UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF APPLIED PHYSICS AND ENGINEERING MATHEMATICS

EMERGENCY MEDICAL CARE

MODULE: PHY1DA1
COURSE: PHYSICS 1
CAMPUS: DFC

JULY EXAMINATION 2016

DATE 27/07/2016	**SESSION: 08:30 - 11:30**
ASSESSOR	**DR S.P. BVUMBI**
INTERNAL MODERATOR	**MR T.G. MATHE**
DURATION 2 HOURS	**MARKS 98**

NUMBER OF PAGES: 8 PAGES INCLUDING DATA SHEET

INSTRUCTIONS:
- **Answer all the questions**
- **Calculators are permitted**
- **Answer SECTION A in the answer book provided**
- **Answer SECTION B on UJ multiple choice grid provided**
- **Write your surname and initials on the multiple choice grid**

SECTION A – answer in full

QUESTION 1 **[17]**

1.1 Define or state

1.1.1 velocity (2)

1.1.2 Newton's second law of motion (3)

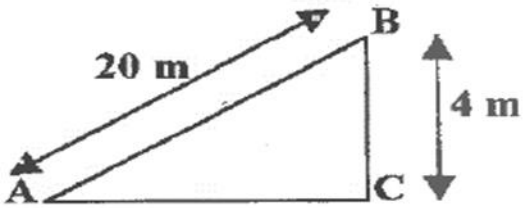
1.1.3 power (3)

1.2 A 1000 kg car is speeding at 90 km h^{-1}. Calculate the retarding force of the brakes required to stop it in 100 m on a level road. (6)

1.3 A motorcycle decelerates uniformly from 30 m s^{-1} to 14 m s^{-1} in 16 s. Calculate the deceleration of the motorcycle. (3)

QUESTION 2 **[18]**

2.1 A body, mass 5 kg, initial velocity 10 m s^{-1} is projected up a frictionless inclined plane for 20 m, as shown in the figure below.



Calculate :

2.1.1 the kinetic energy at A (3)

2.1.2 the potential energy at B (3)

2.1.3 the kinetic energy at B (5)

2.1.4 the velocity at B (4)

2.2 What power must a girl expend to raise a 0,5 kg book vertically at a speed of 0,6 m s^{-1}? (3)

QUESTION 3 **[9]**

State or define

3.1. Pascal's principle (3)

3.2. law of Charles in words **AND** write the mathematical formula (4)

3.3. the Pascal (2)

QUESTION 4 **[10]**

4.1 A solid aluminium cylinder of mass 30 kg and RD 2,7 has a mass of 20 kg in turpentine. Calculate the RD of turpentine. (6)

4.2 Convert 1000 Pa to cm Hg (4)

[Total Section A = 54]

SECTION B – multiple choice

1. Of the given quantities time; velocity; displacement and acceleration, the one that does not fit is

   A time, because it is the only scalar quantity
   B acceleration, because it is the only one with direction
   C displacement, because it is the only vector quantity
   D velocity, because it is the only one with a derived unit

2. The resultant vector is

   A that single vector that closes a vector triangle
   B that single vector that balances the other vectors
   C that single vector that replace all the other vectors
   D obtained by adding the sizes of all the vectors

3. When an unbalanced force acts on a body, the body

   A will accelerate
   B experience a change in velocity
   C experience a change in its state of inertia
   D all of the above

4. What is the tension in a rope suspending a 20 kg object?

   A 20 N
   B 200 N
   C 0 N
   D 100 N

5. The force per unit area is measured in

   A joule
   B newton-meter
   C pascal
   D watt

6. An object start from rest and accelerates at 11 m s^{-2}.How long will it take to acquire a velocity of 48,4 m s^{-1} ?

   A 44 s
   B 14 s
   C 400 s
   D 4,4 s

7. A stone is thrown downward from a height of 32 m. If it reaches the ground after 2 s, its initial velocity will be

   A 0,6 m s^{-1}
   B 6 m s^{-1}
   C 16 m s^{-1}
   D 60 m s^{-1}

8. One mega joule of work is done to lift a crate 20 m high. What is the mass of the crate?

   A 15000 kg
   B 5000 kg
   C 5 x 10^{-3} kg
   D 15 x 10^{-3} kg

9. How much work is required to change the speed of a 1000 kg car from 5 m s^{-1} to 8 m s^{-1}?

   A 12500 J
   B 32000 J
   C 44500 J
   D 19500 J

10. The relative density of a substance is 5. This means that the

   A mass per unit volume of the substance is 5
   B density of the substance compared to the density of pure water at 4 °C is 5
   C density of the substance compared to the mass of an equal volume of water is 5
   D mass of the substance compared to an equal volume of water is 5

11. What volume does 400 g mercury of RD 13,6 occupy?

   A 29,4 cm^3
   B 0.029 cm^3
   C 29411,76 cm^3
   D 294 cm^3

12. The mass of a gold ring (RD = 19,3) of volume 8 x 10^{-6} m^3 is

    A 154,4 kg
    B 154 000 g
    C 2,4 g
    D 154,4 g

13. An empty relative density bottle has a mass of 20 g, filled with water 70 g and filled with spirits 64 g. Calculate the RD of spirits.

    A 9
    B 0,9
    C 90
    D 900

14. Isobars are lines on the map joining places of same

    A temperature
    B volume
    C mass
    D pressure

15. A block has dimensions 2 m x 5 m x 10 m and mass 10 kg. Calculate the pressure exerted by the block if the block lies on its 2 m x 5 m side

    A 9,8 kPa
    B 10 Pa
    C 10 kPa
    D 9,8 Pa

16. Boyle's law for an enclosed mass of gas is only valid if the

    A volume of the gas stays constant
    B temperature of the gas remains fixed
    C pressure of the gas remains fixed
    D gas is at STP

17. Convert a pressure of 70 cm Hg to a pressure in kPa (2 marks)

    A 93,3 kPa
    B 70 kPa
    C 933 kPa
    D 9,3 kPa

18. A gas is confined in a cylinder of constant volume. At 0 °C the pressure of the gas is 100 kPa. Calculate the temperature (in °C) if the pressure is 10 kPa. (4 marks)

A -245.7 °C
B 27,3 °C
C 27,3 K
D -245,7 K

[18 x 2 = 36]

Total = 90
100 % = 90