



# Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Limited)

**Regd. Office :** Aakash Tower, 8, Pusa Road, New Delhi-110005

Ph.: 011-47623456

## Aakash National Talent Hunt Exam 2020

*(for Class X Studying Moving to Class XI)*

### Sample Paper

### ANSWERS

- |  |                                |
|--|--------------------------------|
| 1. (1)                                       | 19. (1)                        |
| 2. (3)                                       | 20. (4)                        |
| 3. (2)                                       | 21. (2)                        |
| 4. (1)                                       | 22. (4)                        |
| 5. (2)                                       | 23. (2)                        |
| 6. (1, 2, 3)                                 | 24. (2)                        |
| 7. (1, 3)                                    | 25. (1, 2)                     |
| 8. (1)                                       | 26. (1, 2, 3)                  |
| 9. A(S), B(Q), C(P), D(R, S)                 | 27. (3)                        |
| 10. (2)                                      | 28. A(Q), B(S), C(S), D (P, R) |
| 11. (2)                                      | 29. (4)                        |
| 12. (4)                                      | 30. (1)                        |
| 13. (3)                                      | 31. (4)                        |
| 14. (3)                                      | 32. (1)                        |
| 15. (1, 3, 4)                                | 33. (3)                        |
| 16. (2, 3, 4)                                | 34. (3)                        |
| 17. (4)                                      | 35. (1, 3)                     |
| 18. A(S), B(P, Q, R), C(P, Q, R), D(P, Q, R) |                                |



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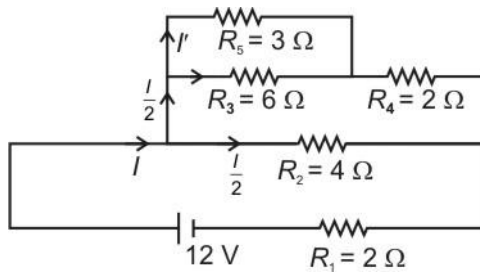
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### Sample Paper

#### ANSWERS & SOLUTIONS

1. Answer (1)



$$R_{eq} = 4 \Omega$$

$$V = IR_{eq}$$

$$I = \frac{12}{4}$$

$$= 3 \text{ A}$$

$$P = I^2 R$$

Power dissipated across resistor  $R_5$

$$= (I')^2 \times 3$$

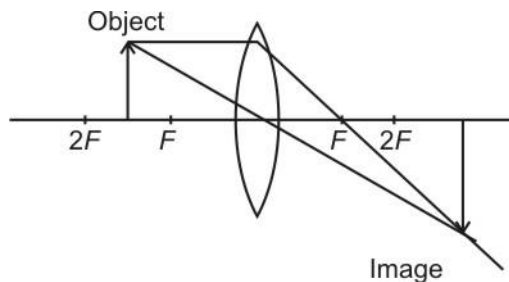
$$= \left(\frac{6}{9} \times \frac{I}{2}\right)^2 \times 3$$

$$= 3 \text{ watt}$$

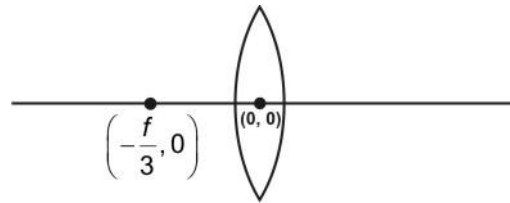
2. Answer (3)

Insulator has maximum resistivity

3. Answer (2)



4. Answer (1)



$$u = -\frac{f}{3}, v = ?$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{f} = \frac{1}{v} + \frac{3}{f}$$

$$\Rightarrow \frac{1}{v} = \frac{-2}{f}$$

$$\Rightarrow v = -\frac{f}{2}$$

$$m = \frac{v}{u}$$

$$= \frac{-f}{-\frac{f}{3}}$$

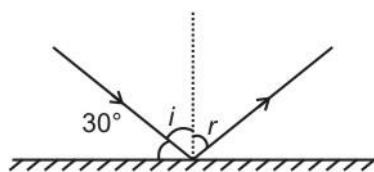
$$= \frac{3}{2}$$

$$= \frac{3}{2}$$

Virtual image of magnification  $\frac{3}{2}$  will be formed at

$$\left(-\frac{f}{2}, 0\right)$$

5. Answer (2)

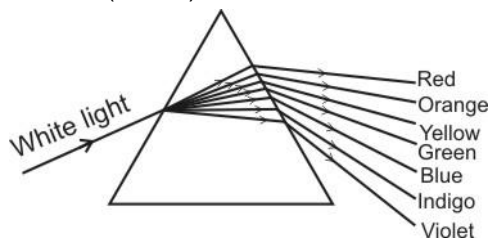


$$\angle i = 90^\circ - 30^\circ = 60^\circ$$

$$\angle i = \angle r$$

$$\angle i + \angle r = 60^\circ + 60^\circ = 120^\circ$$

6. Answer (1, 2, 3)



The refractive indices are different for different wavelengths and speed of light is depended on refractive index *i.e.* light of different wavelength have different speeds.

7. Answer (1, 3)

$m > 1$  is possible only for convex lens.

If  $m = 2$ , then object should be placed between  $F$  and  $P$ .

If,  $m = -2$ , the object should be placed between  $F$  and  $C$

8. Answer (1)

$$n = 6.25 \times 10^{18} \text{ electron}$$

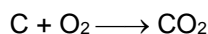
$$q = ne$$

$$= -6.25 \times 10^{18} \times 1.6 \times 10^{-19} \text{ C} = -1 \text{ C}$$

9. Answer A(S), B(Q), C(P), D(R, S)

- Battery is a group of cells and indicated by
- Voltmeter is indicated by
- Ammeter is indicated by
- Electric cell or battery provides electrical energy in the circuit

10. Answer (2)



Carbon and oxygen combine to form a single product.

11. Answer (2)

Substance getting reduced –  $\text{MnO}_2$

Substance getting oxidised –  $\text{HCl}$

12. Answer (4)

Nettle leaf extract contains methanoic acid

13. Answer (3)

X, Y, Z and W are  $\text{H}_2$ ,  $\text{Cl}_2$ ,  $\text{NaOH}$  and  $\text{NaCl}$  respectively.

14. Answer (3)

X, S, G1 and G2 are  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{SO}_2$  and  $\text{SO}_3$  respectively.

15. Answer (1, 3, 4)

Highly reactive metals like K, Na, Ca etc. react with water to produce their respective metal hydroxides and hydrogen gas.

16. Answer (2, 3, 4)

M, N, X and Y are calcium, oxygen, chlorine and phosphorus respectively

17. Answer (4)

- Ionic compounds conduct electricity in their aqueous state as well as molten state.

18. Answer A(S), B(P, Q, R), C(P, Q, R), D(P, Q, R)

- Aqueous solution of  $\text{CO}_2$  *i.e.*  $\text{H}_2\text{CO}_3$  (Carbonic acid), is acidic in nature therefore it turns blue litmus red.
- Solution of milk of Magnesia, sodium oxide and lime water are basic in nature therefore their pH is more than 7 and they turn phenolphthalein pink and red litmus blue.

19. Answer (1)

$$\text{Since, } \tan \theta = \frac{\text{Perpendicular}}{\text{Base}} \text{ and } \tan 30^\circ = \frac{1}{\sqrt{3}}$$

20. Answer (4)

The centroid of  $\Delta PQR$  is same as the centroid of  $\Delta ABC$  and  $\Delta DEF$ .

$$\begin{aligned} \therefore \text{Centroid of } \Delta PQR &= \left( \frac{4-1-1}{3}, \frac{5+2-4}{3} \right) \\ &= \left( \frac{2}{3}, 1 \right) \end{aligned}$$

21. Answer (2)  
 $\sin^2\theta + \cos^2\theta = 1$  where  $\theta \in R$ .
22. Answer (4)  
 Number of times they meet =  $\frac{440}{\text{LCM}(10, 20 \text{ and } 40)} + 1$
23. Answer (2)  
 Sum of five middle-most terms =  $195 = a_{20} + a_{21} + a_{22} + a_{23} + a_{24}$
24. Answer (2)  
 $BD^2 = AD \times CD$  and  $AB^2 = BD^2 + AD^2$
25. Answer (1, 2)  
 Condition for two parallel lines  $a_1x + b_1y + c_1 = 0$   
 and  $a_2x + b_2y + c_2 = 0$  is  $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ .
26. Answer (1, 2, 3)  
 For  $P(x) = ax^2 + bx - c$ ,  
 $a > 0, b > 0$  and  $c < 0$
27. Answer (3)  
 Quadratic equation is represented in the form of  $x^2 - (\text{sum of roots})x + \text{Product of roots} = 0$
28. Answer A(Q), B(S), C(S), D (P, R)  
 (A) Quadratic polynomial can be represented in the form of  $k(x^2 - (\text{sum of zeroes})x + \text{product of zeroes})$ , for some non-zero real number  $k$ .  
 (B) Pair of complementary angles whose sum is  $90^\circ$ .  
 (C) Longest side of a right angled triangle is the hypotenuse of the triangle.  
 (D)  $\sin^2\theta + \cos^2\theta = 1, \text{cosec}^2\delta - \cot^2\delta = 1$  and  $\sec^2\phi - \tan^2\phi = 1$

29. Answer (4)  
 The correct mirror image of given figure is in option (4)
30. Answer (1)  
 $84 : 8 \times 4 = 32 \rightarrow 23$   
 $36 : 3 \times 6 = 18 \rightarrow 81$
31. Answer (4)  
 Letters on odd positions shift to other odd position similarly for letter at even position.
- |           |            |
|-----------|------------|
| ANTHE     | ITUTOR     |
| 1 2 3 4 5 | 12 3 4 5 6 |
| 3 4 5 2 1 | 3 4 5 6 12 |
| THENA     | UTORIT     |

32. Answer (1)  
 $37^2 = 1369, 39^2 = 1521, 41^2 = 1681$  and  $43^2 = 1849$
33. Answer (3)  
 $\% \text{ expenditure on football} = \frac{63 \times 100}{360} = 17\frac{1}{2}\%$
34. Answer (3)  
 C is father of E and A is father of C hence A is grandfather of E.
35. Answer (1, 3)
- |          |  |          |
|----------|--|----------|
| 14 15 20 | } → Sum of positions of letter is 26 ← | 20 15 16 |
| N O T    |  | T O P    |
| 12 11 6  | } →                                    | 6 11 10  |
| L K F    |  | F K J    |
| 13 21 7  | } →                                    |          |
| M U G    |  |          |
| 13 5 19  | } →                                    |          |
| M E S    |  |          |

