NJUMBI HIGH SCHOOL FORM 1 PHYSICS HOLIDAY ASSIGNMENT

1) Name 3 branches of science subject in secondary schools

2) Name and briefly explain the branches of physics

3) Give instances where physics interdependent with agriculture.

4) Group the following form 1physics topics into the various branches of physics.

Topic	**Branch of physics**
Measurement I	
Force	
Pressure	
Particulate nature of matter	
Rectilinear propagation of light	
Reflection at plane surfaces	
Thermal expansion	
Heat transfer	
Electrostatics	
Simple cells and electric circuits	

5. Identify the mistake(s) in the following SI-units and hence write them correctly.

(a)Amperes (a)

(b) Candela (cand)

(c) Metres (M)

(d) Kalvin

(e)Seconds

(f) Kilograms

(g) Pascals

(h) newtons

6. There are two types of physical quantities : basic and derived quantities, state the difference between the two.

7. Convert the following into SI units

a) 1000 km

b) 0.00025mm

c) 0.01Hm

d) 25mm

e) 25μm

8. In an experiment to estimate the height of a tree in Njumbi boys high School compound, a student recorded the following data.

I. Length of shadow of the tree=1000cm

II. Length of shadow of the rod=200cm

III. Height of the rod=100cm

 Determine the height of the tree

9. Trace the outline of your palm on a graph paper and estimate the area of the shape obtained.

10. The diameter of the bore of a capillary tube is 2.0mm.Calculate the cross-section area of the bore in cm2 (take π=3.142)

11. A sheet of paper measures 25cm by 15cm.Calculate its area in mm
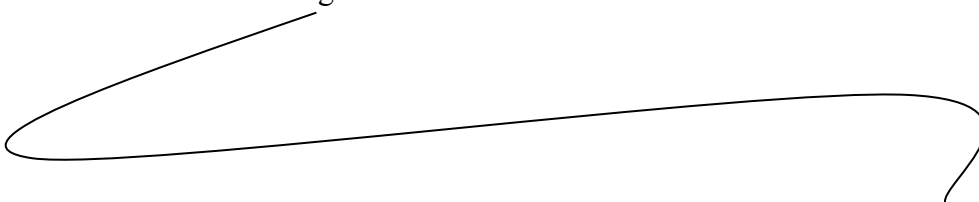
(i). Convert 39.6mg into kg

(ii) Change 50tonnes into g

(iii) 340kg into tonnes

(iv) 20g into kg

(v) 100g into kg

12. Estimate the length of the curve shown.

13. Define density and give its SI units.

14. A burette shows a liquid level as 20cm3. Ten drops of the same liquid each of volume 0.5cm3 are added. Calculate the new liquid level.

15. An empty density bottle has a mass of 15g. When full of alcohol of density 0.8g/cm3, its mass is 47g. Calculate:-

i) The volume of the bottle.

ii) Its mass when full of water.

iii) It mass when full of mercury of density 13.6g/cm3

16. A measuring cylinder contains 8cm3 of water. A small piece of brass of mass 24g is lowered carefully into a measuring cylinder so that it is carefully submerged, if the density of the brass is 8g/cm3, what is the new reading of the level of water in the cylinder in m3.

17. A mixture is made up of two metals X and Y. The mass of the mixture is 30g and the volume of the mixture is 4.5 cm3. Determine the mass of metal X in the mixture. (Density of metal X is 6000Kgm^{-3} and density of metal Y is 7900 kgm^{-3}

18. 25cm3 of a liquid x of density 1.2g/cm3 is mixed with liquid of volume 30cm3 and0.9g/cm3 without change in volume.

Calculate the density of the mixture.

19. The mass of an empty density bottle is 25.0g. Its mass when filled with water is 50.0g and when filled formalin its mass is 60.0g. Calculate.

a) Mass of water

b) Volume of water.

c) Volume of bottle.

d) Mass of formalin.

e) Volume of formalin.

f) Density of formalin.

20. A butcher has a beam balance and masses 0.5kg and 2kg. How would hemeasure 1.5kg of meat on the balance at once?

21. Determine the density in kg/m3 of a solid whose mass is 40g and whose dimensions in cm are 30x4x3

22. Explain the following:

(a) A steel needle placed carefully on the surface of water does not sink.

b) When a small drop of detergents is placed on water, the floating needle moves rapidly away from it and sinks when more detergent is added

c) A match stick wrapped at one end with soap starts moving immediately in one direction when placed on the surface of water

23. By considering action-reaction forces, identify why water rises up a thin capillary tube.

2) Give two examples of contact force and non-contact force.

3) Sketch how a vector quantity is represented on a diagram.

4) Define force and give SI unit.

5) Name all the forces acting on the following bodies:

(a) A box placed on a table

(b) A mass suspended from a spring balance

(c) A moving car negotiating a bend.

24.) Define cohesive force and adhesive force.

25. Explain why a man using a parachute falls through air slowly while a stone fall through air very fast.

26. A spring stretches by 6cm when supporting a load of 15N.

(b) By how much would it stretch when supporting a load of 5kg?

(c) What load would make the spring extend by 25mm?

27. Define surface tension.

a) How does temperature rise and impurities affect the surface tension of water?

b) How would the surface tension of water be increased?

28. Define the terms.

a) Mass

b) Weight.

29. The mass of a lump of gold is constant everywhere, but its weight is not. Explain this.

30. A man has a mass of 70kg.Calculate:

a) His weight on earth, where the gravitational field strength is 10N/kg.

b) His weight on the moon, where the gravitational field strength is 1.7N/kg.

31. A mass of 7.5kg has weight of 30N on a certain planet.

Calculate the acceleration due to gravity on this planet.

32. Define the following terms, giving examples.

a) Vector quantity

b) Scalar quantity

33. Define a resultant vector.

(a) Find the resultant of a force of 4N and a force of

8N acting at the same point on an object if:

i) The force acting the same direction in the same straight line.

ii) The force acting on the opposite directions but in the same straight line.

34. Show diagrammatically how forces of 7N and 9N can be

Combined to give a resultant force of:

(a) 16N (b) 2N

35. Describe how you would measure the volume of a cork using a sinker, a thread, a measuring cylinder and water only
36. A piston whose diameter i s 1. 4m is pushed into a cylinder containing a fluid, If the pressure produced in the cylinder is 4.0 x105 pa, Calculate the force applied on the piston.
37. An octopus is resting in the ocean. If the octopus is at a depth of 47m in sea whose water has a density of 1200 kg/m3, calculate the pressure experienced by the octopus(Take atmospheric pressure= 1. 0125 x105 Pa)

38. Explain why if air gets i n the brake system would d reduce the efficiency of the brakes.(2m arks)

39. A concrete block of mass 50kg rests on the surface of the table as shown below.
What is the maximum pressure that can be exerted on the bench by the block?

40. A hole of area 4. 0cm² at the bottom of a tank 5m deep is closed with a cork. Determine the force on the cork when the tank is filled with water. (Take $g = 10m\ s^{-2}$ and density of water = 1000kgm $^{-3}$).

41. A measuring cylinder of height 25cm is filled to a height of 15cm with water and the rest is occupied by kerosene. Determine the pressure acting on its base (density of water= 1gcm^{-3} density of kerosene = 0. 8gcm^{-3} and atmospheric pressure= 103,000pa).

42. State one advantage of hydraulic brakes over mechanical brakes.

43. Explain why a lady wearing sharp heeled shoes is not likely to skid on a slippery muddy road.

44. Why does atmospheric pressure decrease towards higher altitude?

45. Show that Pressure in fluids is given by P= hρg

46. Give a reason why nose bleeding is likely to occur at the top of a mountain.