

2022-01-24

1. A hollow metal sphere of radius  $R$  is uniformly charged. The electric field due to the sphere at a distance  $r$  from the centre

Increases as  $r$  increases for  $r < R$  and for  $r > R$

Zero as  $r$  increases for  $r < R$ , decreases as  $r$  increases for  $r > R$

Zero as  $r$  increases for  $r < R$ , increases as  $r$  increases for  $r > R$

Decreases as  $r$  increases for  $r < R$  and for  $r > R$

2. Four wires of equal length and of resistances 10 ohms each are connected in the form of a square. The equivalent resistance between two opposite corners of the square is

10 ohm

20 ohm

40 ohm

2.5 ohm

3. Six identical bulbs are connected as shown in the figure with a DC source of emf  $E$  and zero internal resistance. The ratio of power consumption by the bulbs when (i) all are glowing and (ii) in the situation when two from section A and one from section B are glowing, will be

4:9

9:4

1:2

2:1

4. A particle of mass  $m$  moving with velocity  $V_0$  strikes a simple pendulum of same mass and sticks to it. The maximum height attained by the pendulum will be

$$\frac{V_0^2}{8g}$$

$$\sqrt{V_0 g}$$

$$2\sqrt{\frac{V_0}{g}}$$

$$\frac{V_0^2}{4g}$$

5. A lamp consumes only 50% of peak power in an a.c. circuit. What is the phase difference between the applied voltage and the circuit current?

$$\frac{\pi}{6}$$

$$\frac{\pi}{3}$$

$$\frac{\pi}{4}$$

$$\frac{\pi}{2}$$

6.If the momentum of a body increases by 0.01%, its kinetic energy will increase by

0.01%

0.02%

0.04%

0.08%

7.If  $n(A) = 4$ ,  $n(B) = 3$ ,  $n(A \times B \times C) = 24$ , then  $n(C) =$

288

1

12

2

8.Unit vector in the direction of  $2i - 2j + k$  is:

$$\frac{2}{3}i - \frac{2}{3}j + \frac{1}{3}k$$

$$-\frac{2}{3}i + \frac{2}{3}j - \frac{1}{3}k$$

both (a) and (b)

none of the above

9.The relation  $A \cap B = A \cup B$  is true if

$A \subset B$

$B \subset A$

$A \subset B$  and  $B \subset A$

none of the above

10.

$$\lim_{x \rightarrow 2} \frac{|x - 2|}{x - 2} =$$

1

-1

doesn't exist

none of these

11. The figures 4, 5, 6, 7, 8 are written in every possible order. The number of numbers greater than 56000 is

72

96

90

98

12. The product of any  $r$  consecutive natural numbers is always divisible by

$r!$

$r^2$

$r^n$

None of these

13. The function  $f(x) = \log(x + \sqrt{x^2 + 1})$ , is

neither an even nor an odd function

an even function

an odd function

a periodic function

14. The area bounded by a parallelogram whose adjacent sides are given by  $(2, 4, 6)$  and a perpendicular vector of same magnitude is:

$\sqrt{56}$

56

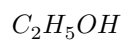
12

144

15. Oxidation number of osmium ( $Os$ ) in  $OsO_4$  is

- 4
- 6
- 7
- 8

16. Select the compound from the following which dissolves in water



17. Conc.  $HNO_3$  reacts with  $I_2$  to give



18. IUPAC name of  $(CH_3)_2 - CH - CH = CH - CH_3$  is

2-methyl-3-pentene

4-methyl-2-pentene

1, 2-isopropyl-1-propene

3-isopropyl-2-propene

19. As cool as cucumber means

an interesting person

a tall person

a calm person, especially when something is surprising

None

20. Although he hardly attends the classes, he gets good grades.

noun

verb

preposition

conjunction