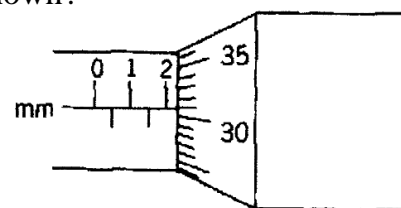


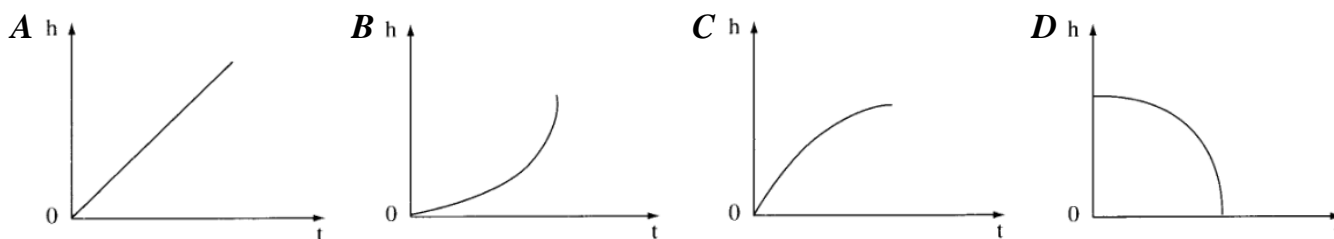
Answer **all** questions. For each question there are four different answers, **A**, **B**, **C** and **D**. Choose the **one** you consider **correct**.

1 The diagram shows a micrometer screw gauge. What is the reading shown?

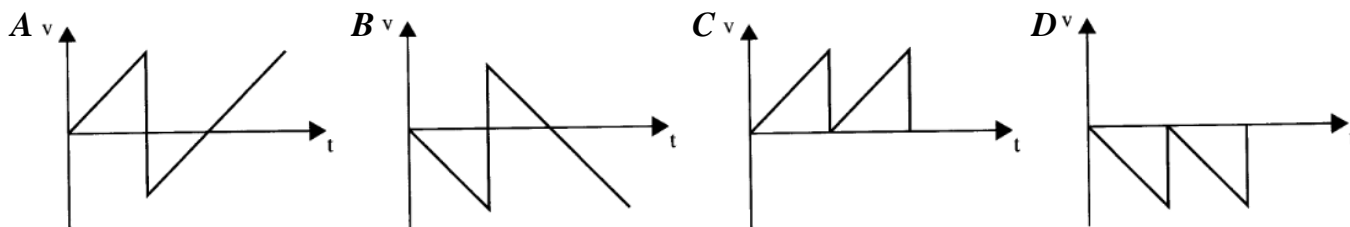
- A** 2.29 mm
- B** 2.30 mm
- C** 2.31 mm
- D** 231 mm



2 An object is projected vertically upwards from the ground. Which of the following graphs correctly shows the variation of the height **h** reached by the object with time **t**?



3 A tennis ball is dropped from a height above the ground and bounces to the same height. Which of the following **v-t** graphs is correct? (Take upward as positive.)



4 The diagram shows a 9 N force and a 12 N force acting at right angles. Which of the following diagrams shows the resultant force?



- A** 10.5 N
- B** 15 N
- C** 21 N
- D** 21 N

5 The engine of a spaceship travelling in space is suddenly turned off. The spaceship will move with

- A** constant velocity.
- B** increasing velocity.
- C** decreasing velocity.
- D** constant acceleration.

6 When an object is moving with uniform velocity on a rough horizontal surface, which of the following statements is/are correct?

- I** There is zero net force acting on the object.
- II** The kinetic energy of the object is increasing.
- III** The potential energy of the object is increasing.

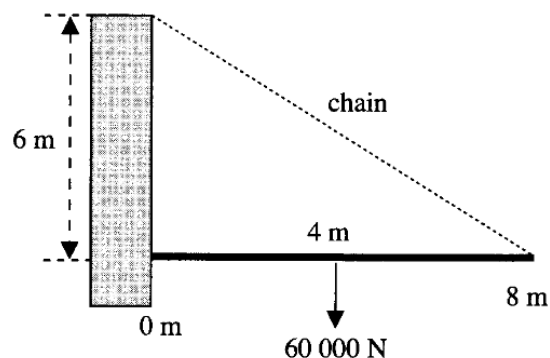
- A** **I**
- B** **II**
- C** **I, III**
- D** **II, III**

7 A rubber ball of mass 1 kg is dropped from rest at a height of 5 m from the ground and rebounds to the same height. If the ball is in contact with the ground for a duration of 0.1 s, what is the total reaction of the ground on the ball?

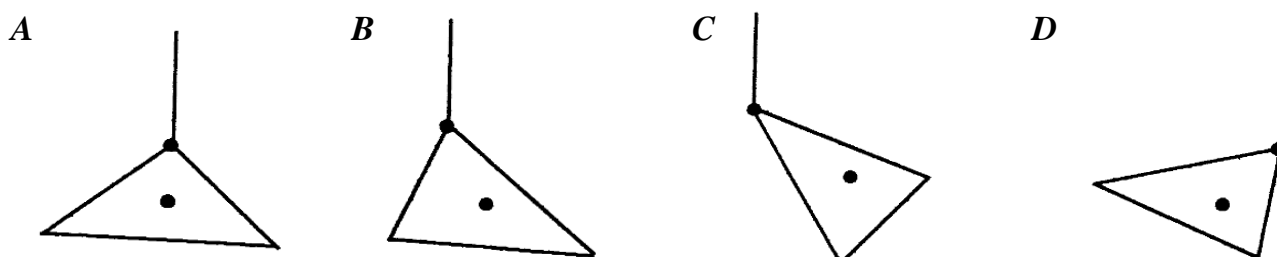
- A** 100 N
- B** 110 N
- C** 200 N
- D** 210 N

8 A 8 m long uniform hanging bridge weighing 60 000 N is being held horizontal by the hinges at the 0 m mark and the strong chain at the 8 m mark as shown. What is the tension in the chain?

- A** 30 000 N
- B** 40 000 N
- C** 45 000 N
- D** 50 000 N

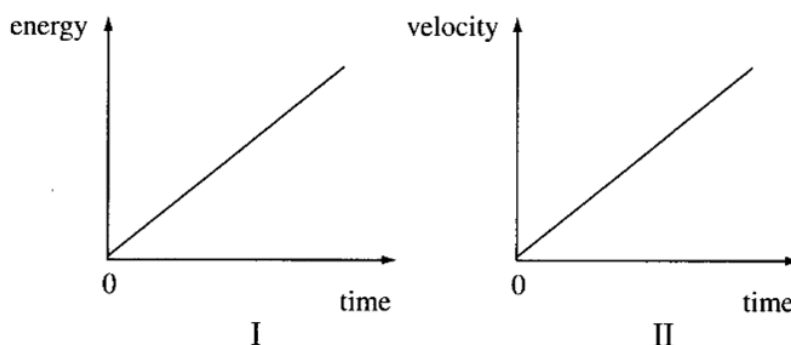


9 Which diagram shows how a piece of card of centre of gravity **M** hangs when suspended by a thread?



10 What physical quantity does the slope of each of the graphs represent?

- | | |
|-------------------|--------------|
| I | II |
| A Force | Distance |
| B Power | Acceleration |
| C Power | Distance |
| D Momentum | Acceleration |

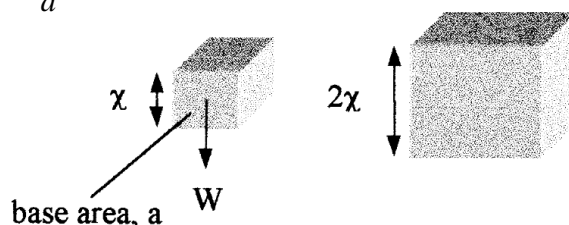


- 11 Electric energy is generated by a hydropower station at the foot of a waterfall of height 10 m. If the flow rate of the waterfall is 10^4 kg/s and the efficiency is 20%, how much power of electric energy can be produced?

A 2×10^4 W
B 1×10^5 W
C 2×10^5 W
D 5×10^5 W

- 12 Two cubes are made from the same material. One cube has sides that are twice as long as the other. Standing on one face, the small cube exerts a pressure $P = \frac{W}{a}$. What is the pressure exerted by the larger cube standing on one of its faces?

A $2P$
B $4P$
C $8P$
D $16P$



- 13 A balloon is squeezed and the pressure of the air inside increases. If there is no change in the temperature of the air, the molecules of air cause this increase in pressure, because they

A are moving faster.
B are greater in number.
C have a larger mean free path.
D collide more frequently with the wall of the balloon.

- 14 Which of the following statements about internal energy is/are true?

I The internal energy of a body always increases when the temperature of the body increases.
II The internal energy of a body is a measure of the total kinetic energy of the molecules in the body.
III The internal energy of a body is a measure of the total potential energy and kinetic energy of the molecules in the body.

A **I, II**
B **I, III**
C **II, III**
D **I, II & III**

- 15 A mercury thread in glass has a length of 3 cm at 0°C and a length of 11 cm at 100°C . What will be the length of the mercury thread if it is placed in an environment of 65°C ?

A 5.2 cm
B 5.8 cm
C 6.5 cm
D 8.2 cm

- 16 The heating element of an electric kettle is at the bottom

A so that heat can be conducted to the top.
B so that heat can be radiated to all the water around it.
C because hot water rises and cold water sinks to the bottom.
D because the heating element must be completely covered with water.

- 17 Each of the following substances of different masses and specific heat capacities is supplied with an equal quantity of heat. Which of them has the smallest rise in temperature?

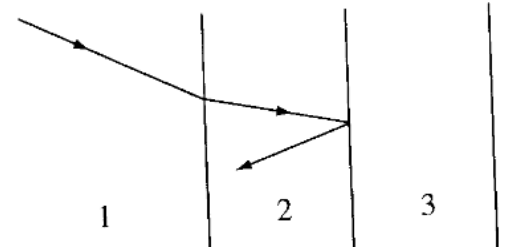
	<i>Mass/kg</i>	<i>Specific heat capacity/J/kgK</i>
A	1.5	900
B	2.0	800
C	2.5	700
D	3.0	600

- 18 Hot water at 100°C is added to 4 g of ice at 0°C . What is the minimum mass of hot water needed to melt the ice? [Specific latent heat of fusion of ice is 336 J/g; specific heat capacity of water is 4.2 J/gK]

- A** 0.8 g
B 3.2 g
C 13.4 g
D 84 g

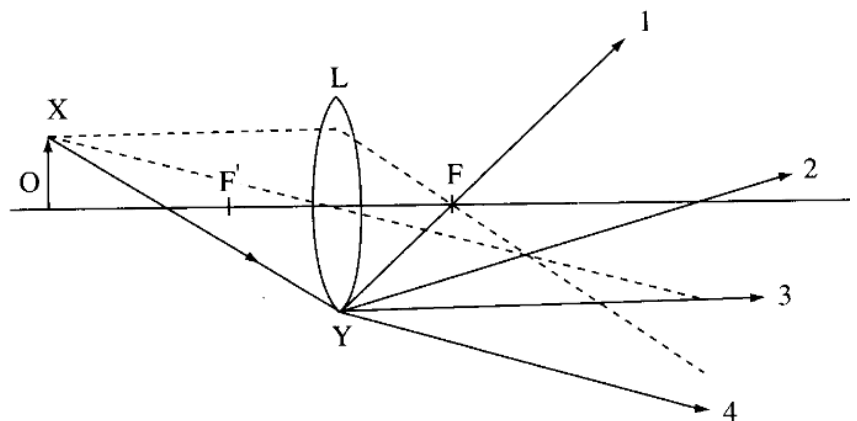
- 19 The diagram shows a light ray travelling from medium **1** to **2** and is totally internally reflected at the boundary between media **2** and **3**. The media may be air, glass or water but not necessarily in that order. What are media **1**, **2** and **3**?

	1	2	3
A	Air	Water	Glass
B	Air	Glass	Water
C	Glass	Water	Air
D	Water	Glass	Air



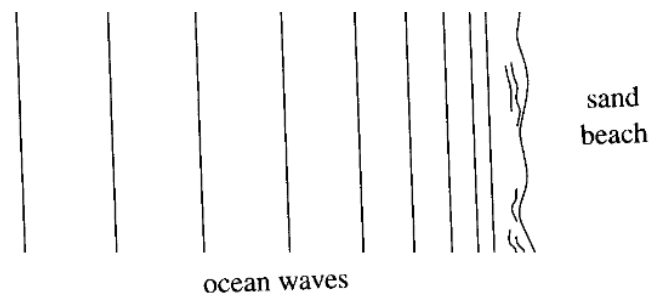
- 20 F and F' are the foci of the convex lens L and the broken lines represent the paths of two light rays coming from object O and passing through L . Which is the most probable path of the ray XY after passing through L ?

- A** **1**
B **2**
C **3**
D **4**



- 21 Ocean waves approaching a sand beach are observed from above. The pattern is shown in the diagram. Which of the following waves properties accounts for the decreasing wavelength?

- A** Reflection
B Refraction
C Dispersion
D Total internal reflection

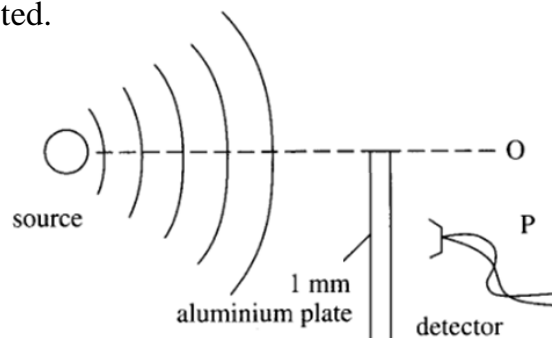


- 22 Which of the following is in the correct order of decreasing wavelengths?
- A** γ -rays, microwaves, ultra-violet rays
B γ -rays, ultra-violet rays, microwaves
C Microwaves, γ -rays, ultra-violet rays
D Microwaves, ultra-violet rays, γ -rays
- 23 Light waves of frequency f and wavelength λ travels in air with velocity c . It is known that its velocity in liquid L is $\frac{2}{3}c$. Which of the following statements is/are true?
- I** The refractive index of the liquid L is $\frac{2}{3}$.
II The frequency of the light waves in L is $\frac{2}{3}f$.
III The wavelength of the light waves in L is $\frac{2}{3}\lambda$.
- A** **I**
B **III**
C **I, III**
D **II, III**

- 24 An aluminium plate of 1 mm is placed in front of a source generating electromagnetic waves. Several electromagnetic wave sources are used and their corresponding detectors moves from P to central position O to detect the wave. Arrange in ascending order the distance between O and the detector that the following electromagnetic waves are detected.

- I** Red light
II Violet light
III Gamma ray

- A** **I, II, III**
B **I, III, II**
C **II, I, III**
D **II, III, I**



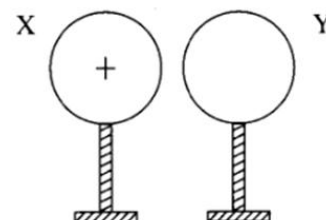
- 25 Two musical notes A and B of frequencies 512 Hz and 256 Hz respectively are heard. Which of the following is/are correct?

- I** A is louder than B .
II The pitch of A is higher than B .
III Both waves travel with the same speed in air.

- A** **II**
B **III**
C **I, II**
D **II, III**

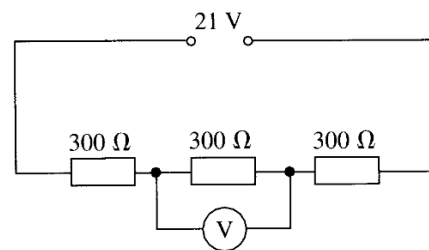
- 26 The positively charged sphere X and the uncharged sphere Y are mounted on insulating stands. When the spheres touch each other, the movement of the charges will be

- A** protons moving from X to Y .
B protons moving from Y to X .
C electrons moving from X to Y .
D electrons moving from Y to X .



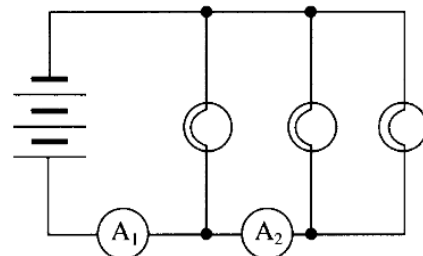
27 The voltmeter in the circuit has a resistance of $1\,200\ \Omega$ and a $21\ \text{V}$ d.c. supply. The voltmeter reading will be

- A 5 V.
- B 6 V.
- C 7 V.
- D 8 V.



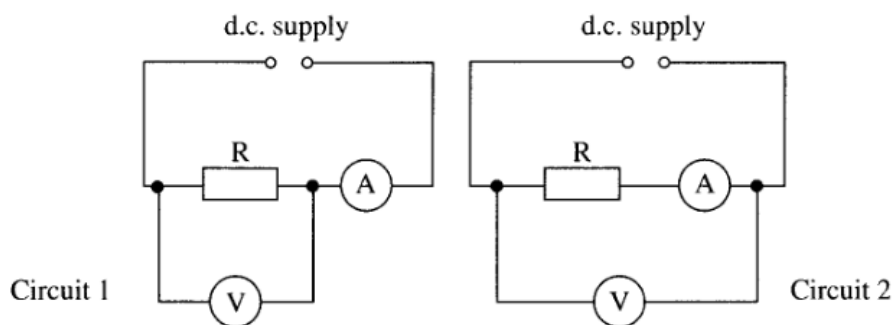
28 In the circuit, all the light bulbs are identical. If ammeter A_1 reads $0.6\ \text{A}$, the reading of A_2 will be

- A 0.2 A
- B 0.3 A
- C 0.4 A
- D 0.5 A



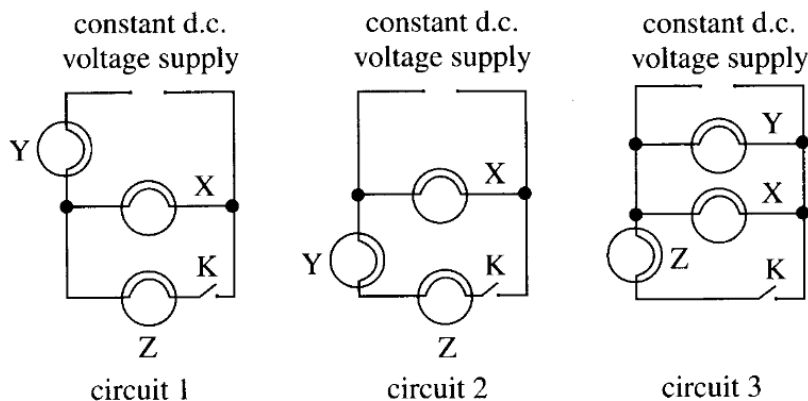
29 The resistance of resistor R is measured with a voltmeter and an ammeter in two different circuits as shown. If the voltmeter and ammeter readings in circuit 1 are $5\ \text{V}$ and $0.5\ \text{A}$ respectively, the readings in circuit 2 will be

- | | <i>Voltmeter</i> | <i>Ammeter</i> |
|---|------------------|-------------------|
| A | $> 5\ \text{V}$ | $> 0.5\ \text{A}$ |
| B | $> 5\ \text{V}$ | $< 0.5\ \text{A}$ |
| C | $< 5\ \text{V}$ | $> 1\ \text{A}$ |
| D | $< 5\ \text{V}$ | $< 1\ \text{A}$ |



30 Three identical bulbs X , Y and Z are connected in three different circuits as shown. In which of the circuits will the brightness of bulb X decrease when key K is closed?

- A I
- B II
- C I, III
- D II, III



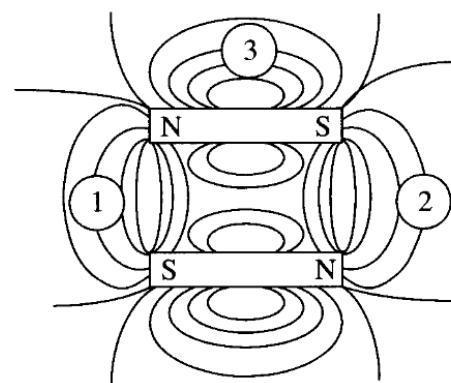
31 The resistance of an iron wire will become larger by increasing the

- I length of the wire.
- II temperature of the wire.
- III cross-sectional area of the wire.

- A I, II
- B I, III
- C II, III
- D I, II & III

- 32 In an electric circuit, a fuse should be placed on the
- A live wire.
 - B earth wire.
 - C neutral wire.
 - D live and earth wires.
- 33 If 1 unit of electricity cost \$0.20, how much does it cost to switch on a heater marked “120 V 3 A” for 90 minutes?
- A \$0.11
 - B \$2.70
 - C \$64.80
 - D \$108.00
- 34 Many domestic hair-dryers have no earth wire. Why?
- A The current is small.
 - B The plug is installed with a fuse.
 - C The casing of the hair-dryer is made of plastic material.
 - D The fan prevents the heating coil from becoming too hot.

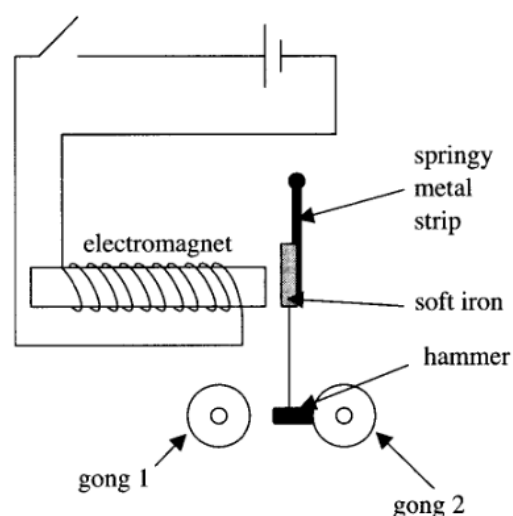
- 35 The diagram shows the magnetic field of two magnets placed close together. Three plotting compasses are placed at the locations shown. Which is the set of compasses showing the correct directions of needles?



	<i>I</i>	<i>2</i>	<i>3</i>
A	↑	↑	→
B	↑	↑	←
C	↓	↑	→
D	↓	↓	→

- 36 The diagram shows the circuit of an electric bell. What happens when the bell button is switched on and switched off?

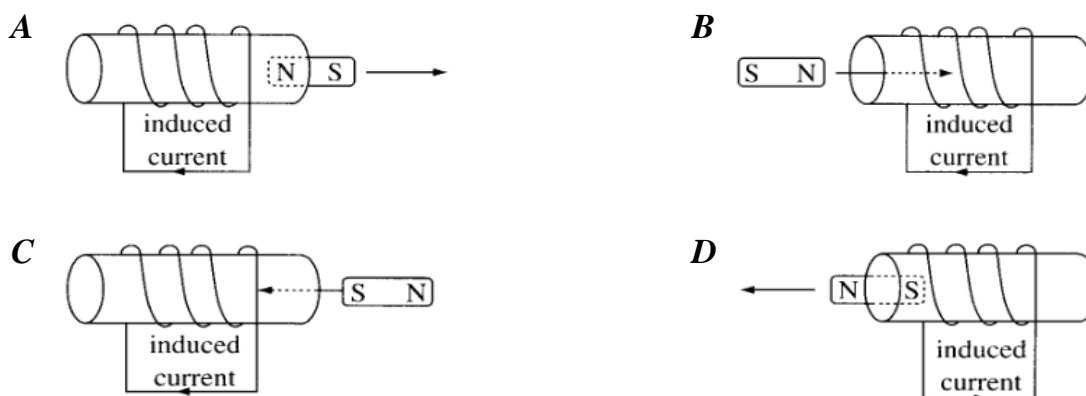
	<i>Switch on</i>	<i>Switch off</i>
A	Silence	Continuous ringing
B	1 ting is heard	Silence
C	1 ting is heard	1 ting is heard
D	Continuous ringing	Silence



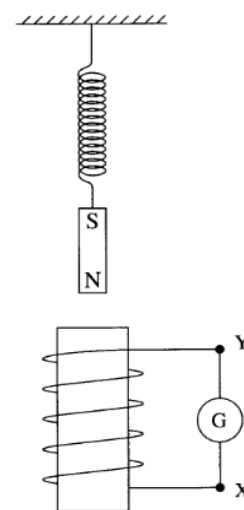
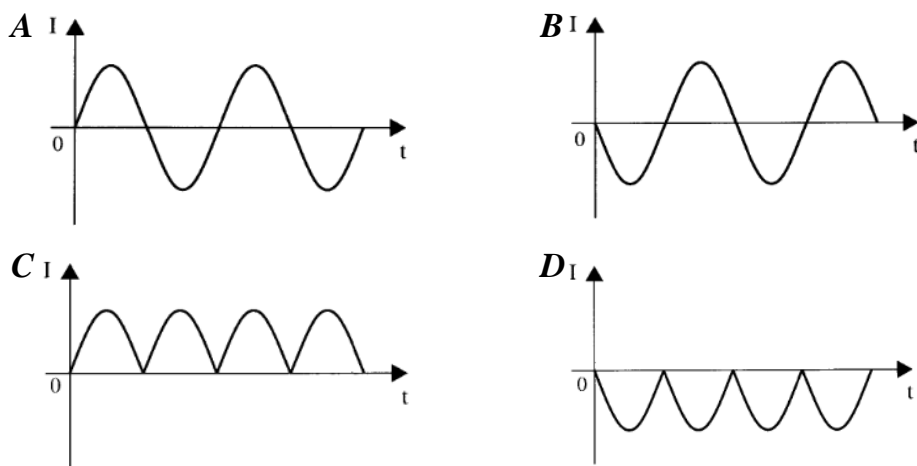
37 When a magnet is withdrawn from a coil, an induced e.m.f. occurs in the coil. Which of the following would increase the induced e.m.f.?

- I** Replacing the magnet by a stronger one.
 - II** Increasing the number of turns of the coil.
 - III** Withdrawing the magnet at a faster speed.
- A** **I, II**
 - B** **I, III**
 - C** **II, III**
 - D** **I, II & III**

38 Which of the following diagrams correctly describes the direction of current induced in a coil when a magnet moves into or out of it?



39 In the figure, the magnet is pulled down a small distance and then released. Which of the following graphs of current against time is correct? (Current is taken as positive when it flows from X to Y through galvanometer.)



40 A 50 V a.c. supply is stepped down to 10 V by a transformer. If the current flowing through the secondary coil is 2 A and the efficiency of the transformer is 80%, the current in the primary coil I_p will be

- A** 0.23 A.
- B** 0.32 A.
- C** 0.41 A.
- D** 0.50 A.

