

JEE EXPERT

SAMPLE PAPER

SCIENCE
Going to XI

Time : 2 Hours

Maximum Marks : 225

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

INSTRUCTIONS

- (i) The question paper has 14 printed pages excluding Answer Sheet. Please ensure that the copy of the question paper you have received contains all pages.
- (ii) The question paper contains 75 questions. Each question carry 3 marks and all the questions are compulsory. **There is negative marking. One mark will be deducted for each wrong answer. No mark will be deducted for unattempted question.**
- (iii) Each question contains Four alternatives out of which only **ONE** is correct.
- (iv) Indicate the correct answer for each question by filling appropriate bubble in your answer sheet.
- (v) For rough work, use the space provided in question paper booklet. No extra sheet will be provided for rough work.
- (vi) Use of Calculator, Log Table, Slide Rule and Mobile is not allowed.
- (vii) The answer(s) of the questions must be marked by shading the circles against the question by dark pencil only. For example if only 'B' choice is correct then,

the correct method for filling the bubble is

A	B	C	D
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

the wrong method for filling the bubble are

- | | | | | |
|-----|-----------------------|----------------------------------|-----------------------|-----------------------|
| (a) | A | B | C | D |
| | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (b) | A | B | C | D |
| | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| (c) | A | B | C | D |
| | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |

The answer of the questions in wrong or any other manner will be treated as wrong.

Name of the candidate

Regn. Number

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I have read all the instructions and shall abide by them.

I have verified all the information filled in by the candidate.

.....
Signature of the Candidate

.....
Signature of the invigilator

DO NOT BREAK THE SEAL WITHOUT BEING INSTRUCTED TO DO SO BY THE INVIGILATOR

PHYSICS SECTION – I

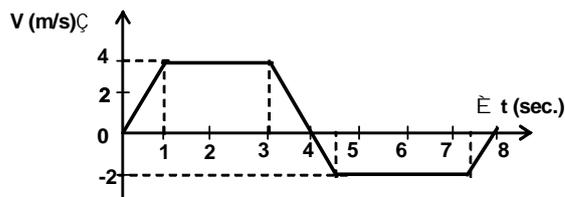
Straight Objective Type

This Section contains 25 multiple choice questions numbered 1 to 25. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. A stone is thrown with an initial speed of 4.9 m/s from a bridge in vertically upward direction. It falls down in water after 2 seconds. The height of the bridge is
 (A) 4.9 m (B) 9.8 m (C) 19.8 m (D) 24.7 m

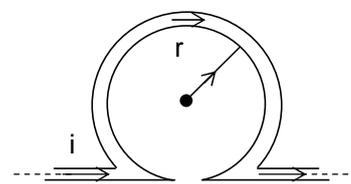
2. The velocity-time graph of a linear motion is shown in figure. The displacement from the origin after 8 sec., is

- (A) 5 m
 (B) 16 m
 (C) 8 m
 (D) 6 m



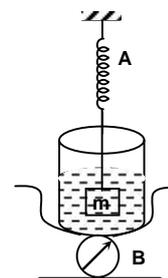
3. An infinitely long straight conductor is bent into the shape as shown in the figure. It carries a current of i ampere and the radius of the circular loop is r metre. Then the magnetic induction at its centre will be

- (A) $\frac{\mu_0}{4\pi} \frac{2i}{r} (\pi + 1)$ (B) $\frac{\mu_0}{4\pi} \frac{2i}{r} (\pi - 1)$
 (C) zero (D) infinite



4. The spring balance A reads 2 kg with a block m suspended from it. A balance B reads 5 kg when a beaker filled with liquid is put on the pan of the balance. The two balances are now so arranged that the hanging mass is inside the liquid as shown in figure. In this situation

- (A) the balance A will read more than 2 kg
 (B) the balance B will read less than 5 kg
 (C) the balance A will read less than 2 kg and B will read more than 5 kg
 (D) the balance A and B will read 2 kg and 5 kg respectively.

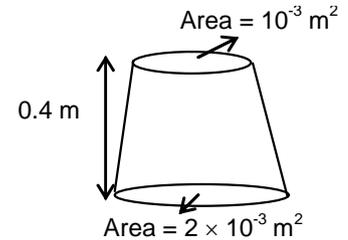


Space for rough work

5. Consider the following statements:
Assertion (A): A table cloth can be pulled from a table without dislodging the dishes.
Assertion (R): To every action there is equal and opposite reaction

- (A) both A and R are true and R is the correct explanation of A
 (B) both A and R are true but R is not the correct explanation of A.
 (C) A is true but R is false.
 (D) A is false but R is true.

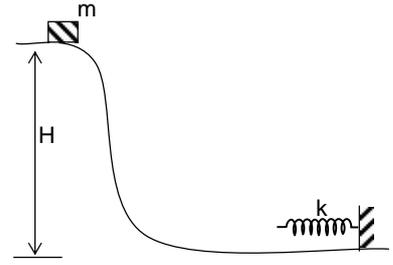
6. A uniformly tapering vessel is filled with a liquid of density 900 kg/m^3 . The force that acts on the base of the vessel due to the liquid is
 ($g = 10 \text{ m/s}^2$)
 (A) 3.6 N (B) 7.2 N
 (C) 9.0 N (D) 14.4 N



7. Two stretched membranes of area 2 m^2 and 3 m^2 are placed in a liquid at the same depth. The ratio of the pressures on them is
 (A) 1 : 1 (B) 2 : 3 (C) $\sqrt{2} : \sqrt{3}$ (D) $2^2 : 3^2$
8. Two masses of 1 gm and of 4 gm are moving with equal linear momenta. The ratio of their kinetic energies is
 (A) 4 : 1 (B) $\sqrt{2} : 1$ (C) 1 : 2 (D) 1 : 16
9. Energy in the sun is generated mainly by
 (A) Fusion of radioactive material (B) Fission of helium atoms
 (C) Chemical reaction (D) Fusion of hydrogen atoms
10. With the propagation of a longitudinal wave through a material medium, the quantities transmitted in the direction of propagation are:
 (A) energy, momentum and mass (B) energy
 (C) energy and mass (D) energy and linear momentum

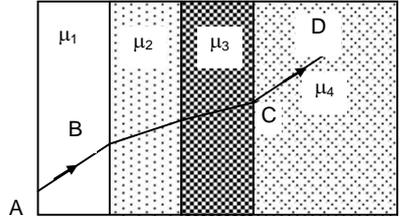
Space for rough work

11. A spring of spring constant 'K' is fixed horizontally at the bottom of a hilly terrain as shown in the figure. A small block of mass m, initially at an altitude 'H' is gently pushed downwards. Assuming no friction anywhere, the maximum compression in the spring will be



- (A) $\sqrt{2gH}$ (B) mgH
 (C) $\sqrt{\frac{mgH}{k}}$ (D) $\sqrt{\frac{2mgH}{k}}$

12. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_4 as shown in the adjacent figure. The surfaces of all media are parallel. If the emergent ray CD is parallel to the incident ray AB, we must have

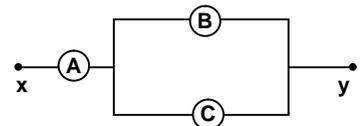


- (A) $\mu_1 = \mu_3$ (B) $\mu_2 = \mu_4$
 (C) $\mu_4 = \mu_1$ (D) $\mu_2 = \mu_3$

13. A uniform electric field and a uniform magnetic field are produced, pointing in the same direction. If an electron is projected with its velocity pointing in the same direction

- (A) The electron will turn to its right
 (B) The electron will turn to its left
 (C) The electron velocity will increase in magnitude
 (D) The electron velocity will decrease in magnitude

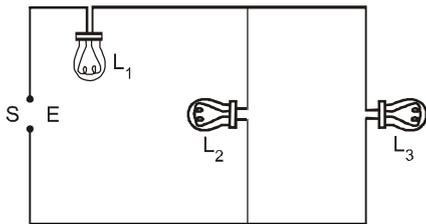
14. A, B and C are voltmeters of resistances R, 1.5 R and 3R respectively. When same potential difference is applied between x and y, the voltmeter readings are V_A, V_B and V_C . Then



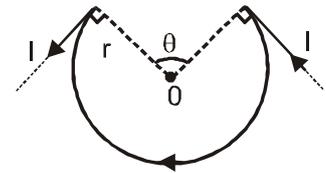
- (A) $V_A = V_B = V_C$ (B) $V_A \neq V_B = V_C$
 (C) $V_A = V_B \neq V_C$ (D) $V_A + V_B = V_C$

Space for rough work

15. One light wave is incident upon a plate of refractive index μ . What is the incident angle i , for which refractive & reflective waves are mutually perpendicular?
 (A) $\tan^{-1}(\mu-1)$ (B) $\tan^{-1}\left(\frac{1}{\mu}\right)$ (C) $\tan^{-1}\mu$ (D) $\tan^{-1}\left(\frac{1}{\mu-1}\right)$
16. A farsighted person cannot focus clearly an objects that are less than 145 cm from his eyes. To correct this problem, the person wear eyeglasses that are located 2.0 cm in front of his eyes. What is the focal length that will permit this person to read a newspaper at a distance of 32.0 cm from his eyes?
 (A) 32 cm (B) 34 cm (C) 36 cm (D) 38 cm
17. Fig. shows three similar lamps L_1, L_2 and L_3 connected across a power supply.



- If the lamp L_3 fuses, how will the current through L_1 and L_2 change?
 (A) Current through L_1 and L_2 will remain same as earlier.
 (B) Current through L_1 will increase and that through L_2 will decrease.
 (C) Current through L_1 will decrease and that through L_2 will increase.
 (D) No. current will flow through L_1 and L_2 .
18. A conducting wire of infinite length, carrying a current I , is arranged in the shape, as shown. If the magnetic field at the centre O of circular segment is zero, then, calculate the angle θ .
 (A) $\theta = \frac{\pi}{4}$ (B) $\theta = 2(\pi - 1)$
 (C) $\theta = \pi/2$ (D) $0 < \theta < 2\pi$
19. Two trains are each 50 m long moving parallel towards each other at speeds 10 m/s and 15 m/s respectively. After what time will they pass each other?
 (A) $5\sqrt{\frac{2}{3}}$ sec (B) 4 sec (C) 2 sec (D) 6 sec



Space for rough work

20. A staircase contains 3 steps each 10 cm high and 20 cm wide. What should be the minimum horizontal velocity of a ball rolling off the uppermost plane so as to hit the lowest plane.
 (A) 1 m/s (B) 2 m/s (C) 3 m/s (D) 4 m/s
21. What thrust is needed to fire a 350-kilogram rocket straight up with an acceleration of 8.0 meters per second squared?
 (A) 2800 N (B) 3430 N (C) 6230 N (D) 630 N
22. A particle of mass 0.5 kg travels in a straight line with velocity $v = ax^{3/2}$ where $a = 5 \text{ m}^{-1/2} \text{ s}^{-1}$. What is the work done by the net force during its displacement from $x = 0$ to $x = 2\text{m}$?
 (A) $10\sqrt{2}$ J (B) $\frac{10}{\sqrt{2}}$ J (C) $25\sqrt{2}$ J (D) 50 J
23. Imagine a light planet revolving around a very massive star in a circular orbit of radius r with a period of revolution T . On what power of r , will the square of time period depend if the gravitational force of attraction between the planet and the star is proportional to $r^{-5/2}$.
 (A) $T^2 \propto r^3$ (B) $T^2 \propto r^{3/2}$ (C) $T^2 \propto r^{5/2}$ (D) $T^2 \propto r^{7/2}$
24. A boat containing some piece of material is floating in a pond. What will happen to the level of water in the pond if on unloading the pieces in the pond, the piece sink?
 (A) Level of water will go down (B) Level of water will rise
 (C) Level of water will remain unchanged (D) No conclusion can be drawn
25. A wave pulse on a string moves a distance of 8m in 0.05s. What would be the wave length of the wave on the same string if its frequency is 200 Hz ?
 (A) 160 m (B) 80 m (C) 1.6 m (D) 0.8 m

Space for rough work

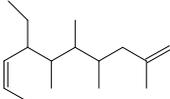
**CHEMISTRY
SECTION – II**

Straight Objective Type

This Section contains 25 multiple choice questions numbered 26 to 50. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

26. Phenolphthalein is
(A) yellow in acidic medium pink in basic medium
(B) pink in acidic medium, colourless in basic medium
(C) colourless in acidic medium, pink in basic medium
(D) pink in acidic medium, yellow in basic medium
27. How many times a solution of pH = 3 be diluted to get a solution of pH = 6?
(A) 2 times (B) 10 times (C) 100 times (D) 1000 times
28. The charge carried by an electron is
(A) 1.602×10^{19} coulombs (B) 1.602×10^{-19} coulombs
(C) 1.609 coulombs (D) 6.02×10^{19} coulombs
29. Which of the following fundamental particles is not deflected by a magnetic field?
(A) Proton (B) Neutron (C) Electron (D) Positron
30. Which of the following sample has maximum number of molecules?
(A) 18 gm H₂O (B) 4 gm H₂ (C) 0.5 gm H₂S (D) 25.5 gm NH₃
31. Chemical analysis of a carbon compound gave the following percentage composition by weight of the elements present in it. Carbon = 10.06%, Hydrogen = 0.84%, Chlorine = 89.10%. Calculate the empirical formula of the compound,
(A) C₂H₂Cl₂ (B) CHCl₂ (C) CHCl₃ (D) C₄H₄Cl₄

Space for rough work

32. The alkaline hydrolysis of oil or fat gives soap and
(A) glycerol (B) ethanol (C) glycol (D) ethanoic acid
33.  IUPAC name of this structure is
(A) 4-ethyl-5, 6, 7, 9-tetramethyldeca-2, 9-diene
(B) 7-ethyl-4, 5, 6-trimethyldeca-2, 9-diene
(C) 7-ethyl-2, 4, 5, 6-tetramethyl deca-1, 8-diene
(D) none of these
34. Which of the following is least ionic?
(A) AgCl (B) KCl (C) BaCl₂ (D) NaCl
35. The reaction $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$ is an example of
(A) combination reaction (B) decomposition reaction
(C) displacement reaction (D) double decomposition reaction
36. A mixture of ammonia chloride and sodium chloride can be separated by
(A) crystallisation (B) sublimation (C) centrifugation (D) distillation
37. Oxides of metals are generally
(A) acidic (B) basic (C) amphoteric (D) neutral
38. The first ionization enthalpy of Na, Mg, Al and Si are in the order of
(A) $\text{Na} < \text{Mg} > \text{Al} < \text{Si}$ (B) $\text{Na} > \text{Mg} > \text{Al} > \text{Si}$
(C) $\text{Na} < \text{Mg} < \text{Al} > \text{Si}$ (D) $\text{Na} > \text{Mg} > \text{Al} < \text{Si}$

Space for rough work

39. The conversion of a gas into liquid is called
(A) gasification (B) sublimation (C) condensation (D) freezing
40. 11.2 L of a gas at STP weighs 14 g. The gas could be :
(A) N₂O (B) NO₂ (C) N₂ (D) CO₂
41. Which of the following is combination reaction ?
(I) $2\text{KClO}_3 \xrightarrow{\text{heat}} 2\text{KCl} + 3\text{O}_2$ (II) $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$
(III) $4\text{Al} + 3\text{O}_2 \longrightarrow 2\text{Al}_2\text{O}_3$ (IV) $\text{Zn} + \text{FeSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Fe}$
(A) I, III (B) III, IV (C) II, IV (D) II, III
42. Bleaching powder can be prepared by reacting :
(A) Caustic Soda with chlorine (B) Washing soda with chlorine
(C) Baking soda with chlorine (D) Slaked lime with chlorine
43. An aqueous solution with pH = zero is :
(A) Acidic (B) Alkaline (C) Neutral (D) Amphoteric
44. Although metals form basic oxide, which of the following metals form amphoteric oxide :
(A) Na (B) Ca (C) Zn (D) Cu

Space for rough work

45. Sodium hydrogen carbonate solution when added to dilute ethanoic acid. It is observed that :
(A) Colourless, odourless gas is evolved
(B) A precipitate is formed
(C) The mixture becomes warm and blue coloured
(D) Colourless, light brown coloured gas evolved
46. Which of the following elements would lose an electron most easily ?
(A) Li (B) Na (C) K (D) Rb
47. When a beam of light is passed through a colloidal solution then the light gets :
(A) Reflected (B) Scattered (C) Refracted (D) Absorbed
48. The correct formula of Aluminium phosphate is :
(A) $\text{Al}_2(\text{PO}_4)_3$ (B) $\text{Al}(\text{PO}_4)_3$ (C) AlPO_4 (D) $\text{Al}_3(\text{PO}_4)_2$
49. The froth floatation process used for the concentration of sulphide ores is based upon :
(A) The difference in the specific gravity of ore and gangue particles
(B) The magnetic properties of gangue particles
(C) Preferential wetting of ore particles by oil
(D) Preferential wetting of gangue particles by oil
50. Which of the following factors, when increased affect the rate of evaporation adversely?
(A) Temperature of liquid
(B) Surface area of liquid exposed to surrounding
(C) Humidity in air
(D) All the above

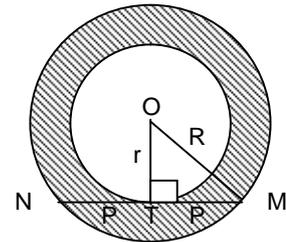
Space for rough work

MATHEMATICS
SECTION – III

Straight Objective Type

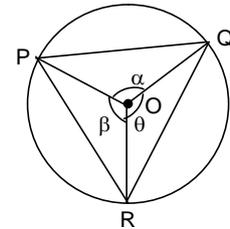
This Section contains 25 multiple choice questions numbered 51 to 75. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

51. If $p(x)$ is a polynomial satisfying $P\left(x + \frac{3}{2}\right) = p(x)$ for all real values of x . If $P(5) = 2006$, then the value of $P(8)$ is:
(A) 2006 (B) 2005 (C) 2004 (D) 2007
52. If a, b, c are real numbers such that $a + \frac{1}{b} = \frac{7}{3}$; $b + \frac{1}{c} = 4$; $c + \frac{1}{a} = 1$, then value of abc is:
(A) 0 (B) 4 (C) 1 (D) 2
53. Four congruent triangles are cut off from the corners of a rectangle with dimensions 11×13 . The resulting octagon has eight equal edges. Then the length of octagon is:
(A) 3 (B) 4 (C) 2 (D) 5
54. The value of $\cos^2 5^\circ + \cos^2 10^\circ + \cos^2 15^\circ + \dots + \cos^2 90^\circ$ is:
(A) 0 (B) $8\frac{1}{2}$ (C) 10 (D) $2\frac{1}{2}$
55. The diagram shows two concentric circles. The chord of larger circle tangent to smaller circle and has length $2P$. Then area of shaded region is:
(A) $9\pi P^2$ (B) πP^2
(C) $3\pi P^2$ (D) $\frac{\pi P^2}{4}$



Space for rough work

56. From a square metal plate a circle of maximum size is cut out; again from this circular plate a square of maximum size is cut. Then the ratio of metal wasted to metal of the original square is:
 (A) 1 : 1 (B) 1 : 3 (C) 2 : 1 (D) 1 : 2
57. If p^{th} term of an AP is $\frac{1}{q}$ and q^{th} term is $\frac{1}{p}$, then sum of pq terms of the AP is:
 (A) $pq + 1$ (B) $\frac{(pq)^2}{2}$ (C) $\frac{1}{2}(pq + 1)$ (D) none of these
58. For an increasing AP $a_1, a_2, a_3, \dots, a_n$ if $a_1 + a_3 + a_5 = -12$ and $a_1 a_3 a_5 = 80$, then which of the following is not true?
 (A) $a_1 = -10$ (B) $a_2 = -7$ (C) $a_3 = -4$ (D) $a_5 = 2$
59. If roots of $x^2 + \alpha x + \beta = 0$ are 8 and 2 and the roots of $x^2 + ax + b = 0$ are 3 and 3, then roots of $x^2 + \alpha x + b = 0$ are:
 (A) $-1, -9$ (B) 1, 9 (C) 8, 3 (D) none of these
60. If $\sin \alpha = \frac{3}{5}$ and $\cos \beta = \frac{3}{5}$, $0 < \alpha, \beta < \frac{\pi}{2}$ then
 (A) $\alpha = \beta$ (B) $\alpha > \beta$ (C) $\alpha < \beta$ (D) none of these
61. In the figure, area of circle is 50sq. cm and the area of triangle is 15 sq. cm, then $\sin \theta + \sin \alpha + \sin \beta = \dots$
 (A) $\frac{9\pi}{10}$ (B) $\frac{3\pi}{5}$
 (C) 6π (D) none of these



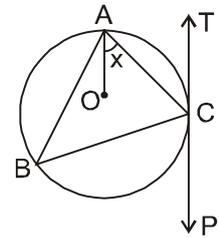
Space for rough work

63. The number of real solutions to equation $x^3 + (x + 1)^3 = (x + 3)^3 - (x + 2)^3$ is
 (A) 0 (B) 1 (C) 2 (D) 3
64. p and q are roots of $x^2 - 2x + A = 0$ and r, s are the roots of $x^2 - 18x + B = 0$. If p, q, r, s are the terms of an increasing A.P. then value of A + B = ?
 (A) 74 (B) 70 (C) 68 (D) 72
65. The last digit of the sum $(2002^{2005} + 2003^{2006} + 2007^{2007})$ is:
 (A) 5 (B) 2 (C) 9 (D) 4
66. If m is any positive integer, then value of $\left[\sqrt{m + \sqrt{m + \sqrt{m + \dots}}} \right] - \left[\sqrt{m - \sqrt{m - \sqrt{m - \dots}}} \right]$ is:
 (A) 1 (B) 0 (C) -1 (D) can't be determined
67. If x and y are distinct integers such that $2005 + x = y^2$ and $2005 + y = x^2$ then the product xy is:
 (A) 2004 (B) -2004 (C) 2005 (D) -2005
68. If $\cot A + \cot B + \cot C = \sqrt{3}$, then the ΔABC is:
 (A) isosceles (B) equilateral (C) right angled (D) none of these
69. Two triangles are similar but not congruent and lengths of side of the first are 6cm, 11cm and 12cm. The sides of second are integral lengths and one of them is congruent to the side of first. The perimeter of second Δ is:
 (A) 52 (B) 29 (C) 58 (D) 56
70. The value of x, when $\frac{1}{\log_2 210} + \frac{1}{\log_4 210} + \frac{1}{\log_8 210} + \frac{1}{\log_{16} 210} = \frac{1}{\log_x 210}$
 (A) 210 (B) 2010 (C) 1024 (D) 512
71. Let $f(\theta) = \frac{\cot \theta}{1 + \cot \theta}$ and $\alpha + \beta = \frac{5\pi}{4}$, then the value of $f(\alpha) \cdot f(\beta)$ is :
 (A) 2 (B) $-\frac{1}{2}$ (C) $\frac{1}{2}$ (D) none of these

Space for rough work

72. If $\tan x = \frac{\alpha}{2}$ and $\tan \frac{\beta}{2}$ are the roots of the equation $8x^2 - 26x + 15 = 0$ then $\cos(\alpha + \beta)$ is equal to :
- (A) $-\frac{627}{725}$ (B) $\frac{627}{725}$ (C) -1 (D) None of these

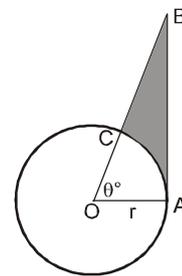
73. In the adjoining figure, PT is tangent at point C of the circle O is the circum center of $\triangle ABC$. If $\angle ACP = 118^\circ$ then measure of $\angle x$ is :
- (A) 28° (B) 32°
 (C) 42° (D) 38°



74. Two circles of radii 20 cm and 37 cm intersect in A and B. If O_1 and O_2 are their centers and $AB = 24$ cm then the distance O_1O_2 is equal to :
- (A) 44 cm (B) 51 cm (C) 40.5 cm (D) 45 cm

75. In the given figure, O is the centre of the circle. Find the perimeter of the shaded region :

- (A) $r \left(\tan \theta + \sec \theta + \frac{\pi \theta}{180} + 1 \right)$
 (B) $r \left(\tan \theta + \sec \theta + \frac{\pi \theta}{180} - 1 \right)$
 (C) $r \left[\tan \theta + \sec \theta - \left(\frac{\pi \theta}{180} - 1 \right) \right]$
 (D) Can't be determined



Space for rough work

JEE EXPERT

Going - XI

(SAT) [20.01.2019]

ANSWERS

Physics

1.	B	2.	A	3.	B	4.	C
5.	B	6.	B	7.	A	8.	A
9.	D	10.	D	11.	D	12.	C
13.	D	14.	B	15.	C	16.	D
17.	C	18.	B	19.	B	20.	B
21.	C	22.	D	23.	D	24.	A
25.	D						

Chemistry

26.	C	27.	D	28.	B	29.	B
30.	B	31.	C	32.	A	33.	C
34.	A	35.	A	36.	B	37.	B
38.	A	39.	C	40.	C	41.	D
42.	D	43.	A	44.	C	45.	A
46.	D	47.	B	48.	C	49.	C
50.	C						

Mathematics

51.	A	52.	C	53.	D	54.	B
55.	B	56.	D	57.	C	58.	D
59.	B	60.	C	61.	B	62.	A
63.	B	64.	A	65.	D	66.	B
67.	B	68.	B	69.	C	70.	C
71.	C	72.	A	73.	A	74.	B
75.	B						