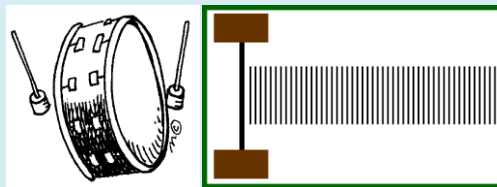


# YR 11 PHYSICS YEARLY REVISION 2012 PAPER 3

## PART A - MCQS

1. C



## PART A - MCQS

2. C

| Light globe | Light intensity 1m from globe ( $\text{Wm}^{-2}$ ) |
|-------------|--|
| A           | 32   |
| B           | 12   |

$$I \propto \frac{1}{d^2}$$

For light globe A:

$$32 = \frac{k}{1^2}$$

$$k = 32$$

$$I_A = \frac{32}{4^2}$$

$$= 2$$

For light globe B:

$$12 = \frac{k}{1^2}$$

$$k = 12$$

$$I_B = \frac{12}{2^2}$$

$$= 3$$

## PART A - MCQS

3. D

- Constant velocity means there is zero acceleration
- Substituting  $a=0$  into  $F=ma$ , gives an  $F$  value of ZERO.
- Therefore, the net force on the car is zero.

## PART A - MCQS

4. C

- Doubling the travelling speed increases the stopping distance by a factor of 4.
- Given by the relationship:  $S = \frac{mu^2}{2F}$

$$S = \frac{mu^2}{2F}$$

$$X = \frac{mv^2}{2F}$$

$$S = \frac{mu^2}{2F}$$

$$= \frac{m(3v)^2}{2F}$$

$$= \frac{9mv^2}{2F}$$

$$= 9X$$

## PART A - MCQS

5. B

- A body will travel with uniform velocity unless acted upon by an external force. A force is required to change the direction of a car. This force is called the centripetal force and acts towards the centre of the motion i.e. towards the centre of the road's curve. The force is supplied by the friction between the tyres and the road. Because the road is slippery, there is reduced friction thus making the change in the car's direction rather difficult resulting in the car going straight ahead.

PART A - MCQS

6. A

- Conservation of momentum:  
$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

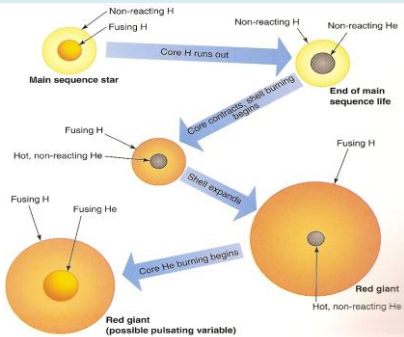
PART A - MCQS

7. C

- Red shift!
- When the light from distant stars and galaxies is examined with a spectroscope and compared to light from the same elements on Earth, the spectrum from the stars and galaxies shows a shift towards the red end of the spectrum i.e. a shift towards a lower frequency (longer wavelength).
- This indicates the light source (galaxy) is receding from us.
- By measuring the degree of redshifting, Hubble was able to calculate the velocity at which the galaxies were moving.

PART A - MCQS

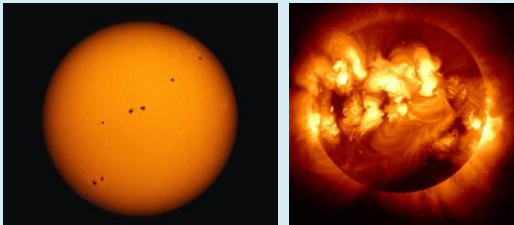
8. C



PART A - MCQS

9. D

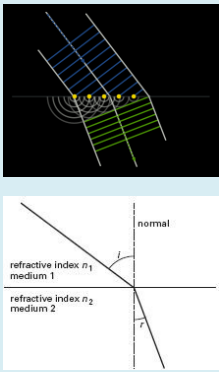
- Sunspots are dark, cool areas on the sun's surface with a very powerful magnetic field.



PART A - MCQS

10. C

- Refraction: the phenomena where the velocity of a wave changes as it travels from one medium to another. As a result of this change in velocity, the waves undergo a change in direction.
- Note: frequency of the wave remains constant as it travels from one medium to another thus, the change in velocity causes a change in wavelength.



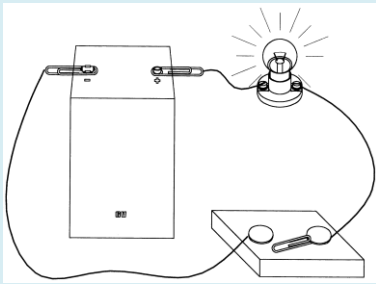
PART A - MCQS

11. A

| POSITIVES                      | NEGATIVES                                      |
|--------------------------------|--|
| Longer factory operating hours | Environmental impact                           |
| Sporting events at night       | Overcrowding in urban areas leading to disease |
| Safer streets                  | Obesity  |
| Controlled traffic             | Loss of jobs - poverty                         |
| Domestic appliances            |  |
| Improved communication         |  |

PART A - MCQs

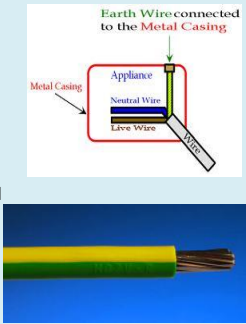
12. A



PART A - MCQs

13. B

- If the outer casing of an appliance is a conductor i.e. made of metal, then it can be made safe by earthing.
- If there is fault in the wiring such that the live wire touches the metal casing, then the surge of current will pass through the earth wire into the earth thus preventing an electric shock when someone comes into contact with the appliance.



PART A - MCQs

14. A

NEWTON

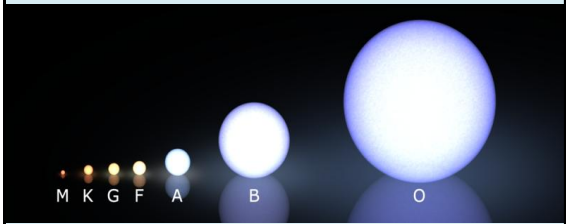
- Supported the heliocentric model
- Proposed the Law of Universal Gravitation

$$F = G \frac{mM}{R^2}$$

- F= gravitational force (N)
- M, m are the masses of the object (kg)
- R is the centre-to-centre distance of separation (m)
- $G = 6.67 \times 10^{-11} \text{ N.m}^2 \text{ kg}^{-2}$

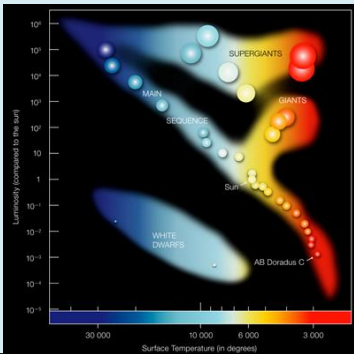
PART A - MCQs

15. C



PART B – SHORT ANSWER QS

16a)



PART B – SHORT ANSWER QS

16b)

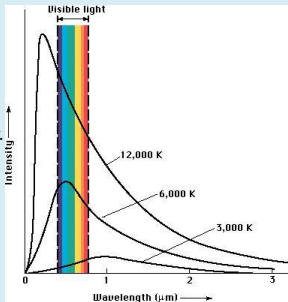
Explain how astronomers can determine the temperature of a star by examining the light emitted by the star. (3 Marks)

- Differences in temperatures among stars change the energy output of the star, the wavelength where the continuous spectrum peaks and the strength of the emission and absorption lines
- Black body radiation
- By measuring the peak wavelength of the light emitted from the star, we can determine its surface temperature through Wien's Law

PART B – SHORT ANSWER QS

16b)

- Very hot stars: radiation is skewed towards the short wavelength ultraviolet end of the spectrum i.e. blue in colour.
- Very cool stars: radiation peaks at long wavelengths and its colour is red.

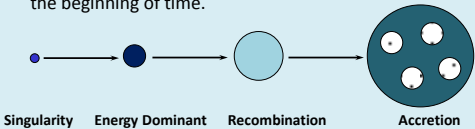


PART B – SHORT ANSWER QS

17.

Describe the key elements of the Big Bang theory and the evidence that supports the theory. (5 Marks)

- The big bang can be understood as the explosion of space at the beginning of time.



PART B – SHORT ANSWER QS

17.

- SINGULARITY: started with a much smaller mass i.e. tiny ball of huge energy.
- ENERGY DOMINANT: energy was transformed into fundamental particles i.e. electrons and quarks
- RECOMBINATION: after the universe had sufficiently cooled, the electrons combined with protons and neutrons to form atoms
- ACCRETION: as the universe was further expanding and cooling, the particles lost kinetic energy and gravity began to attract them together resulting in regions of high mass density which attracted nearby material and cause mass gain. Galaxies formed through accretion. Within these galaxies, further accretion occurred and stars were formed.

PART B – SHORT ANSWER QS

17.

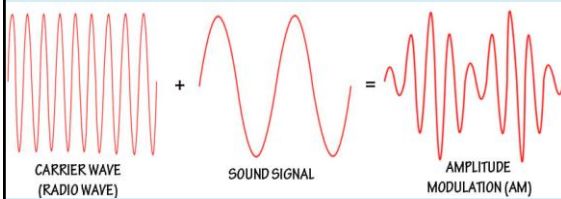
Evidence for the Big Bang theory:

- Red shift
- Cosmic background radiation

PART B – SHORT ANSWER QS

18a)

Sketch both a carrier wave, and the carrier wave after it has been modulated by an AM.(2 Marks)



PART B – SHORT ANSWER QS

18b)

Explain why modulation of radio waves is necessary for the transmission of communication over long distances. (2 Marks)

- Modulation of radio waves is necessary for the transmission of communication over long distances as it results in the radio wave being less prone to disturbances from outside sources and allows for more effective transmission of signals. Without modulation, a receiving station would pick up a combination of all transmissions.

## PART B – SHORT ANSWER QS

19a)

Identify two reasons for having separate electric circuits in a home. (2 Marks)

- There is a limit to the amount of electrical energy that can be safely carried by any household circuit. Therefore, there is generally more than one circuit in any household. One for lighting and the others for power circuits.
- Different circuits may require fuses of different sizes so it is designed so that there are separate electric circuits in the home.

## PART B – SHORT ANSWER QS

19b)

Household electric circuits also have built-in safety features to protect the home and its occupants. Identify one such safety feature and describe how it is designed to function to offer protection. ( 2 Marks)

Fuse: conductor connected in series with the electric circuit which has a higher resistance and lower melting point than the conducting wire. When the current flowing through the circuit exceeds the maximum allowable limit, the fuse will generate heat due to its high resistance thus causing the fuse to melt and disconnecting the circuit.



## PART B – SHORT ANSWER QS

19b)

Circuit breaker: use the property of electromagnets to control the current. When the current reaches a certain allowable value, the magnetic field produced by the current-carrying coil becomes powerful. This attracts the iron piece thus disconnecting the circuit.

These devices are designed to prevent potential fires and electric shocks/electrocutions.

## PART B – SHORT ANSWER QS

20.

Describe the consequences of a non-zero net force acting on an object. (2 Marks)

Non-zero net force means the object is either accelerating (speeding up) or decelerating (slowing down) or changing direction