P6 Quick Revision Questions

H = Higher tier only

SS = Separate science only

Question 1 .... of 50

- Define wavelength

Answer 1 .... of 50

- The distance from a point on one wave to the equivalent point on the adjacent wave. Measured in m

Question 2 .... of 50

Define frequency

Answer 2 .... of 50

- The number of complete waves passing a point in 1 second

Question 3 .... of 50

- Give the wave equation

Answer 3 .... of 50

$$v = f \lambda$$

Question 4 .... of 50

What type of waves are ripples on water?

Answer 4 .... of 50

Transverse wave

Question 5 .... of 50

- Describe a longitudinal wave

Answer 5 .... of 50

- The vibrations of the particles are parallel to the direction of the energy transfer

Question 6

.... of 50 **SS**

- Describe compressions and rarefractions

Answer 6 .... of 50

Compression – waves bunch up

Rarefraction – waves spread out

Question 7 .... of 50 **SS**

- Why can't sound waves travel in a vacuum?

Answer 7 .... of 50

Longitudinal waves travel by passing the vibrations from one particle to another

Question 8 .... of 50

- What does amplitude measure?

Answer 8 .... of 50

- The height of a wave above or below its rest point

Question 9 .... of 50

- Give an example of echo sounding

Answer 9 .... of 50

Ships using high frequency sound waves to find the depth of the seabed or to locate a shoal of fish

Question 10 .... of 50

- A ship sends out a sound wave and receives an echo after 4 seconds. The speed of sound in water is 1500 m/s. How deep is the water?
  - Time for sound to reach the sea bed = 2 seconds

Answer 10 .... of 50

- Speed = distance/time
- Distance = speed x time
- = 1500 m/s x 2s
- = 3000 m

Question 11 …. of 50

- What piece of equipment is used to study waves?

Answer 11 .... of 50

- A ripple tank

Question 12 .... of 50

- Define the incident ray and the reflected ray on a ray diagram

Answer 12 .... of 50

Incident ray = the ray coming in from the wave source to the surface

Reflected ray = the ray coming away from the surface

Question 13 .... of 50

- Give the law of reflection

Answer 13 .... of 50

When a wave is reflected off a surface, the angle of incidence is equal to the angle of reflection

Question 14 .... of 50

- Define refraction

Answer 14 .... of 50

When a wave changes direction and enters a different medium

Question 15 .... of 50

- What is the difference between a specular reflection and a diffuse reflection?

Answer 15 .... of 50

Specular = smooth surfaces

Diffuse = rough surfaces

Question 16 .... of 50 **SS**

- What is the typical range for human hearing?

Answer 16 .... of 50

- 20Hz – 20kHz

Question 17 .... of 50

- Why does sound travel faster in solids?

Answer 17 .... Of 50

- The particles are packed more tightly together

Question 18 .... of 50 **SS**

- How do sound waves travel?

Answer 18 .... of 50

- As vibrations

Question 19 .... of 50 **SS**

- What is ultrasound?

Answer 19 .... of 50

- Soundwaves with a frequency above 20kHz

Question 20 .... of 50 **SS**

- Why are ultrasound scans used in medicine?

Answer 20 .... of 50

They have low energy and don’t damage living cells (unlike x-rays)

Question 21 .... of 50 **SS**

- Why is gel used when a person has an ultrasound scan?

Answer 21 .... of 50

- To prevent the ultrasound being reflected at the skin, therefore giving a good image of the internal structure

Question 22 .... of 50 **SS**

- How do earthquakes happen? What are the shockwaves called that pass through the Earth and travel around its surface?

Answer 22 .... of 50

- When two parts of the Earth's crust slide past each other suddenly at a fault
- Seismic waves

Question 23 .... of 50 **SS**

- What are the two types of seismic waves?

Answer 23 .... of 50

- P-wave = primary (pressure) wave, longitudinal, similar to a sound wave, speed increases with the depth in the Earth and is slower in liquids than solids
- S-wave = secondary (shear), transverse wave, speed increases with the depth in the Earth (always less than P waves) and cannot travel through liquids

Question 24 .... of 50

- Why are electromagnetic waves different from other waves?

Answer 24 .... of 50

- They do not need a material
- Able to travel through a vacuum

Question 25 .... of 50

- What is the wave type with the shortest wavelength in the electromagnetic spectrum?

Answer 25 .... of 50

- Gamma rays

Question 26 .... of 50

- What does it mean when a wave has a higher frequency?

Answer 26 .... of 50

- It can transfer more energy to another object when the radiation is absorbed

Question 27 .... of 50

- Are shorter or longer wavelength waves more dangerous?

Answer 27 .... of 50

- Shorter wavelengths

Question 28 .... of 50

- What is a wavefront?

Answer 28 .... of 50

- A line that joins all the points on a wave which are moving up and down together at the same time

Question 29 .... of 50

- What is the half life of technetium-99m and why is this important?

Answer 29 .... of 50

- 6 hours
- It stays in the body long enough for diagnosis but not long enough to cause lasting damage to cells

Question 30 .... of 50

- What is the key difference between gamma rays and X-rays?

Answer 30 .... of 50

- How they are produce
- Gamma rays – emitted from the nucleus of an unstable atom during radioactive decay
- X-rays – generated by an x-ray machine when high speed electrons collide with metals and lose energy

Question 31 .... of 50

- Give one use of ultraviolet radiation

Answer 31 .... of 50

- Fluorescent lighting

Question 32 .... of 50

- Why can small doses of UV rays be good for you but large doses harmful?

Answer 32 .... of 50

- Small doses = production of vitamin D
- Too much = wrinkles and dark pigmentation spots (premature ageing), harmful to the eyes and even sometimes skin cancer

Question 33 .... of 50

- Describe the absorption of infrared radiation by food

Answer 33 .... of 50

- Energy from infrared radiation is absorbed by the particles on the surface of the food
- They vibrate more and energy can then be transferred slowly by conduction to the food below the surface

Question 34 .... of 50

- What device can be used to detect low levels of infrared radiation from warm objects?

Answer 34 .... of 50

- Thermal imaging cameras

Question 35 .... of 50

- How in an experiment can you compare different surfaces to see which is better at absorbing infrared radiation?

Answer 35 .... of 50

- Set up 2 metal plates, either side of a heater
- One with a shiny surface, the other blackened
- Stick a glass stopper on the back of each plate with wax
- After a few minutes one of the stoppers will drop off (the one that absorbs the most infrared radiation first)

Question 36 .... of 50

- What are microwaves?

Answer 36 .... of 50

- Radio waves with short wavelengths

Question 37 .... of 50

- Give two uses of microwaves

Answer 37 .... of 50

- Communication
- Cooking

Question 38 .... of 50

- How do microwaves heat food?

Answer 38 .... of 50

- Microwaves penetrate the outer layers of food by about 1cm
- Energy transferred by the microwaves makes water or fat molecules in the outer layers of the food vibrate more
- Energy is transferred from the vibrating water/fat to the centre of the food by conduction

Question 39 .... of 50

- How does radar work?

Answer 39 .... of 50

- Sends out microwave pulses from a transmitter mounted on the aircraft
- Microwaves reflect from a metal target
- Reflected microwaves are detected by the radar system's receiving antenna

Question 40 .... of 50

- How can radio waves be produced?

Answer 40 .... of 50

- Oscillations in electrical circuits

Question 41 .... of 50

- Where are radio waves refracted so it returns to the earth surface?

Answer 41 .... of 50

- Ionosphere

Question 42 .... of 50 **SS**

- Define opaque

Answer 42 .... of 50 **SS**

- An object that doesn't allow light to travel through it

Question 43 .... of 50 SS

- Describe a convex lens

Answer 43 .... of 50 **SS**

- Narrow at the outside and bulges in the middle

Question 44 .... of 50 **SS**

- What does a concave lens do?

Answer 44 .... of 50 **SS**

- Makes rays move away from each other

Question 45 .... of 50 **SS**

- How is a virtual image produced?

Answer 45 .... of 50

- When an object is placed between the principal focus and a convex lens

Question 46 .... of 50 **SS**

- Give the equation for magnification

Answer 46 .... of 50

- Magnification = image height/object height

Question 47 .... of 50 **SS**

- A lens is used to focus an image of person 1.76m tall onto a white wall. The image on the wall is 1.9cm tall. Calculate the magnification produced by the lens

Answer 47 .... of 50

- Magnification = image height/object height

= 190/1.76

= 107.95

Question 48 .... of 50 **SS**

- What sort of surfaces are poor at absorbing and emitting infrared radiation?

Answer 48 .... of 50 **SS**

- White, shiny surfaces
- Hence why in hot countries, houses are often painted white to keep them cool inside

Question 49 .... of 50 **SS**

- How can the temperature of the Earth be altered?

Answer 49 .... of 50

- Change rates of absorption, emission and reflection of radiation

Question 50 .... of 50

- Work out the period of a wave when the frequency is 15000 Hz

Answer 50 .... of 50

- $T = 1/f$
- $T = 0.000067$ s