Techniques For **CET PHYSICS**

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Direct application

1. Height of free fall in 10s is… (490m).

2. 8 kg of a radioactive sample is reduced to 1 kg in 6 years. The half life is ....(2 yrs)

3. Copper, gold and germanium are cooled. The electrical resistance increases for

(1) copper only **(2) germanium**

(3) gold only (4)copper and gold

Direct application contd..

4. Dimensional formula for the product of electrical resistance and electrical capacitance is

(1) $T^{1/2}$ (2) $T^{-1/2}$ (3) $1/T$ (4) T

Soln: $$RC = \frac{V}{I} \times \frac{Q}{V} = \frac{Q}{I} \Rightarrow \frac{C}{C/s} = s$$

Hence Ans is (4)

Numericals

1. Time of free fall from a height '3m' is

(1) 4s (2) 8s (3) 2.4s (4) 0.78s

Soln: $s = \frac{1}{2} gt^2 = 3$,

$\frac{1}{2} g \approx 5$; so, $t^2 = 3/5 = 0.6$

This gives $t \approx 0.8$s.

Hence Ans is (4)

Numericals contd..

2. Approximate volume of Be^8 nucleus is __ cc.

(1)$7x10^{-38}$ **(2) $7x10^{-24}$**

(3) 10^{-13} **(4) $7x\ 10^{-44}$**

Soln: $R^3 = R_0^3\ A$,

$V = 4\pi\ R^3/3 \approx 4\ R_0^3 x8 = 32x(1.3)^3\ x10^{-45}\ m^3$

$= *\ x\ 10^{-44}\ m^3$

$= *\ x\ 10^{-38}$ cc

Ans: (1)

Numericals contd..

Binomial approximation:

$(1 + x)^n \approx 1 + nx$ for $x << 1$.

Eg.1: If the length is increased by 1%, area increases by ..?

area ✪ L^2, $L^2(1 + 0.01)^2 = L^2(1 + 0.02)$

Thus, area increases by 2%.

Numericals contd..

Eg.2: 1/98 = ?

$$\frac{1}{98} = \frac{1}{100-2} = \frac{1}{100(1-0.02)}$$

$$= \frac{(1-0.02)^{-1}}{100} = \frac{(1+0.02)}{100} = \frac{1.02}{100} = 0.0102$$

Elimination

1. Effective resistance of 1 Ω, 5 Ω and 10 Ω connected in parallel is ____ Ω.

(1) 16 (2) 5

(3) 7.5 (4) 0.77

Soln: R_P is < least.

- ans must be <1.
- **ans is (4)**

Elimination contd

2. A car accelerates from rest at a constant rate α for some time t_1 after which it decelerates at a constant rate β for time t_2 and comes to rest. if the total time elapsed is t, the maximum velocity acquired by the car is given by

(1) $\frac{(\alpha^2+\beta^2)t}{\alpha\beta}$ (2) $\frac{(\alpha^2-\beta^2)t}{\alpha\beta}$ (3) $\frac{(\alpha+\beta)t}{\alpha\beta}$ (4) $\frac{(\alpha\beta)t}{(\alpha+\beta)}$

Elimination contd

3. An object is placed at a distance of 18 cm from a convex lens. The image is formed at a distance of 9 cm. The focal length of the lens is

(1) 6 cm (2) 9 cm

(3) 10 cm (4) 18 cm

Soln: f < both u and v for a **real** image

f < 9 cm and **ans (1)**

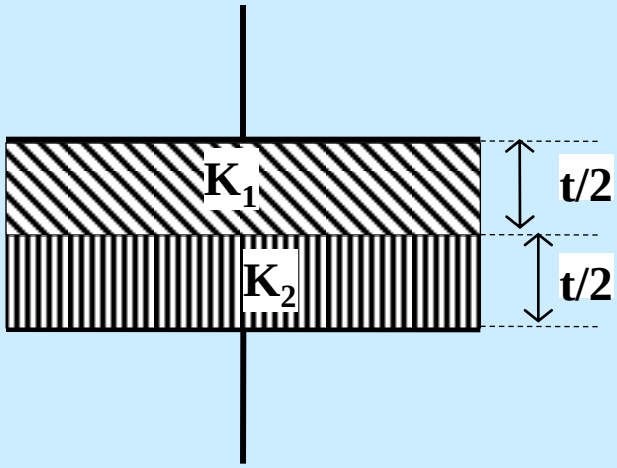
This is faster than using uv/(u+v)

Elimination contd

4. A parallel plate capacitor is filled with two dielectrics as shown. The ratio of its capacitance with and without dielectric is

(1) $K_1 + K_2$ (2) $\frac{K_1 + K_2}{K_1 - K_2}$

(3) $\frac{2K_1K_2}{K_1 + K_2}$ (4) $\frac{K_1 + K_2}{2K_1K_2}$



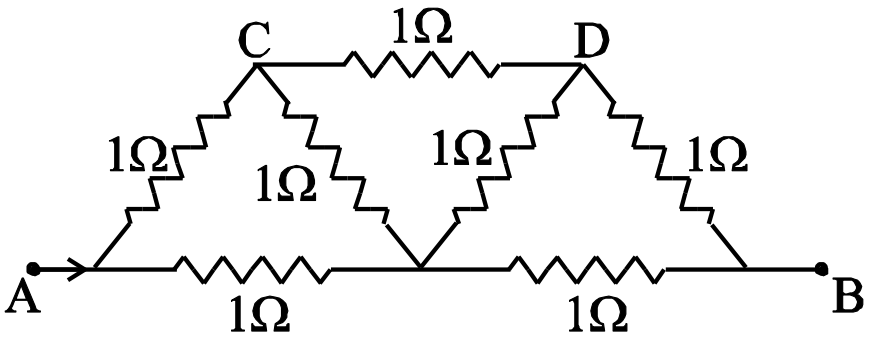
$K_1 = K_2 = K$ should give ans K. Verify.

Ans is (3)

HOTS

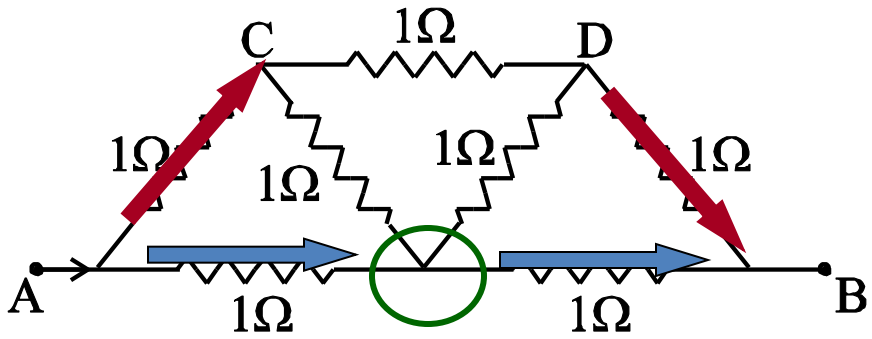
In the network shown in the figure, each resistance is 1 ohm. The effective resistance between A and B is ____ ohm.

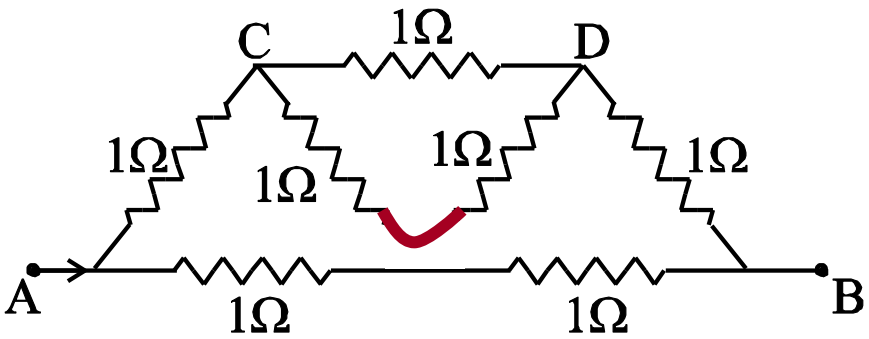
(1) 4/3 (2) 3/2 (3) 7 (4) 8/7

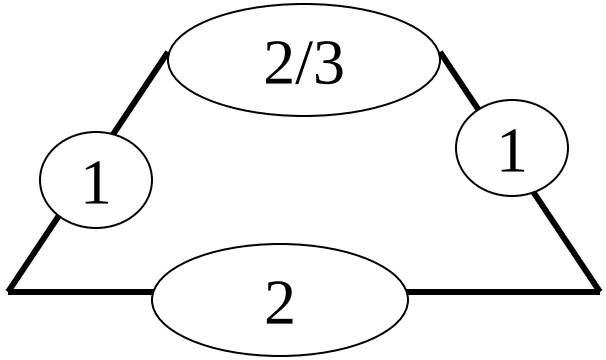


HOTS contd

(1) 4/3
(2) 3/2
(3) 7
(4) 8/7







(2 + 2/3) || 2 < 3 || 2 = (3x2)/5 =1.2
Ans is little <1.2 **Ans (4) 8/7**

HOTS contd

The resistance of a conductor is 5 ohm at 50^0 C and 6 ohm at 100^0 C. Its resistance at 0^0 C is _____ ohm.

(1) 2.5 (2) 4.5 (3) 7 **(4) 4**

Its resistance at 25^0 C is _____ ohm.

Ans: (2) 4.5