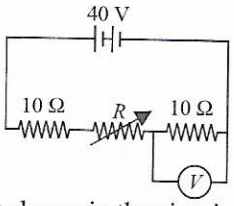
11. X and Y are two points on a uniform ring of resistance R. The $\angle XOY = \theta$, where O is the centre of the ring. The equivalent resistance between X and Y is

A. $\frac{R\theta(2\pi-\theta)}{4\pi^2}$ B. $R\left(1-\frac{\theta}{2\pi}\right)$

C. $\frac{R\theta}{2\pi}$ D. $\frac{R(2\pi-\theta)}{4\pi}$

12. A 40 V d.c. supply is connected to a series combination of two 10 Ω resistors and a variable resistor R. The value of R varies from 0 to 20 Ω. A voltmeter of infinite resistance is connected across one of the 10 Ω resistors as shown in the circuit diagram. Which range of values is displayed by the voltmeter when R is varied?



A. 20 V - 10 V B. 30 V - 10 V

C. 30 V - 20 V D. 40 V - 20 V

13. In nuclear power reactors,

(i) Uranium-235 is used as the fission material

(ii) Graphite is used as a moderator

(iii) Rods of cadmium are used to control the rate of nuclear reaction.

Which of the above statements are correct?

A. (i), (ii) and (iii) B. (i) and (ii) only

C. (ii) and (iii) only D. (i) and (iii) only.

14. Which of the following statements is/are correct?

I. A person suffering from myopia can see distant objects clearly.

II. The bluish colour of water in deep sea is only due to reflection of sky in water.

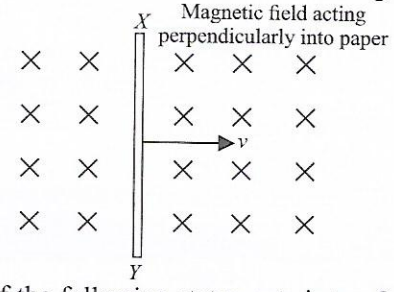
III. In vacuum, all the colours of the white light move with the same speed.

IV. At noon, the sun appears white as light is least scattered.

A. I only B. II only

C. I and II only D. III and IV only

15. A metal rod XY is pulled to the right with a velocity v through a magnetic field as shown in figure.



Which of the following statements is true?

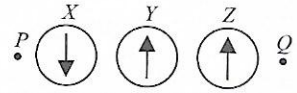
A. The induced current flows from Y to X because X is at a higher potential.

B. The induced current flows from X to Y because X is at a higher potential.

C. The induced current flows from Y to X because Y is at a higher potential.

D. There is no induced current in the rod.

16. A student knows that two wires, placed perpendicular to plane of paper P and Q are carrying a 2 A current and a 1 A current but he does not know which wire is carrying which current. He arranges three magnetic compasses X, Y and Z between the wires P and Q such that the compass marked Y is at the mid-point between the two wires.



(i) What is the direction of the currents in P and Q?

(ii) Which wire carries more current?

	(i)	(ii)
A.	Same direction	P
B.	Same direction	Q
C.	Different directions	P
D.	Different directions	Q

17. Which of the following is not due to total internal reflection?

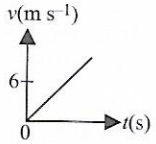
A. Working of optical fibres

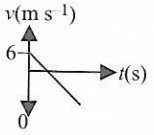
B. Difference between apparent and real depth of a pond

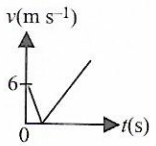
C. Mirage on hot summer days

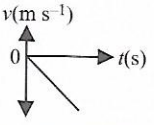
D. Brilliance of diamonds

18. A sandbag is released from a hot air balloon when it is 20 m above the ground. The balloon is ascending at a velocity of 6 m s^{-1}. Which of the following graphs best shows how velocity of the sandbag will vary with time?

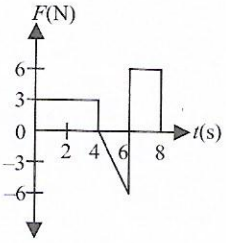
A. 

B. 

C. 

D. 

19. The force F acting on a particle of mass 1 kg is indicated by the force-time graph as shown. If the particle starts from rest, then the speed of the particle at the end of 6 s will be



A. 3 m s^{-1}

B. 6 m s^{-1}

C. 9 m s^{-1}

D. 18 m s^{-1}