

JEE Scholarship Test Sample Paper

Time: 60 Minutes

Maximum Marks: 200

- All questions carry equal marks.
- There are 50 questions in the test. For each question you will be **awarded 4 marks** for the correct answer and **zero mark** for unattempted questions. In all other cases, **minus one (-1) mark** will be awarded.

1. Find the odd-one out of the following terms:

- EF22, JK42, GH24, VW90, IJ38
- (a) EF22 (b) GH24
(c) IJ38 (d) VW90

2. Choose the conclusions which logically follow from the given statements.

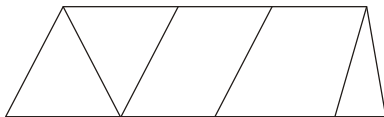
Statement:

All the pens are papers
All the papers are boats
Some birds are boats.

Conclusions:

- (A) Some boats are pens
(B) Some birds are papers
(C) None of the pens are birds
- (a) Only A and B (b) Only A
(c) Only C (d) Only A and C

3. How many quadrilaterals are there in the given figure?



- (a) 10 (b) 11
(c) 12 (d) 13

4. Which of the following alternatives will fit in place of 'M'?

- 255, 3610, 4915, M, 8125
- (a) 5100 (b) 5420
(c) 6420 (d) 6422

5. Which of the following alternatives will fit in place of 'M'?

- L6, O8, R11, M, X25, A42, D75
- (a) U15 (b) U16
(c) W14 (d) U14

6. Which of the following alternatives will fit in place of 'M'?

7	3	6	2
2	8	5	4
1	1	2	4
4	2	1	M

- (a) 6 (b) 5
(c) 4 (d) 3

7. If 'Σ' means 'X', 'δ' means '÷', 'σ' means '+' and '∞' means '-' then evaluate the following expression using standard operator precedence.

$$56\delta(6\sigma 8)\Sigma 4\infty 1$$

- (a) 52 (b) 24
(c) 15 (d) 43

8. With what operators, should the symbols @ and < be replaced so that the following expression is valid.

$$100 - 81 \div 27 @ 3 < 6 = 115$$

- (a) + and - (b) × and ÷
(c) + and × (d) ÷ and -

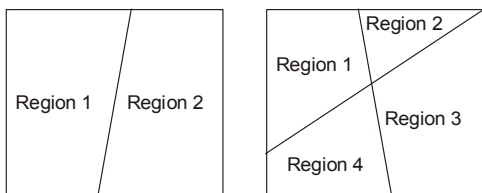
9. x is an integer such that it leaves a remainder of 2 when divided by 3, leaves a remainder of 3 when divided by 5, and leaves a remainder of 5 when divided by 7. What could be a possible value of x from among the following options?

- (a) 53 (b) 68
(c) 74 (d) 83

10. In how many ways can you distribute 10 identical balls into two non-identical boxes so that none are empty?

- (a) 2 (b) 8
(c) 9 (d) 10

11. One line forms two regions in a plane. Similarly, two lines in a plane can form a maximum of four regions. These are shown in the figures below:



What is the maximum number of regions that can be formed by 4 lines in a plane? Lines need not be concurrent.

- (a) 7 (b) 8
(c) 10 (d) 11
12. You need to take n arbitrary points on or inside a square of side 2 cm such that there will always be a pair of points at a distance of not more than $\sqrt{2}$ cm. What is the minimum value of n ?
(a) 2 (b) 4
(c) 5 (d) 8
13. The following facts are known about an unknown number X :
I : The sum of digits of X is 15.
II : The unit's digit of X is 6.
Then which of the following statements is certainly true about X ?
(a) X is divisible by 3 but not by 6
(b) X is divisible by 6 but not by 9
(c) X is not divisible by 6 but divisible by 9
(d) X is divisible by both 6 and 9
14. The average age of A, B and C is 43 years. Which of the following statements are required to find the eldest among them?
Statements:
I : Age of C is 65 years.
II : Age of A is 25 years.
(a) I is sufficient
(b) Both I and II are required
(c) I and II together are not sufficient
(d) II is sufficient

Directions (Q. 15-16) : A class is to be taught five subjects_Hindi, Physics, Chemistry, Biology and Mathematics by five different teachers—A, B, C, D and E in five periods (1 to 5). A teacher can teach in only one of the periods. The following details are available about the teaching.

- A teaches Mathematics which is not taught in the first period.
- Physics is taught by D in an even numbered period.
- Chemistry is taught in an odd period, and it precedes Mathematics period.
- E teaches in the first period.
- C teaches Chemistry but not in the first or the last periods.

• Hindi is taught in the last period.

15. Which of the following statements is necessarily true?
(a) Third period is of Hindi taught by B
(b) Second period is of Physics taught by C
(c) Fourth period is of Mathematics taught by A
(d) Fifth period is of Biology taught by D
16. Which subject is taught by B?
(a) Physics (b) Chemistry
(c) Biology (d) Hindi
17. A solid metallic cylinder of radius 12 cm and height 175 cm is melted and moulded into another solid cylinder of height 63 cm. What is the radius of the new cylinder?
(a) 14 (b) 4π
(c) 20 (d) 5π
18. Choose the option which shows the correct mirror image of the characters given below.
D I V E R T 6 4 7 5 A L E
(a) DIAEBKLE9†ΔPVT E
(b) DIAEBKL9†ΔPVT E
(c) DIAEBKLE9†ΔPVT E
(d) DIAEBKLE9†ΔP AFE

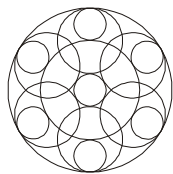
Directions (Q. 19-20) : There are 150 students in a class. 20 students play both hockey and kabaddi. The same numbers of students play only football. 35 students play both hockey and football but not kabaddi. 25 play both football and kabaddi but not hockey. The number of students who play only hockey is the same as the number of students who do not play any of three mentioned games and the number of students who play only hockey is half of the number of students who play only football.

19. How many students play only kabaddi?
(a) 10 (b) 20
(c) 30 (d) 40
20. How many students play only hockey?
(a) 10 (b) 15
(c) 20 (d) 25
21. What will be the number in the blank box?

1	3	4	6	7	9
2	14	5	77	8	

- (a) 98 (b) 128
(c) 189 (d) 194

22. What is the total number of circles in the figure given below?

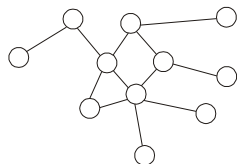


- (a) 13 (b) 14
(c) 15 (d) 16

23. A bucket contains milk mixed with water, of which 3 parts are water and 5 parts are milk. A part of the mixture is removed from the bucket and is replaced by water. What portion of the mixture should have been removed so that the new mix contains milk and water is equal proportion?

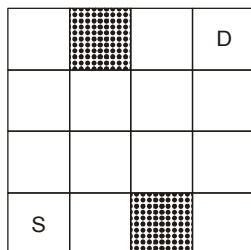
- (a) $\frac{1}{3}$ (b) $\frac{1}{4}$
(c) $\frac{1}{5}$ (d) $\frac{1}{6}$

24. You need to colour the circles in such a way that no two circles connected by a line get the same colour. What is the minimum number of distinct colours needed to colour all the circles in the figure?



- (a) 4 (b) 5
(c) 6 (d) 7

25. From each box you can move only to the immediate right box or the immediate top box. You cannot move into or through a shaded box. How many ways are there to move from the box marked S to the box marked D?



- (a) 8 (b) 10
(c) 12 (d) 14

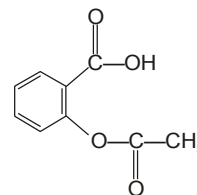
26. A metal 'M' of moderate reactivity is present as its sulphide 'X'. On heating in air, 'X' converts into its oxide 'Y' and a gas evolves. On heating 'Y' and 'X' together, the metal 'M' is produced. 'X' and 'Y' respectively are—

- (a) 'X' = cuprous sulphide, 'Y' = cuprous oxide
(b) 'X' = cupric sulphide, 'Y' = cupric oxide
(c) 'X' = sodium sulphide, 'Y' = sodium oxide
(d) 'X' = calcium sulphide, 'Y' = calcium oxide

27. Which one of the following statement is incorrect about graphite and diamond ?

- (a) Graphite is smooth and slippery.
(b) Diamond is good conductor of heat.
(c) Graphite is a good conductor of electricity.
(d) Physical and chemical properties of graphite and diamond are different.

28. The functional groups present in the following compound are—



- (a) alcohol, ketone and ester
(b) ester and carboxylic acid
(c) carboxylic acid and ketone
(d) ester and alcohol

29. A part of the modern periodic table is presented below in which the alphabets represent the symbols of elements.

Table

Period ↓	Group →					
	1	2	14	15	16	17
2				M	Q	
3	A	J			R	
4	E		L			T
5	G					X

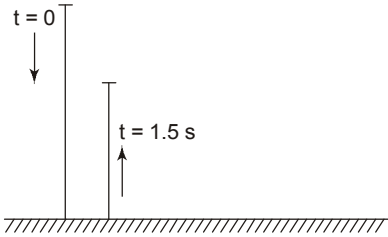
Consult the above part of the periodic table to predict which of the following is a covalent compound.

- (a) RQ_2 (b) AT
(c) JQ (d) JX_2

30. A compound 'X' reacts with a compound 'Y', to produce a colourless and odourless gas. The gas turns lime water milky. When 'X' reacts with methanol in the presences of concentrated H_2SO_4 , a sweet smelling substance is produced. The molecular formula of the compound 'X' is—

- (a) C_2H_4O
(b) $C_2H_4O_2$
(c) C_2H_6O
(d) $C_2H_6O_2$

36. A ball released from rest at time $t = 0$ hits the ground. It rebounds inelastically with a velocity 5 m s^{-1} and reaches the top at $t = 1.5 \text{ s}$. What is the net displacement of the ball from its initial position after 1.5 s ? ($g = 10 \text{ m/s}^2$)

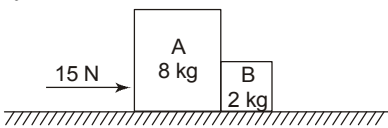


- (a) 1.25 m (b) 3.75 m
(c) 5.00 m (d) 6.25 m

37. A horizontal jet of water is made to hit a vertical wall with a negligible rebound. If the speed of water from the jet is ' v ', the diameter of the jet is ' d ' and the density of water is ' ρ ', then the force exerted on the wall by the jet of water is-

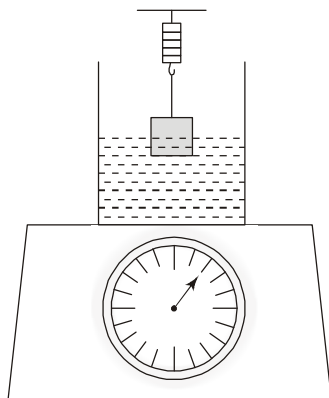
- (a) $\frac{\pi}{4} d^2 \rho v$ (b) $\frac{\pi}{4} d^2 \rho v^2$
(c) $\frac{\pi}{8} d^2 \rho v^2$ (d) $\frac{\pi}{2} d^2 \rho v^2$

38. Two blocks A and B of masses 8 kg and 2 kg respectively, lie on a horizontal frictionless surface as shown in the figure. They are pushed by a horizontally applied force of 15 N. The force exerted by B on A is



- (a) 1.5 N (b) 3.0 N
(c) 4.5 N (d) 6.0 N

39. A beaker half-filled with water is put on a platform balance which is then set to zero. A 800 g mass is immersed partially in water using a spring balance as shown in the figure. If the spring balance reads 300 g, what will be the reading on the platform balance?



- (a) 200 g (b) 300 g
(c) 500 g (d) 800 g

40. An object falls a distance H in 50 s when dropped on the surface of the earth. How long would it take for the same object to fall through the same distance on the surface of a planet whose mass and radius are twice that of the earth? (Neglect air resistance.)

- (a) 35.4 g (b) 50.0 s
(c) 70.7 s (d) 100.0 s

41. A source produces sound waves under water. Waves travel through water and then into air. Which of the following statements about the frequency (f) and the wavelength (λ) is correct and sound passes from water to air?

- (a) f remains unchanged but λ decreases.
(b) f remains unchanged but λ increases.
(c) λ remains unchanged but f decreases.
(d) λ remains unchanged but f increases.

42. The diameter of a wire is reduced to one-fifth of its original value by stretching it. If its initial resistance is R , what would be its resistance after reduction of the diameter?

- (a) $\frac{R}{625}$ (b) $\frac{R}{25}$
(c) 25 R (d) 625 R

43. An object of mass ' m ' moving along a straight line with a velocity ' u ' collides with a heavier mass ' M ' and gets embedded into it. If the compound system of mass $(m + M)$ keeps moving in the same direction then which of the given options is true?

- (a) The kinetic energies before and after collision are same.

- (b) The kinetic energy after collision is

$$\frac{1}{2} (M + m) u^2 .$$

- (c) There will be a loss of kinetic energy equal to

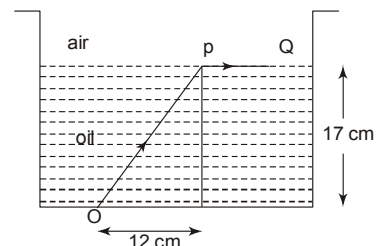
$$\frac{1}{2} \frac{m^2 u^2}{(M + m)}$$

- (d) There will be a loss of kinetic energy equal to

$$\frac{1}{2} \frac{Mm}{(M + m)} u^2$$

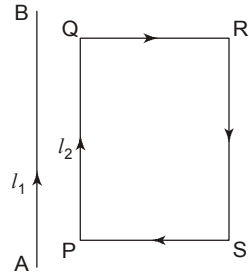
44. A vessel is filled with oil as shown in the diagram. A ray of light from point O at the bottom of vessel is incident on the oil-air interface at point P and grazes the surface along PQ . The refractive index of the oil is close to

- (a) 1.41
(b) 1.50
(c) 1.63
(d) 1.73



45. A charged particle placed in an electric field falls from rest through a distance d in time t . If the charge on the particle is doubled, the time of fall through the same distance will be
- (a) $2t$ (b) t
 (c) $\frac{t}{\sqrt{2}}$ (d) $\frac{t}{2}$

46. AB is a long wire carrying a current I_1 , and PQRS is rectangular loop carrying current I_2 (as shown in the figure).



Which among the following statements are correct?

- (a) Arm PQ will get attracted to wire AB, and the arm RS will get repelled from wire AB.
 (b) Arm PQ will get repelled from wire AB and arm RS attracted to wire AB.
 (c) Forces on the arms PQ and RS will be unequal and opposite.
 (d) Forces on the arms QR and SP will be zero.
- (a) only (a) (b) (b) and (c)
 (c) (a) and (c) (d) (b) and (d)

47. The sum of all the possible remainders, which can be obtained when the cube of a natural number is divided by 9, is
- (a) 5 (b) 6
 (c) 8 (d) 9

48. When a polynomial $p(x)$ is divided by $x - 1$, the remainder is 3. When $p(x)$ is divided by $x - 3$, the remainder is 5. If $r(x)$ is the remainder when $p(x)$ is divided by $(x - 1)(x - 3)$, then the value of $r(-2)$ is
- (a) -2 (b) -1
 (c) 0 (d) 4

49. For what value of p , the following pair of linear equations in two variables will have infinitely many solutions?

$$px + 3y - (p - 3) = 0$$

$$12x + py - p = 0$$

- (a) 6 (b) -6
 (c) 0 (d) 2

50. Two quadratic equations $x^2 - bx + 6 = 0$ and $x^2 - 6x + c = 0$ have a common root. If the remaining roots of the first and second equations are positive integers and are in the ratio 3 : 4 respectively, then the common root is

- (a) 1 (b) 2
 (c) 3 (d) 4