200 m/s -

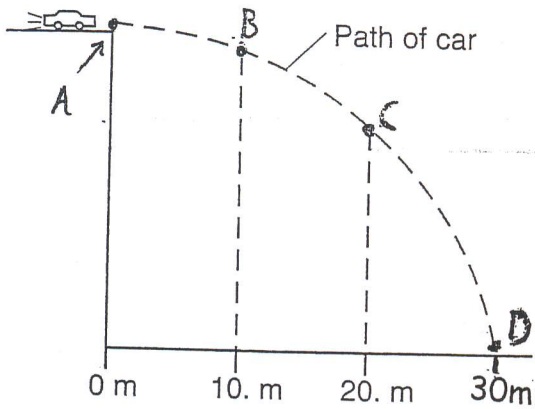
- (6) How long does the cannon ball stay in the air?
- (1) 4.5 sec (3) 20 sec
(2) 10 sec (4) 25 sec



- (7) The forward velocity the cannonball strikes the ground with is -
- (1) 45 m/s (3) 150 m/s
(2) 100 m/s (4) 200 m/s

8 to 12

The diagram below represents the path of a stunt car that is driven off a cliff, neglecting friction. The car is in the air 3 seconds.



8) The initial vertical velocity of the car the instant it comes off the cliff is -

- 1) 0 m/s
- 2) 10 m/s
- 3) 15 m/s
- 4) 30 m/s

9) The horizontal velocity of the car as it comes off the cliff is -

- 1) 0 m/s
- 2) 10 m/s
- 3) 15 m/s
- 4) 30 m/s

10) The direction of the cars acceleration at point C is

- 1) Up
- 2) Down
- 3) Right
- 4) Down and to the right

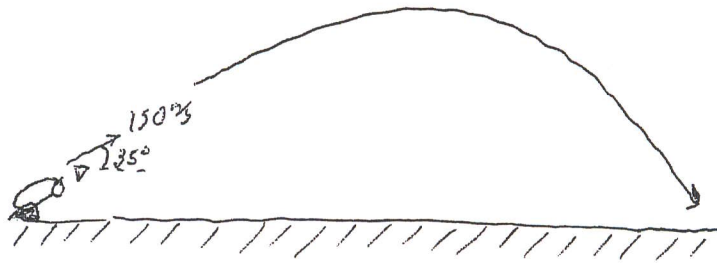
11) How far does the car fall downwards (*What vertical distance*)?

- 1) 10 meters
- 2) 15 meters
- 3) 30 meters
- 4) 45 meters

12) Compared to the horizontal component of the car's velocity at point A, the horizontal component of the car's velocity at point B is

- (1) smaller
- (2) greater
- (3) the same

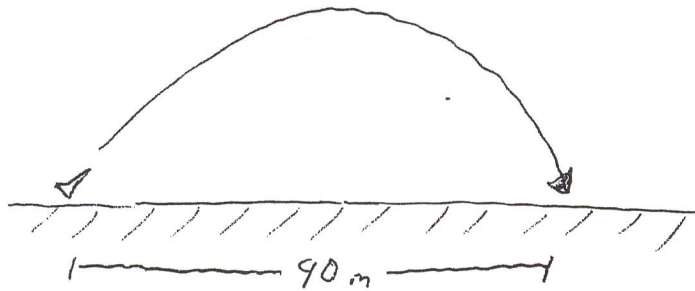
A cannon is fired at an angle of 35° above the horizontal at a velocity of 150 m/s.



- (13) What is the vertical component of the cannon's velocity V_{y} ?
- (1) 86 m/s (3) 150 m/s
- (2) 123 m/s (4) 200 m/s
- (14) How long is the cannon shell in the air total T ?
- (1) 8.6 sec (3) 12.3 sec
- (2) 17.2 sec (4) 24.6 sec
- (15) What is the maximum height reached by the cannon shell D_y ?
- (1) 370 m (3) 1125 m
- (2) 740 m (4) 3690 m
- (16) What is the total distance the shell travels in the forward direction D_x ?
- (1) 370 m (3) 1125 m
- (2) 740 m (4) 3690 m
- (17) If the angle is increased to 45° , what is true about the shell?
- (1) It's not in the air as long, and travels less forward distance.
- (2) It's in the air longer and travels less forward distance.
- (3) It's not in the air as long and travels more forward distance.
- (4) It's in the air longer and travels more forward distance.

18 to 20

A toy rocket is fired and rises for 3 seconds until it reaches its peak. The rocket lands 90 meters from where it was fired.



(18) What is the initial vertical component cannons velocity V_{Ly} ?

(1) 10 m/s

(3) 20 m/s

(2) 15 m/s

(4) 30 m/s

(19) What is the maximum height reached by the cannon shell D_y ?

(1) 10 m

(3) 45 m

(2) 30 m

(4) 60 m

(20) What is the rockets forward velocity V_x ?

(1) 10 m/s

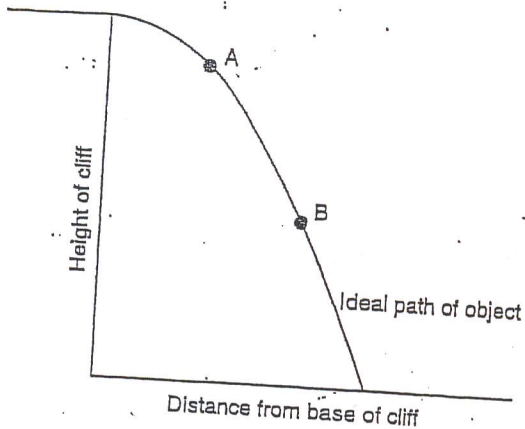
(3) 20 m/s

(2) 15 m/s

(4) 30 m/s

Base your answers to questions 49 through 51 on the information and diagram below.

An object was projected horizontally from a tall cliff. The diagram below represents the path of the object, neglecting friction.



21

49 How does the magnitude of the horizontal component of the object's velocity at point A compare with the magnitude of the horizontal component of the object's velocity at point B? [1]

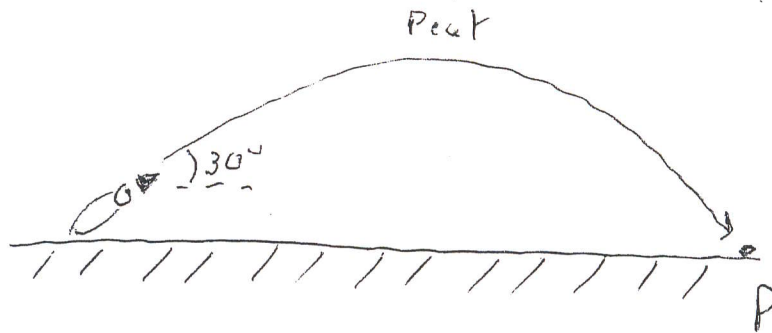
22

50 How does the magnitude of the vertical component of the object's velocity at point A compare with the magnitude of the vertical component of the object's velocity at point B? [1]

23

51 On the diagram in your answer booklet, sketch a likely path of the horizontally projected object, assuming that it was subject to air resistance. [1]

A cannon is fired at a 30 degree angle above the horizontal. The shell rises to the highest point at the peak and returns to the ground at point P.



During the shells flight the horizontal velocity of the will -

24

- (1) It decreases, then increases.
- (2) It decreases, then remains the same.
- (3) It increases, then decreases.
- (4) It remains the same.

During the shells flight the vertical velocity of shell will -

25

- (1) It decreases, then increases.
- (2) It decreases, then remains the same.
- (3) It increases, then decreases.
- (4) It remains the same.

During the shells flight the acceleration of the shell will -

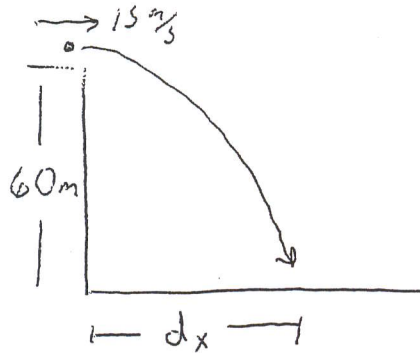
26

- (1) It decreases, then increases.
- (2) It decreases, then remains the same.
- (3) It increases, then decreases.
- (4) It remains the same.

Name _____

Long Problems (15 points)

- 1) A rock is thrown horizontally off the top of a 60 meter tall building. The rock is thrown with a forward velocity of 15 m/s.



A - How long is the rock in the air? (Show equation, with substitution, with units) [2]

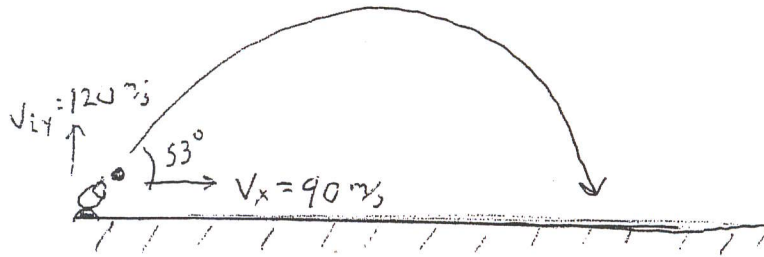
B - How far from the base of the building will the rock strike the ground? [2]
(Show equation, with substitution, with units)

C - If the rock is thrown forward twice as fast, How will it effect - [1]

Time in air -

Forward distance traveled -

- 2) A cannon is fired at an up angle, The cannonballs initial upward velocity is 120 m/s, its initial forward velocity is 90 m/s.



- A - What time does the cannon ball take to reach its peak, What total amount of Time does it spend in the air ? (1)

T = _____

T = _____

- B - What is the maximum height the cannonball rises to ? (2)
(Show equation, with substitution, with units)

- C - What forward distance does the cannonball travel ? (2)
(Show equation, with substitution, with units)

- D - The cannon was fired at an angle of 53 degrees to the horizontal. (1)
If the angle were decreased to 45 degrees How would that effect -

Forward distance -

Time in air -