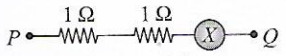
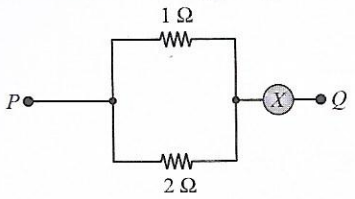
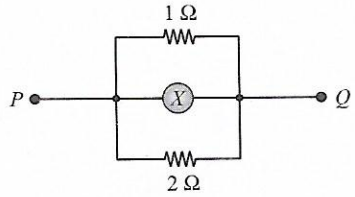
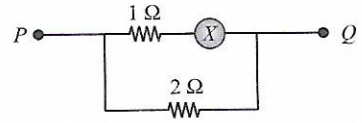
SECTION-1
PHYSICS

1. Four arrangements of resistors with an ammeter X which has resistance of 2 Ω are shown here.

I. 

II. 

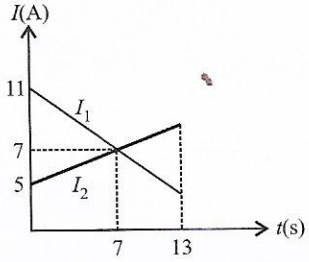
III. 

IV. 

When same potential difference is applied between points P and Q for each arrangement, then the largest reading of ammeter is given by arrangement

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

2. I_1 and I_2 are currents flowing through two different circuits. Variation of these currents with time is shown in the graph. Using the graph, find the difference in the total charge that flows through the two circuits for the first 7 seconds.



A. 0 C
B. 21 C
C. 42 C
D. 49 C

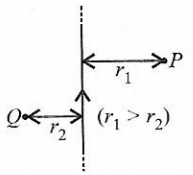
3. A 2.0 cm tall object is placed 15 cm in front of a concave mirror of focal length 10 cm. What is the size and nature of the image?

A. 4 cm, real
B. 4 cm, virtual
C. 1.0 cm, real
D. None of these

4. The speed of light in media M_1 and M_2 are 1.5×10^8 m s^{-1} and 2×10^8 m s^{-1} respectively. A ray travels from medium M_1 to the medium M_2 with an angle of incidence θ. If the ray suffers total internal reflection, then the value of the angle of incidence θ is

A. $> \sin^{-1}\left(\frac{3}{4}\right)$
B. $< \sin^{-1}\left(\frac{3}{4}\right)$
C. $= \sin^{-1}\left(\frac{4}{3}\right)$
D. $\leq \sin^{-1}\left(\frac{4}{3}\right)$

5. A long current carrying conductor is placed in the plane of paper as shown in figure. If B_1 and B_2 are magnetic fields at points P and Q respectively, then



A. $B_1 > B_2$ and directions of magnetic field at points P and Q are into the paper.
B. $B_1 < B_2$ and direction of magnetic field at point P is into the paper while that at point Q is out of the paper.
C. $B_1 < B_2$ and direction of magnetic field at point P is out of the paper while that at point Q is into the paper.
D. $B_1 > B_2$ and the directions of magnetic fields at points P and Q are out of the paper.

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

I. A solar panel is made by combining a large number of solar concentrators.
II. To work properly, wind energy generators need wind speeds of at least about 15 km/h.
III. Many of the sources ultimately derive their energy from sun.

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