

# Sample Paper of Selection Test for X to XI Moving Students



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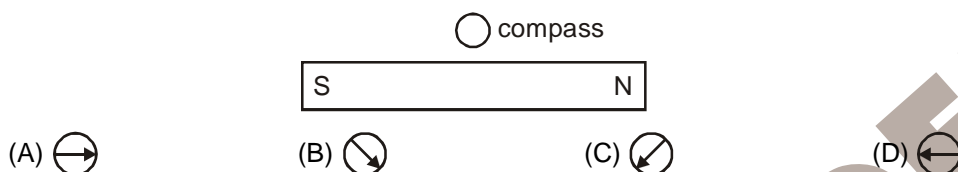
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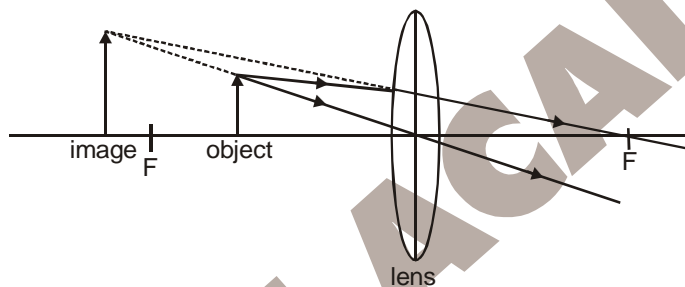
## Selection Test Time duration 2 Hours

- P and Q are blocks of different metals. They have the same volume but block P has twice the mass of block Q. When given identical quantities of energy, the temperatures rise by the same amount.
  - The density of P is half that of Q
  - The density of P is the same as that of Q
  - The specific heat capacity of P is half that of Q
  - The specific heat capacity of P is the same as that of Q

- A small compass is placed close to the middle of a bar magnet as shown. In which direction will the compass needle point ?



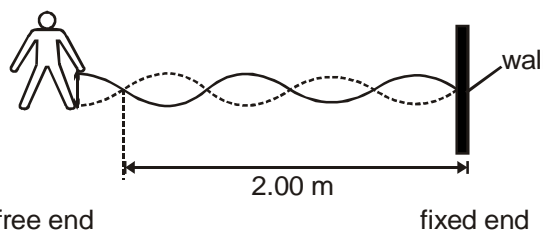
- The diagram shows a converging lens producing an upright, virtual image.



Which optical instrument uses this arrangement

- a camera
- a magnifying glass
- a photographic enlarger
- a projector

- The diagram shows waves set up in a rope by a student moving the free end up and down at a steady rate.



What is the wavelength of the waves shown, and what will be the wavelength when the student doubles the frequency at which the free end is moved up and down ?

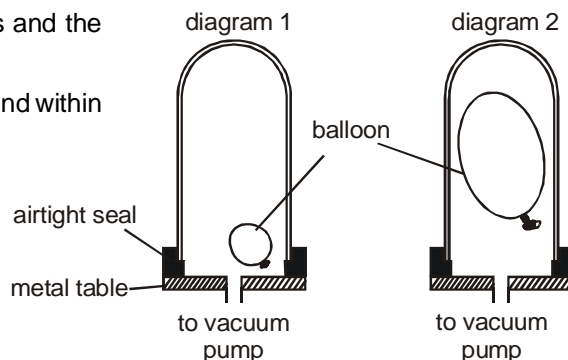
- |     | Wavelength as shown | wavelength when frequency doubled |
|-----|---------------------|-----------------------------------|
| (A) | 0.50 m              | 1.00 m                            |
| (B) | 0.50 m              | 0.50 m                            |
| (C) | 1.00 m              | 1.00 m                            |
| (D) | 1.00 m              | 0.50 m                            |

- A partially inflated balloon is placed under a bell jar (diagram 1).

A vacuum pump is turned on for several minutes and the volume of the balloon increases (diagram 2)

Which pressure changes occur within the bell jar and within the balloon ?

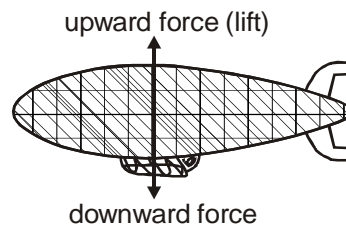
- |     | Pressure change<br>in the bell jar | Pressure change<br>in the balloon |
|-----|------------------------------------|-----------------------------------|
| (A) | decrease                           | decrease                          |
| (B) | decrease                           | increase                          |
| (C) | increase                           | decrease                          |
| (D) | increase                           | increase                          |



6. An airship is moving forwards at constant height.

Which statement is correct ?

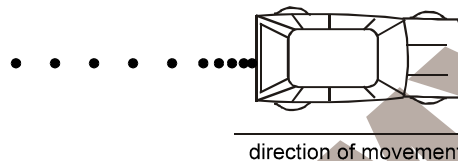
- (A) Gravity no longer has any effect
- (B) The airship now has zero mass
- (C) The potential energy is zero
- (D) The upward and downward forces are balanced



7. Oil drips at a constant rate from a moving car. The diagram shows the pattern of the drips on a road.

Which statement describes the motion of the car ?

- (A) It accelerated and then moved at a steady speed
- (B) It accelerated and then slowed down
- (C) It moved at a steady speed and then slowed down
- (D) It moved at a steady speed and then accelerated



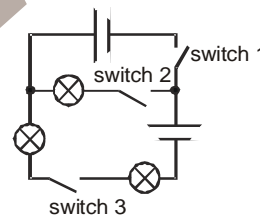
8. Which pair of quantities is not proportional ?

- (A) angle of incidence and angle of refraction for light entering a glass block
- (B) current and potential difference for a resistor at constant temperature
- (C) extension and load applied for a wire which obeys Hooke's law
- (D) speed and time for an object freely falling from rest through a vacuum

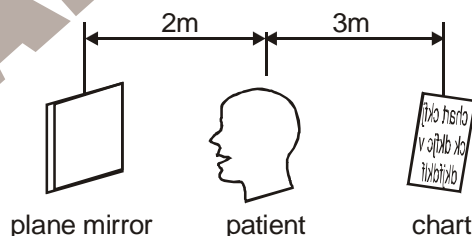
9. A circuit is set up as shown.

Which switch setting lights all three lamps ?

- |     |          |          |          |
|-----|----------|----------|----------|
|     | switch 1 | switch 2 | switch 3 |
| (A) | closed   | closed   | open     |
| (B) | closed   | open     | closed   |
| (C) | open     | closed   | closed   |
| (D) | open     | closed   | open     |



10. The diagram shows a patient having her eyes tested. A chart with letters on it is placed behind her and she sees the chart reflected in a plane mirror.



How far away from the patient does the chart seem to be ?

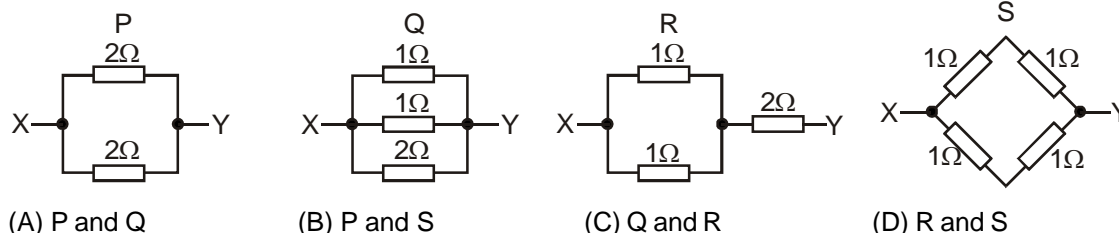
- (A) 2m
- (B) 4m
- (C) 5m
- (D) 7m

11. Most houses have an electricity meter so that the cost of the electricity used by the customer may be calculated.

What does the electricity meter record ?

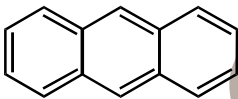
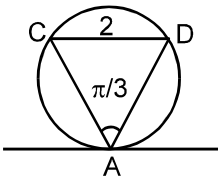
- (A) charge
- (B) current
- (C) energy
- (D) power

12. Which two resistor combinations have the same effective resistance between X and Y ?



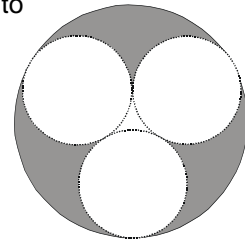
- (A) P and Q
- (B) P and S
- (C) Q and R
- (D) R and S

13. What does RCC stand for ?  
 (A) Recitified concrete cement (B) Reinforced concentrated cement  
 (C) Reinforced concrete cement (D) Reinforced concrete compound
14. Which acid is known as king of chemicals ?  
 (A) HCl (B)  $H_2SO_4$  (C)  $HClO_4$  (D)  $H_3PO_4$
15. Which of following is not a physical property of ammonia.  
 (A) Ammonia is a colourless gas (B) Ammonia is lighter than air  
 (C) Ammonia can be easily liquified (D) Ammonia is insoluble in  $H_2O$
16. Write the expression for the equilibrium constant for the following reactions  

$$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$$
 (A)  $K_c = \frac{[SO_2]^2[O_2]}{[SO_3]^2}$  (B)  $K_c = [SO_2][O_2][SO_3]$   
 (C)  $K_c = \frac{[SO_3]^2}{[SO_2]^2[O_2]}$  (D)  $K_c = \frac{[SO_2]^{1/2}[O_2]}{[SO_3]^{1/2}}$
17. Formula for acetic acid is  
 (A)  $HCO_2H$  (B)  $CH_3CO_2H$  (C)  $CH_3-CH_2-CO_2H$  (D)  $Ph-CO_2H$
18. The molecular formula of the molecule shown below is  
  
 (A)  $C_{14}H_{14}$  (B)  $C_{14}H_{12}$  (C)  $C_{14}H_{10}$  (D)  $C_{12}H_{12}$
19. What is the pH of a  $10^{-5}$  M sodium hydroxide solution ?  
 (A) 5 (B) 9 (C) 7 (D) 6
20. Which of the following is weak electrolyte  
 (A) Sodium chloride (NaCl) (B) Sodium hydroxide (NaOH)  
 (C) Water ( $H_2O$ ) (D) Copper sulphate ( $CuSO_4$ )
21. Which of the following will replace hydrogen from acids to form salts ?  
 (A) S (B) P (C) Na (D) Si
22. What is the general molecular formula of ketones :  
 (A)  $C_nH_{2n}O$  (Where n is number of Carbon) (B)  $C_nH_{2n}O_n$   
 (C)  $C_nH_nO_{2n}$  (D)  $C_{2n}H_nO$
23. Calcium oxychloride is also known as ( $CaOCl_2$ ) :  
 (A) Slaked Lime (B) Bleaching powder (C) Lime Stone (D) Quick lime
24. Which metal is more reactive :  
 (A) Sodium (B) Copper (C) Silver (D) Mercury
25. A boat on a river travels downstream between two points 20 km apart in one hour. The return trip against the current taken  $2\frac{1}{2}$  hours. What is the speed of the boat.  
 (A) 8 km/hr (B) 10 km/hr (C) 14 km/h (D) 16 km/hr.
26. Identify the correct statement.  
 (A)  $\frac{2}{\sqrt{5}} < \frac{\sqrt{3}}{2}$  (B)  $\sqrt{7} + \sqrt{3} < \sqrt{6} + \sqrt{4}$   
 (C)  $\frac{7}{3} < \frac{9}{4}$  (D)  $\sqrt{2} + 1 > \sqrt{7}$
27. Let chord CD is parallel to tangent to circle at point A as shown in figure  $CD = 2$ ,  $\angle CAD = \pi/3$ , then area of  $\triangle CAD$  is  
  
 (A)  $\sqrt{3}$  (B)  $4\sqrt{3}$   
 (C)  $16\sqrt{3}$  (D) 4

28. Let  $\alpha, \beta$  satisfy the equations  $\alpha + 2\beta = 5$  ;  $3\alpha - \beta = 1$ , then the quadratic equation whose roots are  $\alpha$  &  $\beta$  is  
 (A)  $x^2 - x - 2 = 0$  (B)  $x^2 + 3x + 2 = 0$  (C)  $x^2 - 5x + 4 = 0$  (D)  $x^2 - 3x + 2 = 0$
29. Let triangle ABC be right angled isosceles triangle whose length of hypotenuse is 2, then the sum of the lengths of altitudes dropped from the vertices A, B, C to sides BC, CA, AB respectively is  
 (A)  $\sqrt{2}$  (B)  $2\sqrt{2}$  (C)  $1 + 2\sqrt{2}$  (D)  $2 + 2\sqrt{2}$
30. Let  $a^6 - b^6$  is simplified to  $(a - b)(a^2 - ab + b^2)k$ , then  $k =$   
 (A)  $a^3 + b^3$  (B)  $(a^2 + ab + b^2)(a+b)$  (C)  $a^3 + a^2b + ab^2 + b^3$  (D)  $(a + b)^3$
31. Let water is dropping from a inverted conical flask. The ratio of volume of water when its depth is half the total depth to the volume of water when the flask was completely filled is  
 (A)  $1/2$  (B)  $1/4$  (C)  $1/8$  (D)  $1/16$
32. Let  $441000 = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_n^{\alpha_n}$ , where  $p_1, p_2, \dots, p_n$  are prime numbers and  $\alpha_1, \alpha_2, \dots, \alpha_n$  are whole numbers then  $\alpha_1 + \alpha_2 + \dots + \alpha_n =$   
 (A) 8 (B) 9 (C) 10 (D) 11
33. The expression  $2\sin^2 A - \sin^4 A + \cos^4 A$  is simplified to  
 (A) 2 (B) 1 (C)  $\sin^2 A$  (D)  $\cos^2 A$
34. Let the hcf & lcm of two natural numbers a, b be 6 and 36 respectively and  $a + b = 42$ , then  $a - b$  is equal to  
 (A) 24 (B) 30 (C) 36 (D) 48
35. The value of 'a' for which the system of equations  $(a + 2)x + y = 1$  and  $3x + ay = 1$  has no solution is  
 (A) 1 (B) -1 (C) -2 (D) -3
36. Consider 3 equal circles of radius r within a given circle of radius R each to touch the other two and the given circle as shown in figure, then the area of shaded region is equal to

- (A)  $\pi R^2 - \sqrt{3} r^2 - 2\pi r^2$  (B)  $\pi R^2 + \sqrt{3} r^2 - 2\pi r^2$   
 (C)  $\pi R^2 - \frac{5}{2} \pi r^2 - \sqrt{3} r^2$  (D)  $\pi R^2 + \sqrt{3} r^2 - \frac{7}{2} \pi r^2$



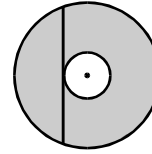
37. Let  $N = a2607b$  be a six digit number divisible by 75, then 'a' can not be equal to  
 (A) 1 (B) 2 (C) 4 (D) 7
38. Which of the following inequalities are true for all positive real numbers 'a' and 'b'.  
 (i)  $a^2 + b^2 \geq a + b$  (ii)  $a^2 + b^2 \geq 2ab$   
 (iii)  $a^2 + b^2 \geq ab$  (iv)  $a^3 + b^3 \geq ab$   
 (A) ii and iii only (B) ii, iii and iv only (C) ii only (D) i, ii & iii only
39. The largest power of 2 that divides  $2^{2008} + 10^{2008}$   
 (A)  $2^{2008}$  (B)  $2^{2009}$  (C)  $2^{2010}$  (D)  $2^{2011}$
40. Let x, y and z be real numbers which satisfy the three equations below.

$$x + \frac{1}{yz} = \frac{1}{5} ; \quad y + \frac{1}{xz} = -\frac{1}{15} ; \quad z + \frac{1}{xy} = \frac{1}{3}$$

Then the value of  $\frac{z-y}{z-x}$

- (A) -5 (B) -3 (C) 1 (D) 3
41. Two opposite sides of a square are increased by 25% and the other two are decreased by 40%. The percent decrease in the area of the resulting rectangle is  
 (A) 15% (B) 40% (C) 25% (D) 65%
42. An equilateral triangle is inscribed in a circle. The ratio of the area of the triangle to the area of circle  
 (A)  $\frac{\sqrt{3}}{2\pi}$  (B)  $\frac{\sqrt{3}}{\pi}$  (C)  $\frac{2\sqrt{3}}{\pi}$  (D)  $\frac{3\sqrt{3}}{4\pi}$

43. If  $a + b = 3$  and  $a^2 + b^2 = 7$  then the value of  $a^3 + b^3$  is  
 (A) 18 (B) 16 (C) 14 (D) 11
44. The circles in the figure shown are concentric. The chord shown is tangent to the inner circle and has length 20. What is the area of the shaded region?  
 (A)  $40\pi$  (B)  $60\pi$   
 (C)  $100\pi$  (D)  $120\pi$



45. If  $x^2 + x + 1 = 0$ , then the value of  $\left(x^3 + \frac{1}{x^3}\right)^3$  is  
 (A)  $-8$  (B)  $-1$  (C) 0 (D) 8
46. The height of cylinder having radius R so that its volume is three times the volume of hemisphere having same radius is  
 (A) R (B) 2R (C) 3R (D) 4R
47. The value of the product  $\tan 5^\circ \tan 15^\circ \tan 25^\circ \tan 35^\circ \tan 45^\circ \tan 55^\circ \tan 65^\circ \tan 75^\circ \tan 85^\circ$  is  
 (A) 1 (B) 2 (C) 1/2 (D) 3/2
48. The number of distinct real numbers p which have the property that the median of the five numbers p, 6, 4, 1, 9 is equal to their mean  
 (A) 0 (B) 1 (C) 2 (D) 3
49. January, February, April, July, November, April, ?  
 What comes next?  
 (A) July (B) August (C) September (D) October

50.

A	C	B	E	C	G	?	?
G	E	K	H	O	K	?	?

What letters should appear in the fourth square?

- (A) 

D	H
R	N

 (B) 

D	H
S	N

 (C) 

D	I
R	N

 (D) 

D	I
S	N

51. How many minutes is it before 12 noon, if 48 minutes ago it was twice as many minutes past 9 a.m.?  
 (A) 12 (B) 44 (C) 60 (D) 36
52. Which is the odd one out?  
 heptagon, triangle, hexagon, cube, pentagon  
 (A) triangle (B) cube (C) pentagon (D) heptagon

53.

1	2	4	7
4	?	7	10
6	?	?	12
7	8	10	?

Which is the missing section?

- (A) 

6	
8	10
12	

 (B) 

5	
9	7
13	

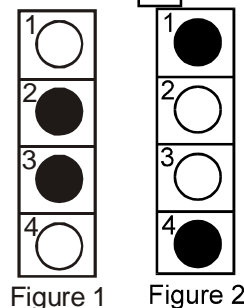
 (C) 

6	
7	8
14	

 (D) 

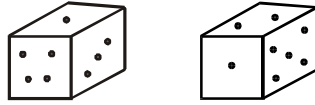
5	
7	9
13	

54. Switch A turns lights 1 and 2 on/off or off/on  
 Switch B turns lights 2 and 4 on/off or off/on  
 Switch C turns lights 1 and 3 on/off or off/on
- = ON  
 ● = OFF
- Switches C, A and B are thrown in turn with the result that Figure 1 turns into Figure 2. Which switch does not work at all?  
 (A) A (B) B (C) C (D) All switches work



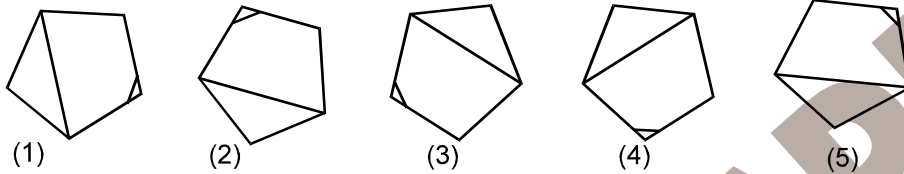
55. Identify two words (one from each set of brackets) that have a connection (analogy) with the words in capitals and relate to them in the same way.  
 SEA (wet, swimmer, ship)  
 SNOW (mountain, ice, skier)  
 (A) wet, ice (B) ship, mountain (C) swimmer, skier (D) ship, skier

56. The diagram shows two positions of a standard dice



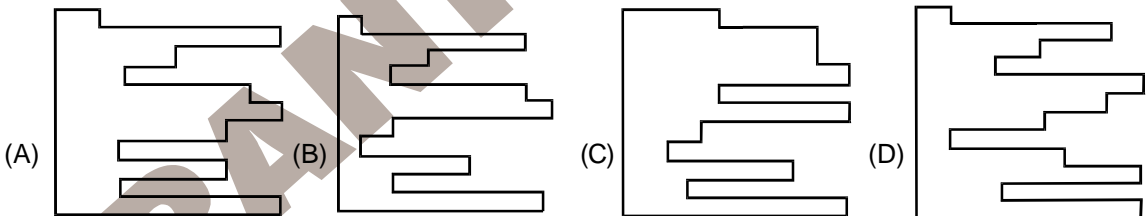
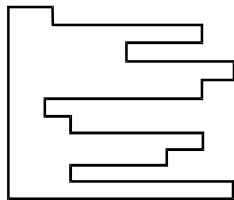
- How many dots are there on the face which is opposite to the face having two dots ?  
 (A) 4 (B) 3 (C) 6 (D) 1

57. Which is the odd one out ?



- (A) 2 (B) 3 (C) 4 (D) 5

58. Which piece below, when fitted into the piece on the left, can form a perfect square ?



59. A man has 53 socks in his drawer : 21 identical blue, 15 identical black and 17 identical red. The lights are turned off and he is completely in the dark. At least how many socks must he take out to make 100 per cent certain that he has two black socks ?  
 (A) 15 (B) 26 (C) 39 (D) 40

60. **St. 1** : Hour's hand of a clock is exactly between 4 and 5.  
**St. 2** : Minute's hand of the clock is at 6  
 To determine the time shown by the clock  
 (A) Both the statements are needed (B) Only statement 1 is sufficient  
 (C) Only statement 2 is sufficient (D) None of these