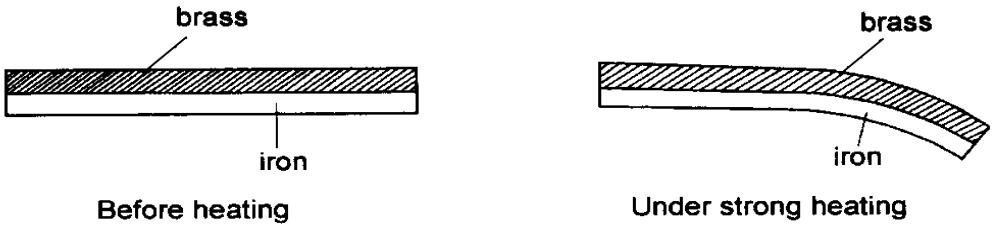
8 Energy

8.1 (a) Thermal expansion

1 Brass and iron are suitable substances for use in a bimetallic strip because they

A are both good conductors of heat
B are good conductors of electricity
C can be joined together
D expand different amount when heated

2 In the figure, the bimetallic strip made of iron and brass bends when it is heated.



This result shows that

A brass and iron are metals.
B brass bends more easily than iron.
C brass expands more than iron.
D iron expands more than brass.

3 Liquids expand

A more than solids
B more than gases
C in an equal manner as solids
D less than solids

4 In the figure, the flask contains water at room temperature. When it is immersed in a basin of hot water, the level of the water in the glass tube falls at first because

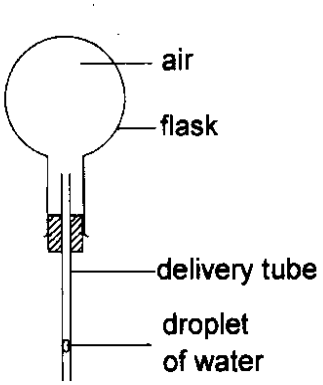
A the flask expands before the water.
B the water expands before the flask.
C water molecules become closer together.
D water evaporates at once when it is warmed

8.1 (a) Thermal expansion

5 In an experiment shown in the figure, what happens when the flask is held with both hands? (96)

The droplet of water in the delivery tube

A moves down because the air in the flask expands
B moves down because the delivery tube expands
C moves up because pressure in the flask decreases
D moves up because the hand attracts it



6 A metallic strip is made of two different metals as shown in the figure. When the metallic strip is heated, it bends. (98)

98 Q 10

Why does the metallic strip bend when it is heated ?

A Both metals expand equally
B One metal contracts more than the other metal
C One metal contracts while the other expands
D One metal expands more than the other metal

7 In Brunei Darussalam, telephone wires are usually hung loosely from pole to pole as shown in the figure. This is (99)

99Q 26

A to allow for contraction on cold days
B to allow for contraction on hot days
C to allow for expansion on cold days
D to allow for expansion on hot days

8 Which of the following statements about heating is true? (2000S)

A Heating changes molecules to light energy
B Heating increases the size of the molecules
C Heating makes the molecules attract each other more
D Heating makes the molecules move faster AND FURTHER APART

9 D 10 A 11 A 12 B

8.1(b) (i) Thermal transfer- conduction

1 Heat energy passes from one particle to another particle directly in the process of

A conduction B convection C radiation D conduction and convection

2 On a cold morning the metal part of the hammer was found to be colder than its wooden handle because

A the metal part is harder than the wooden part.
B the metal part is heavier than the wooden part.
C the metal part conducts heat easily from the hand
D the wooden handle conducts heat easily from the hand

3 What will happen when the copper rod in the figure is heated for some time?

Topic 7 Q 26

A The copper rod will melt.
B The water will boil.
C Pin A will drop off first.
D Pin B will drop off first.

4 A metal spoon is placed in a thick glass before boiling water is poured into it. The glass does not break because the metal spoon

A stops heat from reaching the glass.
B makes the glass expand more.
C conducts heat away and makes the glass expand less.
D conducts heat away and makes the glass expand more

5 Two thermometers were placed in a rod made of two different metals as shown in the figure .There was a difference in the temperature readings of both thermometers.

Topic 7 Q 32

Which is the best explanation for the result?

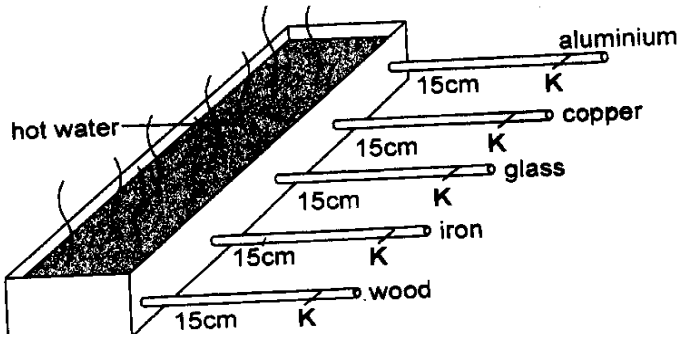
A Metal R is denser than metal S.
B Metal S is heavier than metal R.
C Metal R is a better conductor of heat than metal S.
D Metal S is a better conductor of heat than metal R.

8.1(b) (i) Thermal transfer- conduction

6 Which of the following is NOT used as an insulator?

A Bakelite B Porcelain C Carbon D Plastic

7 In the figure, all the rods are covered with wax. (96)



On which rod will the wax melt up to K first ?

A aluminium rod B copper rod C glass rod D iron rod

8 The figure shows four thumbtacks, each attached to four identical metal rods with wax. The end of each
rod is put into a container of hot water. (98)

98Q 21

In which order will the thumbtack drop first ?

A P,Q,R,S B Q,R,P,S C S,P,R,Q D S,Q,R,P

9 The transfer of heat by conduction takes place from (2000IS)

A a cold region to a hot region
B a dark coloured region to a light coloured region
C a hot region to another of the same temperature
D a hot region to a cold region

8.1(b) (ii) Thermal transfer - convection

1 Heat is transferred through a liquid by

A conduction B convection C radiation D evaporation

2 Which one of the following statements about heat transfer by convection is **not** true?

A Convection is the way by which heat is transferred through liquids and gases.
B In convection, there is no movement of particles.
C In convection, hot particles move up and cold particles move down.
D Land and sea breezes are the result of heat transfer by convection

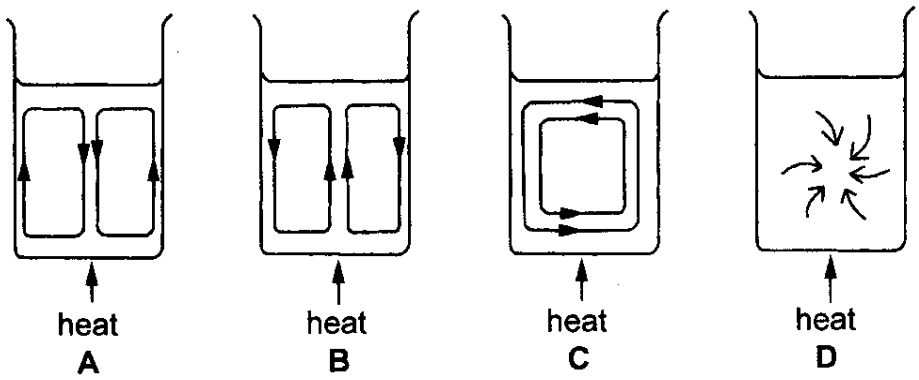
3 Convection currents cause

A land and sea breezes
B sunshine
C drought
D high and low tides

4 Convection occurs in

A liquids and gases only
B solids and gases only
C solids and liquids only
D solids, liquids and gases

5 Which one of the following diagrams shows correctly the convection currents in the beaker of water when heated ?



Answer: B

6 Which of the following is **not** true about convection in water ? (99)

A It causes hot water to sink and cold water to rise
B It is applied in car radiators
C It is the circulation of liquids due to differences in densities
D It occurs in liquids and gases only

8.1(b) (iii) Thermal transfer - radiation

1 The earth receives heat from the sun by the process of

A conduction B convection C radiation D conduction and radiation

2 Heat energy from the sun cannot reach earth by conduction or convection because

A earth is very far away from the sun.
B there are layers of clouds between the earth and the sun.
C most of the space between the earth and the sun is a vacuum.
D earth is surrounded by air.

3 Which of the following cans will lose heat most quickly?

Topic 7 Q 6

Cancell answer E !!!

Answer: B

4 Figure shows four identical metal cups of cold water placed at equal distance from a lit 200 watt bulb.
After some time the four metal cups of water become warm.

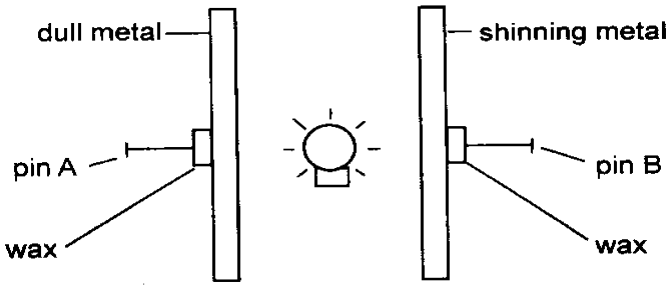
Topic 7 q 20

How does the water in each cup get heated?

A by radiation only.
B by convection only
C by conduction and convection.
D by radiation and conduction.

8.1(b) (iii) Thermal transfer – radiation

5 An experiment was set up as shown in the figure. The 100 W bulb was placed at equal distance between two screens.



What happened when the bulb was switched on for some time ?

A Pin A fell before pin B.
B Pin B fell before pin A.
C Both pins fell at the same time.
D Both pins did not fall.

6 All the four pieces of copper, P, Q, R and S shown in the figure are of the same size and thickness. A piece of heat-sensitive paper which changes colour to dark blue at 50°C is placed underneath each piece of copper.
If this experiment is carried out in sunlight, which diagram will show the heat sensitive paper changing colour to dark blue the earliest? (PMB 97)

Answer: B

7 Heat can only travel by radiation through (98)

A gold B plastic C vacuum D water

8 The electric lamp gives off heat which makes us hot. How does this heat reach us? (99)

A By conduction B By convection C By radiation D By reflection

9 Which of the following statements about the vacuum flask is true? (2000S)

A The cork stopper stops heat escaping by convection
B The glass walls stop heat escaping by convection
C The silvered walls stop heat escaping by conduction
D The vacuum stops heat escaping by radiation

8.1(c) Application of thermal expansion & thermal transfer

1 The inner surfaces of a thermos flask are mirrored. This helps the flask to prevent heat loss or heat gain by

A conduction B convection C radiation D conduction and radiation

2 Equal amounts of hot coffee are poured into five cups as shown in the figure. Which one will remain hot for a long time?

Topic 7 Q 21

Cancel answer E !!!

A Aluminium uncovered. C Porcelain covered
B Aluminium covered. D Porcelain uncovered

3 Two electrical appliances in which bimetallic thermostats are used are

I Fan II Radio III Electric iron IV Rice cooker

A I and II B III and IV C II and III D II and IV

4 Which one of the following does **not** make use of expansion or contraction to function ?

A bimetallic thermometer C bimetallic thermostat
B hot-air balloon D hydrogen balloon

5 The thermal expansion of liquids is made use of in

A thermometers C calipers
B lever balance D measuring cylinder

6 A refrigerator always has its cooling unit at the top while an oven has its gas burner at the bottom. This is because

A hot air sinks and cold air rises. C cold air is lighter than hot air.
B hot air has smaller molecules. D cold air is heavier than hot air.

7 In the refrigerator, the freezer is always placed at the top . The main reason for this is

A to absorb all the smell of food inside
B to prevent it from becoming wet
C to prevent short circuit
D to set up a convection current

8.1(c) Application of thermal expansion & thermal transfer

8 In a hot water tank the heating element should be placed at the bottom because

A conduction cannot occur when the heater is at the top of the tank.
B heated water will rise and form a convection current.
C it is easier to connect the electrical circuit.
D it is easier to do the maintenance.

9 In a thermos flask heat loss by conduction and convection is reduced by

A having a vacuum between two walls.
B using a cork stopper
C keeping the flask in a plastic container.
D silvering the glass walls.

10 D
11 C

8.2 (a) Linear propagation of light

1 Choose the luminous bodies out of the following:

A Star, Moon and Venus
B Star, Venus and Sun
C Star, Sun and Burning candle
D Moon, Venus and Sun

2 A pinhole camera works on the principle that light

A can cast a shadow
B travels at high speed
C reflects from a screen
D travels in a straight line

3 A pin-hole camera is focused towards a van as shown in the figure.

Topic 10 Q7

Which one of the following diagrams is most similar to the image formed inside the camera?

Topic 10 Q 7

Answer: D

4 An eclipse of the sun occurs when

A the sun is between the earth and the moon
B the moon is between the sun and the earth
C the earth is between the sun and the moon
D the earth casts its shadow on the moon

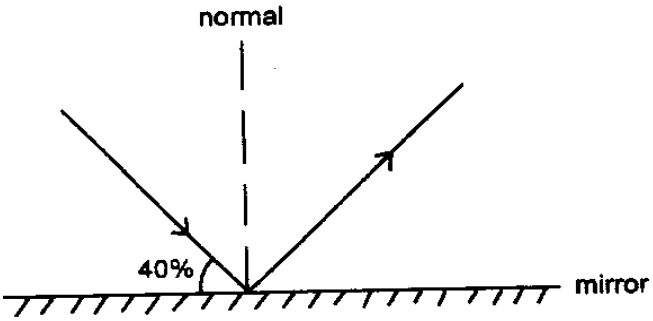
5 The image produced in a pinhole camera is (2000S)

A always the same size
B always upright
C inverted
D virtual

6 D
7 D

8.2 (b) Reflection of light

1 The diagram shows a ray of light reflected in plane mirror. Which of the following is the angle of reflection ?



A 20^o B 40^o C 50^o D 90^o

2 The image of an object placed in front of a plane mirror is

A laterally inverted
B smaller than the object
C larger than the object
D real and inverted

3 The perpendicular distance of the image from the mirror is

A equal to the perpendicular distance of the object from the mirror
B twice the perpendicular distance of the object from the mirror
C three times the distance of the object from the mirror
D half the distance of the object from the mirror

4 When light is reflected by a plane mirror

A the angle of incidence is equal to the angle of reflection
B the angle of incidence is equal to the angle of refraction
C the angle of incidence is twice the angle of reflection
D the angle of incidence is twice the angle of refraction

5 A man stands 2.0 metres in front of a plane mirror. The distance between him and his image produced by the mirror is

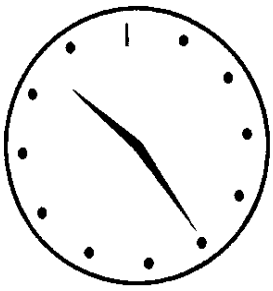
A 1.0 metre
B 2.0 metres
C 3.0 metres
D 4.0 metres

6 A man stands in front of a mirror. The image is 4 metres away from the man. What is the distance of the man from the mirror?

A 1 metre B 2 metres C 4 metres D 8 metres

8.2 (b) Reflection of light

7 The image of a clock formed by a mirror is shown in the following figure. What is the actual time ?



A 1.25 B 1.35 C 10.25 D 10.35

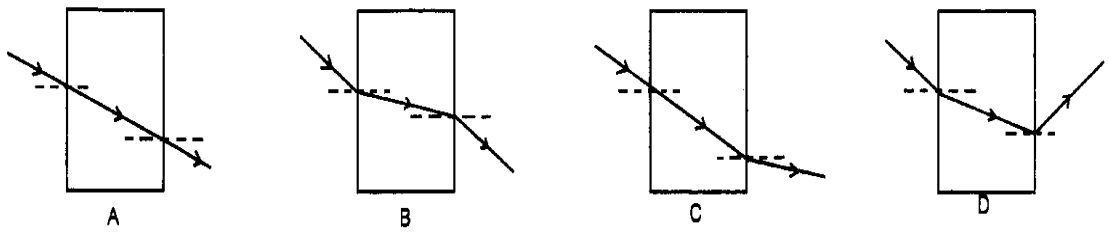
8 Reflection is the process where light (97PMB)

A becomes coloured light
B penetrates glass
C bounces back from a shiny surface
D travels from air into glass

9 D

8.2 (c) Refraction of light

1 Which of the following diagrams shows how a ray of light is refracted when it passes through a glass block?



Answer: B

2 When a ray of light passes obliquely from air into glass it

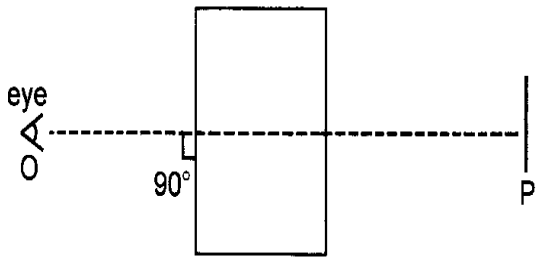
A bends away from the normal
B bends towards the normal
C continues to travel without bending
D goes along the normal

3 Which of the following diagrams shows how a ray of light is refracted when it passes from air to glass?

SAP pg 67 Q9

Answer: C

4 The diagram below shows an observer at O looking through a rectangular glass block at an object P. The object when viewed from observer appears to be



A diminished B nearer C further D at its true position

8.2 (c) Refraction of light

5 The following diagram shows a ray of light entering a glass block.

SAP pg 68 Q15

Which of the following is the correct angle of incidence and refraction?

	angle of incidence	angle of refraction
A	p	r
B	p	s
C	q	r
D	q	s

6 The diagrams show the path of light rays through the glass prism. Which one is the correct path of the light rays? (97BJCE)

97BJCE Q 31 (1 inch)

Answer: B

7 D
8 D

8.2 (d) Lenses, eye, camera & magnifying glass

1 In the following diagram, which of the following can be placed at position X to form the ray diagram shown ?

SAP pg73Q1

A converging lens B diverging lens C glass block D plane mirror

2 A ray of light travels through a thin converging lens. In what direction A,B,C,or D will the ray emerge ?

SAP pg 73Q4

Answer: D

3 The following figure shows four rays of light falling on a convex lens.

Topic 10 Q 3
(cancell ray 2 and change !!!)

The ray that shows the correct path of the light after PASSING THROUGH THE LENS is

A 1 B 2 C 3 D 4

4 A convex lens is used to correct

A blindness B colour blindness C long-sightedness D short-sightedness

5 What controls the thickness of the lens in the eye ?

A Ciliary muscle
B Cornea
C Iris
D Pupil

6 A boy was reading his comic book. He then looked out of the window to focus his eyes on his friend in the field. The lenses in his eyes became

A fatter
B harder
C softer
D thinner

8.2 (d) Lenses, eye, camera & magnifying glass

7 The image formed on the retina of the eye is

A real, diminished and inverted.
B real, magnified and erect.
C virtual, diminished and erect.
D virtual, diminished and inverted.

8 Which part of the eye has similar function to the aperture of a camera?

A Iris B Pupil C Retina D Cornea

9 If the image of an object falls exactly on the blind spot of the retina, the eye will

A not see the colour of the object
B not see the object at all
C see the object much smaller
D see the object much bigger

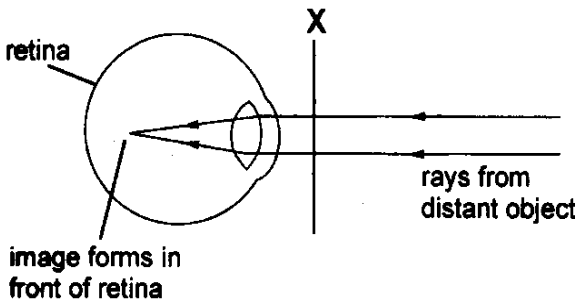
10 The following figure shows the longitudinal section of a human eye.

Topic 10 Q 15

Part X helps the eye to

A control the amount of light entering the eye
B control the shape of the lens
C focus the light from the object
D hold the lens in place

11 The figure shows an eye defect (95)



In order to correct this defect, which type of lens should be placed at X ?

A Concave lens B Convex lens C Cylindrical lens D Prismatic lens

8.2 (d) Lenses, eye, camera & magnifying glass

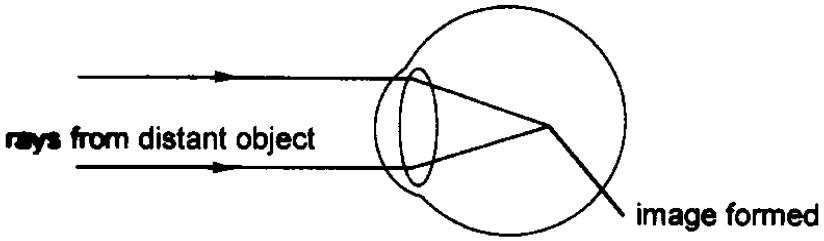
12 Which one of the following statements about the human eye is **not** true ? (96)

A The aqueous humour helps to keep the eye in shape
B The ciliary muscles control the curvature of the eye lense
C The cornea helps to converge the light entering the eye
D The pupil controls the amount of light entering the eye

13 A student is reading a book in a room. An aeroplane flies past and the student turns to look at it Which of the following describes the change in the student's eye lenses ? (98)

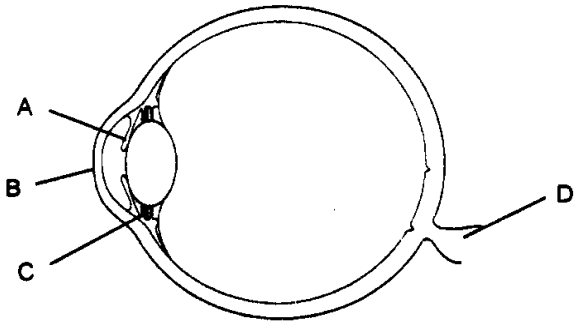
A Longer and thicker
B Shorter and thicker
C Longer and thinner
D Shorter and thinner

14 What do you call the eye defect as shown in the figure ? (99)



A Colour blindness B Long sightedness C Night blindness D Short sightedness

15 Figure shows a cross-section of a human eye. (2000IS)



Which part of the eye labelled A,B,C or D is responsible for changing the focal length of the eye lens ?

Answer: C

16 C
17 B
18 B
19 D
20 B

8.2 (e) Dispersion of light

1 The spectrum of white light consists of

A 3 colours B 5 colours C 7 colours D 9 colours

2 The splitting of white light into different colours is

A reflection B refraction C dispersion D transmission

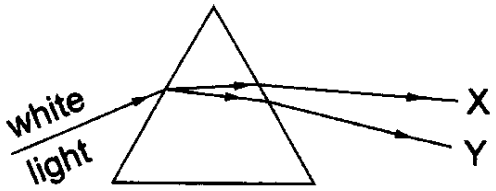
3 Light ray from the sun is passed through a prism. The colours produced are

A red, orange, yellow, green, blue, indigo,violet
B red, orange, white, orange, blue, indigo, violet
C red, orange, blue, pink, yellow, indigo, violet
D red, orange, yellow, indigo, black, green, violet

4 In the evening, rainbows form at the

A north B south C east D west

5 The following figure shows a spectrum of colours formed on a white screen between X and Y when white light is passed through a glass prism.



Which colour will be visible at position X ?

A Red B Violet C Green D Orange

6. B

8.3 (a) Production & transmission of sound

1 Sound is produced and transmitted by

A raindrops hitting a roof
B a singer holding a guitar
C a man holding a fork
D a bell vibrating in a vacuum

2 Sound is caused by

A reflection B refraction C dispersion D vibration

3 Sound cannot travel through

A solids B liquids C gases D vacuum

4 Two astronauts on the moon can hear each other when

A they face each other
B they are near to each other
C their helmets are touching
D they show hand signals

5 The figure shows three hollow bamboos with one end closed. They have different length but the same diameter. A stick was used to hit them in turn, to produce different sounds. (97BJCE)

BJCE Q39

Which COMBINATION OF THE FOLLOWING statements IS true ?

I The air column inside vibrates
II The longer the bamboo the higher the pitch
III The shorter the bamboo the lower the pitch
IV The shorter the bamboo the higher the pitch

A I and II only
B I, II and III only
C I and IV only
D II and III only

8.3 (b) The ear

1 Which part of the ear contains three tiny bones?

A Outer ear B Cochlea C Inner ear D Middle ear

2 Which part of the ear changes sound wave into nerve impulse?

A the chain of bones B the ear lobe C the cochlea D the semicircular canal

3 Sound is produced by vibrations which is carried through the air into our ears. These vibrations are carried to the middle ear through the vibrations of the (97BJCE)

A anvil B cochlea C eardrum D earlobe

4 The ear bones in the ears help to

A vibrate the ear drums
B send messages to the ears
C transmit sound to the inner ear
D set up electric signals in the nerve cells

5 Which of the following does **not** cause a hearing loss ? (97PMB)

A Abnormal growth of the bones in the middle ear
B Damage of semicircular canal
C Hearing loud noises all the time
D Infection in the middle ear

6 B

8.3 (c) Speed of sound & echo

1 Sound travels fastest through

A vacuum B air C solids D liquids

2 The following statements are all correct about sound, **except**

A Echo is the reflection of sound
B Sound cannot be heard through vacuum
C Sound is caused by vibrations
D Sound travels fastest in air

3 The speed of sound in air is about

A 130 m/s B 230 m/s C 330 m/s D 430 m/s

4 Which one of the following statements about sound is **not** true ?

A Light travels faster than sound
B Thunder is heard before lightning is seen
C Gun smoke is seen before gun shot is heard
D Sound travels through any medium except vacuum

5 Sound cannot travel through

A air B glass C a vacuum D wood

6 When piano strings and tuning forks are producing sounds, they are in a state of

A compression B rotation C tension D vibration

7 A
8 D