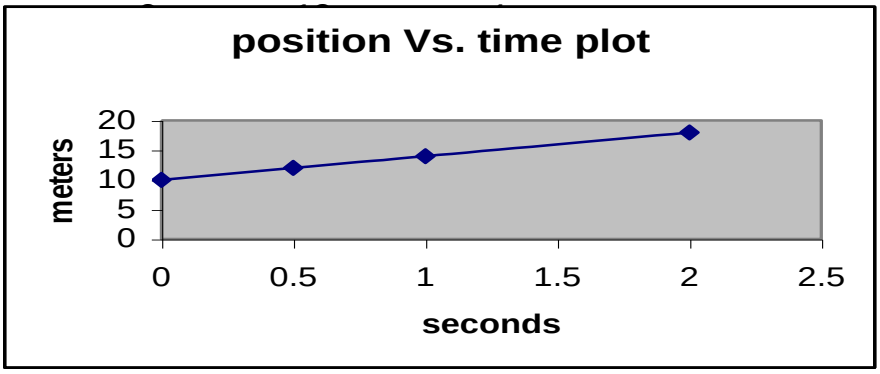
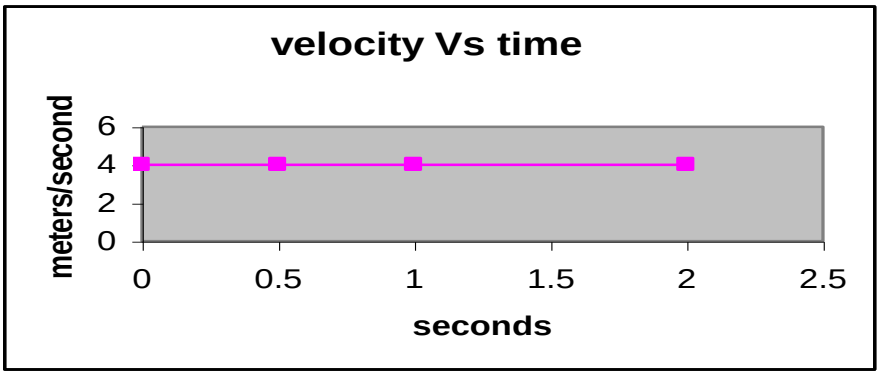
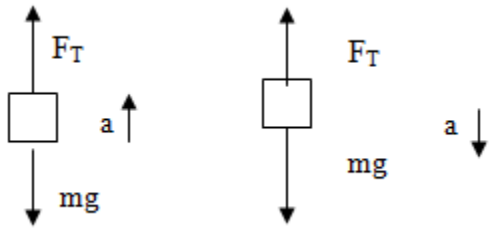
1. 32 m/s
2. 62.5 m
3. 11 m
4. 5.8 m/s^2
5. 62.2 m/s
6. 13.9 m/s, 1.4 s
7. 39.2 m/s
8.
    a. 10m, 12m, 14m, 18m
    b. and c.





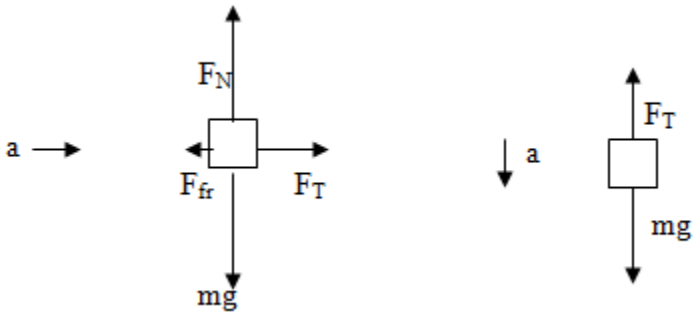
9.
    a. Series 1 car is initially traveling with a-4.0 m/s but undergoes a constant forward acceleration of 1 m/s^2 for 6 seconds. Series 2 cat has a constant forward velocity of 4 m/s for 6 s. Series 3 car has an initial velocity of 4 m/s but experiences a negative acceleration of –1 m/s^2 for 6 seconds.
    b. -6m, 24m, 6m
    c. 10m, 24m, 10m

10. Ss
    a.



    b. 1.1 m/s^2
    c. 131 N
    d. 4.9 m
    e. 3.3 m/s

11.
    a.

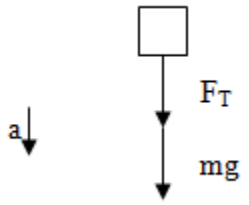


    b. $F_T - F_{fr} = m_1a$
    c. $F_T - m_2g = m_2a$
    d. 2.1 m/s^2
    e. 2.3 N

12.
    a. 1 m/s^2
    b. 2000 N
    c. 0 m/s^2
    d. 0 N
    e. -2 m/s^2
    f. -4000 N

13.

a.

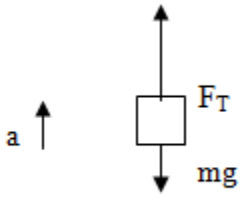


b. $F_T = mv^2/r - mg$

c. 3.8 N

14.

a.



b. $F_T = mv^2/r + mg$

c. 16.5 N

15.

a. $9.13x10^2$N toward mars

b. The magnitude is the same since the equation is the same but the direction is in the opposite direction

c. Toward mars

d. 0.9 m/s^2

e. Perpendicular to the acceleration

f. 2500 m/s

g. 4.8 hours

16.

a. 1.96 J

b. 3.96m/s

c. 3.13 m/s

d. 28.59N

e. 22.69N

17.
    a. EPE
    b. 0.0521J
    c. When the block is released it begins to accelerate increasing the KE and simultaneously reducing the compression in the spring thereby reducing the EPE. So the total amount of energy stays the same.
    d. 0.361m/s
18.
    a. 7.35 J
    b. 7.35 J
    c. 1.56 m/s
    d. 6.2 m
19.
    a. 1 kg-m/s
    b. 1 kg-m/s
    c. 0.498 m/s
    d. 50J
    e. 0.249 J
    f. No, this is an inelastic collision the KE before the collision is 50 J after the collision it is only 0.249J.
    g. 0.0316m
20.
    a. 1.2 Ω
    b. 1.25 Ω
    c. 10 Ω
    d. 1.2A
    e. 1.44V
    f. 9.06 V
    g. 1.5V
    h. 0.72A, 0.48A, 1.2A, 0.15A, 0.75A, 0.3A
21.
    a. 35V
    b. 175V
    c. 10A
    d. 150V
    e. 15A
    f. 360V
    g. 5400W

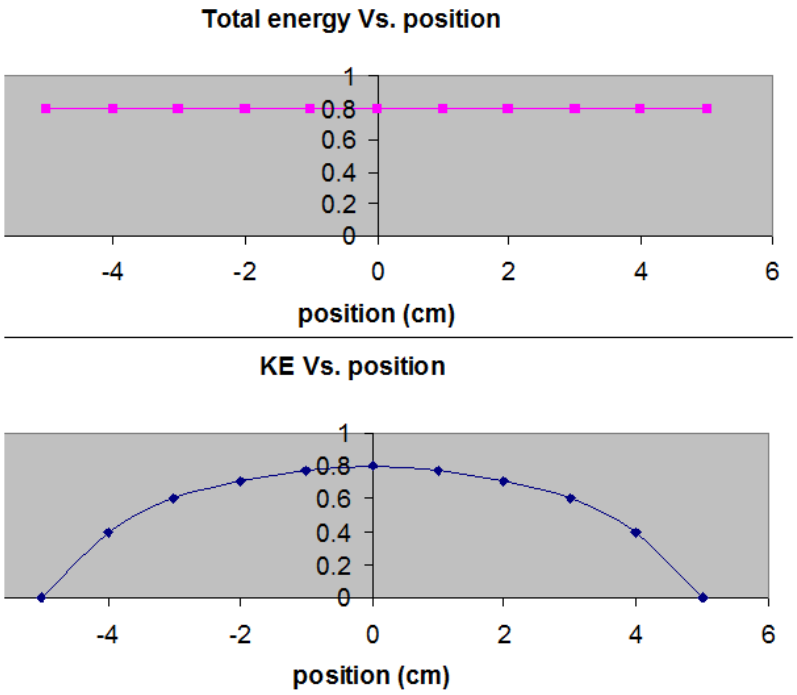
22.

a. 4.5J
b. 1.11m/s
c. 0.333J
d. 0.333J
e. 0.0629m
f. 1.42s

23.

24.

g. and b.



c. 5 cm
d. 0.1J
e. 0.7J
f. x = 4.8cm or x = -4.8cm
g. 0.176s

25.

h. 1 m
i. 19.8 m/s
j. 19.8 Hz
k. If mass is increased F_T is increased the wave speed will increase and so will the number of loops on the string.

26.

l. 0.8 m
m. 0.4 m
n. destructive interference
o. constructive interference
p. destructive interference

27.

q. 4^{th} harmonic
r. 1.2 m
s. 71.46 Hz
t. 214.5 Hz

28.

a. 5^{th} harmonic
b. 1.2 m
c. 57.16 Hz
d. The 4^{th} harmonic does not exist.