

**ASPIRE****IIT & MEDICAL**

AN INITIATIVE BY IITIANS



BRAIN OF HIMACHAL

ASPIRE TALENT HUNT EXAM

FOR

CLASS 11th - QUESTION PAPERTime: 120 MinutesMaximum Marks: 400

INSTRUCTIONS:

PLEASE FILL DETAILS CAREFULLY

NAME _____

FATHER NAME _____

SCHOOL NAME _____

CONTACT NUMBER _____

Read the instructions carefully. 5 minutes are allowed specifically for this purpose.

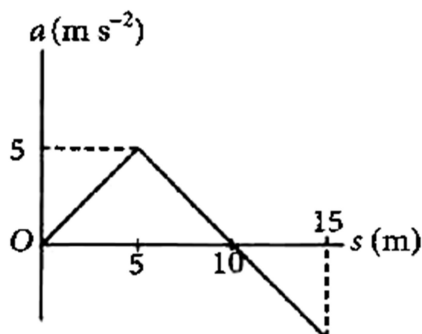
1. Answer all questions
2. This booklet is your question paper containing **100** questions
3. The question paper consist of **3 sections** I, II, III .
4. Section-I **Physics** (Questions -1 to 30), Section-II **Chemistry** (31-60), Section-III **Mental ability** (61-100).
5. Each question has **only one correct** answer. Once you have marked an option you can't mark a fresh option
6. For each **correct** answer **+4** marks will be awarded. For **wrong** answer **-1** mark will be deduced.
7. Fill your **OMR** sheet carefully.
8. All the Notations used in this paper are standard.
9. No use of electronic gadgets, calculators, mobile phones etc are allowed.
10. **In case of any discrepancy do not ask anyone one including your invigilator. Try to attempt question and mark the best possible answer.**

Roll No.										
----------	--	--	--	--	--	--	--	--	--	--

ASPIRE IIT & MEDICAL SHIMLA / UNA Ph.:-93172-68600 ,98823-72779,93172-68603**Website : www.aspireiit.in | Email ID :aspirehimla01@gmail.com**

Section-I (PHYSICS)

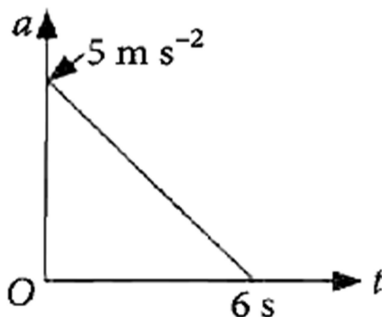
- suppose refractive index μ is given as $\mu = A + \frac{B}{\lambda^2}$, Where A and B are constants and λ is wavelength, then dimensions of B are same as that of
 (a) Wavelength (b) volume (c) pressure (d) area
- The length of a cylinder is measured with a meter rod having least count 0.1 cm. Its diameter is measured with vernier calipers having least count 0.01 cm. Given that length is 5.0 cm and radius is 2.0 cm. The percentage error in the calculated value of the volume will be
 (a) 1% (b) 2% (c) 3% (d) 4%
- The mass of a box measured by a grocer's balance is 2.3 kg. Two gold pieces of masses 20.15 g and 20.17 g are added to the box. What is the total mass of the box and the difference in the masses of the pieces to correct significant figures?
 (a) 2.34 kg, 0 g (b) 2.3 kg, 0.02 g (c) 2.34 kg, 0.02 g (d) 2.3 kg, 0 g
- A particle starts from rest, whose a acceleration versus displacement graph is shown in the figure. The velocity of the particle at $t = 15$ s is



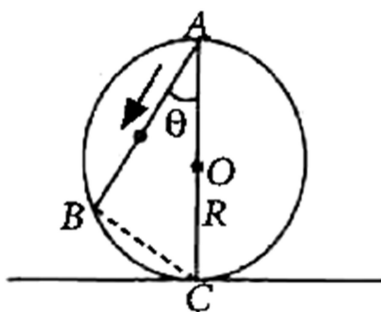
- (a) 5 ms^{-1} (b) $5\sqrt{3} \text{ ms}^{-1}$ (c) $\frac{5}{\sqrt{2}} \text{ ms}^{-1}$ (d) zero

Rough work

5. A particle starts from rest. Its acceleration at time $t = 0$ is 5 m s^{-2} which varies with time as shown. The maximum speed of the particle will be



- (a) 7.5 ms^{-1} (b) 15 ms^{-1} (c) 30 ms^{-1} (d) 2.5 ms^{-1}
6. A frictionless wire AB is fixed on a sphere of radius R . A very small spherical ball slips on this wire. The time taken by this ball to slip from A to B is



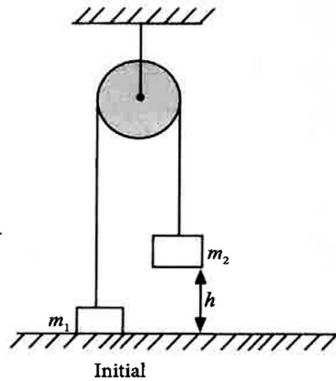
- (a) $\frac{2\sqrt{gR}}{\cos \theta}$ (b) $2\sqrt{gR} \cos \theta$ (c) $2\frac{\sqrt{R}}{g}$ (d) $\sqrt{\frac{R}{g \cos \theta}}$
7. A particle is moving in xy -plane whose x and y -coordinates are $x = 3 \sin 2\pi t$ and $y = 2 \cos 2\pi t$, where, x and y are in metre and t is in second. Then,
- (a) the path of the particle is elliptical.
 (b) the path of the particle is circular.
 (c) the path of the particle is parabolic.
 (d) the path of the particle is straight line.

Rough work

8. A ball falls from a table top with initial horizontal speed v_0 . In the absence of air resistance, which one of the following is correct statement?
- (a) The vertical component of the acceleration changes with time.
(b) The horizontal component of the velocity does not change with time.
(c) The horizontal component of the acceleration is non-zero and finite.
(d) The time taken by the ball to touch the ground depends on V_0 .
9. In an oblique projectile motion if the velocity of projection is increased by 2%, the percentage increase in horizontal range will be
- (a) 1% (b) 2% (c) 3% (d) 4%
10. A particle is moving in a circle, then
- (a) The resultant force on the particle must be towards the centre.
(b) The cross product of the tangential acceleration and the angular velocity will be zero.
(c) The direction of the angular acceleration and the angular velocity must be the same.
(d) The resultant force may be towards the centre.
11. A particle moves on a circular path of radius 0.2 m with an angular acceleration 0.25 rad s^{-2} . The particle starts from rest, find the time at which the magnitude of radial acceleration and the magnitude of tangential acceleration are same.
- (a) 1s (b) 2 s (c) 3 s (d) 4 s
12. A particle is moving eastwards with a velocity of 5 m/s. In 10s, the velocity changes to 5 m/s northwards. The average acceleration in this time is
- (a) Zero (b) $\frac{1}{\sqrt{2}} \text{ m s}^{-2}$ towards north-west
(c) $\frac{1}{\sqrt{2}} \text{ m s}^{-2}$ towards north-east (d) $\frac{1}{\sqrt{2}} \text{ m s}^{-2}$ towards north

Rough work

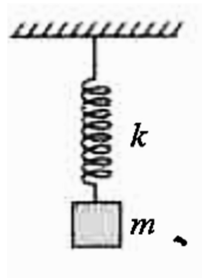
13. Two blocks with masses $m_1 = 3 \text{ kg}$ and $m_2 = 5 \text{ kg}$ are connected by a light string that slides over a frictionless pulley as shown in figure. Initially, m_2 is held 5 m off the floor while m_1 is on the floor. The system is then released. The speed with which m_2 hit the floor is



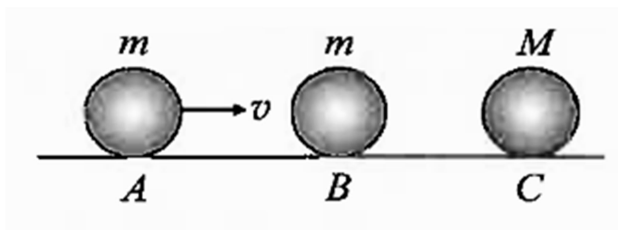
- (a) 5 m/s (b) 6 m/s (c) $\sqrt{10} \text{ m/s}$ (d) $\sqrt{8} \text{ m/s}$
14. A particle of mass 1 kg is moving along x-axis and a force F is also acting along x-axis in such a way that the displacement of the particle is varying as $x = 3t^2$. Find the work done by the force F when the particle moves 2 m.
 (a) 12 J (b) 16 J (c) 32 J (d) 42 J
15. A spring of constant 100 N/m is stretched by applying equal forces each of magnitude F at the two ends. The energy stored in the spring is 200 J. Now, spring is cut into two equal parts and one of the part is stretched by applying equal forces each of magnitude F at the two ends. The energy stored is
 (a) 200 J (b) 100 J (c) 400 J (d) 50 J
16. A uniform rope of mass 1 kg and length 1 m is lying on the ground. One end of the rope is pulled up by a worker with the constant velocity of 1 m/s. The average power supplied by the worker in pulling the entire rope just off the ground such that the rope becomes vertical is (take $g = 10 \text{ m/s}^2$)
 (a) 5.5 W (b) 6 W (c) 10.5 W (d) None of these

Rough work

17. Initially, spring of spring constant $100 \text{ N}^{-1} \text{ m}$ is in its natural length. When the block of mass 1 kg is released from rest, the maximum power of weight of the block is



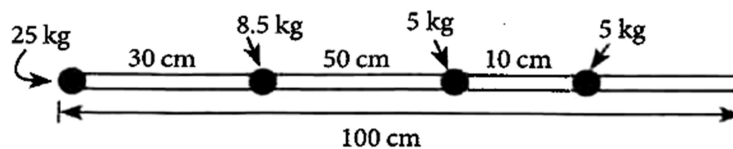
- (a) 5 W (b) 10 W (c) 20 W (d) 40 W
18. A bullet of mass 10 g moving horizontally at a speed 140 m/s strikes a block of mass 100 g attached to a string like a simple pendulum. The bullet penetrates the block and emerges on the other side. If the block rises by 80 cm , find final velocity of bullet.
- (a) 100 m/s (b) 150 m/s (c) 1200 m/s (d) 50 m/s
19. Three balls A, B, C are placed on a smooth horizontal surface. Ball A moves with velocity v towards ball B and C. All collisions are perfectly elastic. If $M < m$, the number of collisions between the balls will be



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

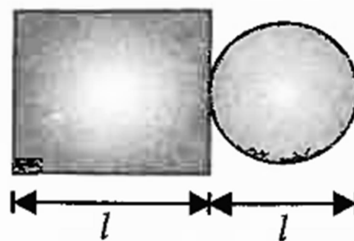
Rough work

20. figure shows a rod of mass 10 kg of length 100 cm with some masses tied to it at different positions. The point on the rod at which if the rod is picked over a knife edge, it will be in equilibrium about that knife edge is

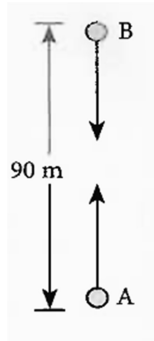


- (a) 50 cm (b) 30 cm (c) 10 cm (d) 40 cm
21. If the density of the material of a square plate and a circular plate shown in the figure is the same, the centre of mass of the composite system will be

- (a) inside the square plate
(b) inside the circular plate
(c) at the point of contact
(d) outside the system.



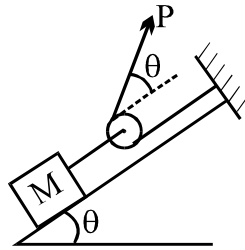
22. Two particles A and B of mass 1 kg and 2 kg respectively are projected in the direction shown in figure with speeds $u_A = 200$ m/s and $u_B = 50$ m/s. Initially they were 90 m apart. Find the maximum height attained by the centre of mass of the particles from the initial position of A. Assume acceleration due to gravity to be constant ($g = 10$ m/s²)



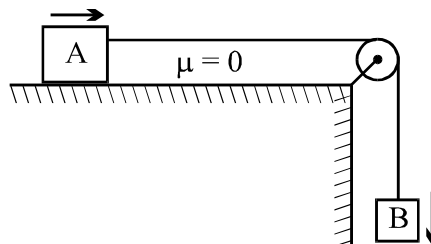
- (a) 115.5 m (b) 100 m (c) 11.55 m (d) 1.55 m

Rough work

23. What should be the minimum force P to be applied to the string so that block of mass m just begins to move up the frictionless plane.



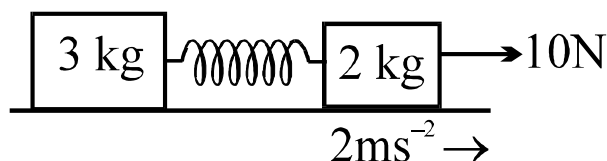
- (a) $Mg \tan \theta/2$ (b) $Mg \cot \theta/2$ (c) $\frac{Mg \cos \theta}{1 + \sin \theta}$ (d) None
24. Both the blocks shown here are of mass m and are moving with constant velocity in direction shown in a resistive medium which exerts equal constant force on both blocks in direction opposite to the velocity. The tension in the string connecting both of them will be : (Neglect friction)



- (a) mg (b) $mg/2$
 (c) $mg/3$ (d) $mg/4$
25. A rope of mass 5 kg is moving vertically in vertical position with an upwards force of 100 N acting at the upper end and a downwards force of 70 N acting at the lower end. The tension at midpoint of the rope is
- (a) 100 N (b) 85 N (c) 75 N (d) 105 N

Rough work

26. Find the acceleration of 3 kg mass when acceleration of 2 kg mass is 2 ms^{-2} as shown in figure.

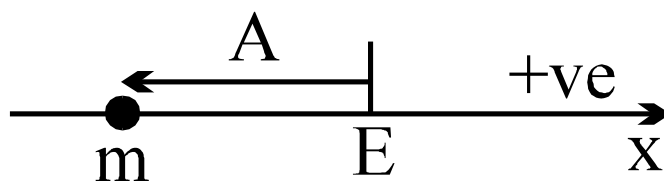


- (a) 3 ms^{-2} (b) 2 ms^{-2}
 (c) 0.5 ms^{-2} (d) zero

(Question No. 27/28)

A particle of mass m is constrained to move on x -axis. A force F acts on the particle. F always points toward the position labeled E . For example, when the particle is to the left of E , F points to the right. The magnitude of F is a constant F except at point E where it is zero.

The system is horizontal. F is the net force acting on the particle. The particle is displaced a distance A towards left from the equilibrium position E and released from rest at $t = 0$.

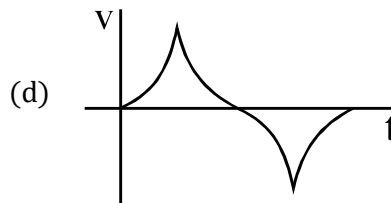
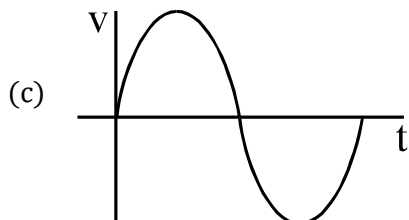
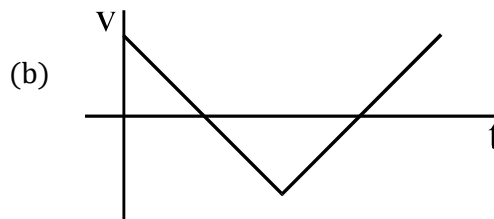
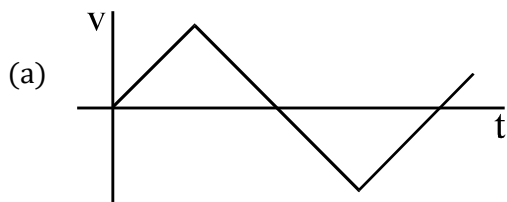


27. What is the period of the motion?

- (a) $4\left(\sqrt{\frac{2Am}{F}}\right)$ (b) $2\left(\sqrt{\frac{2Am}{F}}\right)$ (c) $\left(\sqrt{\frac{2Am}{F}}\right)$ (d) None

Rough work

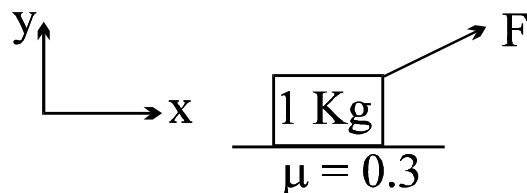
28. Velocity – time graph of the particle is



29. A body is placed on a rough inclined plane of inclination θ . As the angle θ is increased from 0° to 90° the contact force between the block and the plane

- (a) Remains constant (b) first remains constant then decreases
(c) First decreases then increases (d) first increases then decreases

30. A force $\vec{F} = \hat{i} + \hat{j}$ acts on block shown. The force of friction acting on the block is:



- (a) $-\hat{i}$ (b) $-1.8\hat{i}$
(c) $-2.4\hat{i}$ (d) $-3\hat{i}$

Rough work

Section-II (CHEMISTRY)

31. Equal masses of He, O₂ and SO₂ are taken in a closed container. The ratio of partial pressure of gases He, O₂ and SO₂ would be
 (a) 1:2:8 (b) 8:16:1 (c) 16:8:1 (d) 16:2:1
32. The rate of diffusion of two gases A and B is in the ratio of 4:1 and that of B and C in the ratio of 1:3. Thus, rate of diffusion of gases of A and C is
 (a) 1:12 (b) 3:4 (c) 4:3 (d) 2:3
33. As the temperature is raised from 20°C to 40°C. The average kinetic energy of the neon atoms changes by a factor of which of the following?
 (a) $\frac{1}{2}$ (b) $\sqrt{313/293}$ (c) 313/293 (d) 2
34. Consider the van der Waals' constants, a and b , for the following gases.

Gas	Ar	Ne	Kr	Xe
$a/(\text{atm dm}^6\text{mol}^{-2})$	1.3	0.2	5.1	4.1
$b/(10^{-2}\text{dm}^3\text{mol}^{-1})$	3.2	1.7	1.0	5.0

Which gas is expected to have the highest critical temperature?

- (a) Kr (b) Xe (c) Ar (d) Ne
35. The compressibility factor for a real gas at high pressure is
 (a) $1 + \frac{RT}{pb}$ (b) 1 (c) $1 + \frac{pb}{RT}$ (d) $1 - \frac{pb}{RT}$
36. At 300 K, the density of certain gaseous molecules at 2 bar is double to that of dinitrogen (N₂) at 4 bar. The molar mass of gaseous molecule is
 (a) 28 g mol⁻¹ (b) 56 g mol⁻² (c) 112 g mol⁻¹ (d) 224 g mol⁻¹
37. Valence shell electron of K(19) has quantum numbers as

	n	l	m_l	m_s
(a)	3	2	0	$+\frac{1}{2}$
(b)	4	0	0	$+\frac{1}{2}$
(c)	4	0	1	$-\frac{1}{2}$
(d)	4	1	0	$+\frac{1}{2}$

Rough work

	n	I
I.	3	1
II.	5	3
III.	2	0
IV.	4	2

(d) $\text{III} < \text{I} < \text{IV} < \text{II}$

	n	l	m_l		n	l	m_l
(a)	3	2	-2	(b)	4	4	0
(c)	3	1	0	(d)	5	4	-3

(a) n^2 (b) I (c) 21 (d) $(2l+1)$

(Ar) $1 \uparrow 1 \uparrow 1 \uparrow 1 \uparrow 1 \uparrow$ $4s^1$ $4p^4$ $3d^5$

(a) I, II (b) I, III (c) II, III (d) I, II, III

(a) Cu^{2+} and Ni^{2+} (b) Mn^{4+} and Co^{2+} (c) Zn^{2+} and Cu^{2+} (d) Mg^{2+} and Sc^{+}

(a) 4.214×10^{20} (b) 3.612×10^{20} (c) 8.428×10^{20} (d) 4.816×10^{20}

Rough work

44. How many moles of Cl^- ions are present in 50.0 mL of 0.20M BaCl_2 solution?
(a) 0.02 mol (b) 10 mol (c) 0.01 mol (d) 20 mol
45. Mass of one drop of water molecule is 0.0018 g. Thus, number of water molecules in one drop is
(a) 6.02×10^{23} (b) 3.01×10^{20} (c) 6.02×10^{20} (d) 6.02×10^{19}
46. For a reaction, $\text{N}_2(g) + 3\text{H}_2(g) \rightarrow 2\text{NH}_3(g)$, identify dihydrogen (H_2) as a limiting reagent in the following reaction mixtures.
(a) 56 g of N_2 + 10 g of H_2 (b) 35 g of N_2 + 8 g of H_2
(c) 14 g of N_2 + 4 g of H_2 (d) 28 g of N_2 + 6 g of H_2
47. What is the empirical formula of a compound which contains 60.0% oxygen and 40% sulphur by mass?
(a) SO_2 (b) SO_3 (c) SO (d) S_2O
48. NH_3 is formed in the following sequence of reactions.
I. $\text{Ca} + 2\text{C} \rightarrow \text{CaC}_2$ (50% yield)
II. $\text{CaC}_2 + \text{N}_2 \rightarrow \text{CaCN}_2 + \text{C}$ (100% yield)
III. $\text{CaCN}_2 + 3\text{H}_2\text{O} \rightarrow 2\text{NH}_3 + \text{CaCO}_3$ (50% yield)
To form 2 moles of NH_3 , calcium should be taken
(a) 1 mole (b) 2 moles (c) 3 moles (d) 4 moles
49. The outer most electronic configuration of transition elements is
(1) ns^2nd^{1-10} (2) $(n-1)d^{1-10}ns^{1-2}$
(3) $(n-1)d^2ns^{0-2}$ (4) $(n-1)d^{1-10}ns^2$
50. Which of the following has the largest ionic radius?
(1) Be^{2+} (2) Mg^{2+} (3) Ca^{2+} (4) Sr^{2+}
51. The shielding effect of d -electrons is
(1) More than s -electrons (2) More than p -electrons
(3) Less than s -electrons (4) Same as f -electrons
52. From the ground state electronic configurations of the elements given below, pick up the one with the highest value of second ionisation energies.
(1) $1s^2, 2s^2 2p^6, 3s^2$ (2) $1s^2, 2s^2 2p^6, 3s^1$
(3) $1s^2, 2s^2 2p^6$ (4) $1s^2, 2s^2 2p^5$
53. Considering the elements B, Al, Mg and K, the correct order of their metallic character is
(1) $\text{B} > \text{Al} > \text{Mg} > \text{K}$
(2) $\text{Al} > \text{Mg} > \text{B} > \text{K}$
(3) $\text{Mg} > \text{Al} > \text{K} > \text{B}$
(4) $\text{K} > \text{Mg} > \text{Al} > \text{B}$

54. Diagonal relationship is shown by

- (1) All elements with their diagonally opposite elements.
- (2) All elements of 3rd and 4th periods
- (3) Some of the elements of 2nd and 3rd periods
- (4) Elements of *d*-block

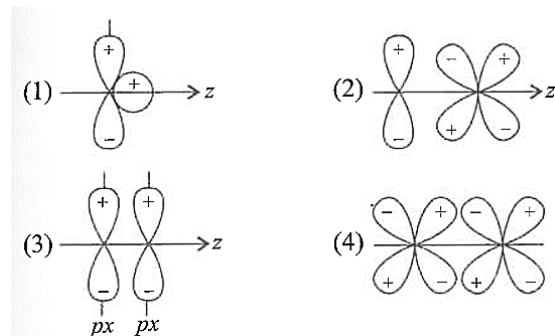
55. Which has maximum ionic mobility in aqueous state?

- (1) $\text{Li}^{\oplus}$
- (2) $\text{Na}^{\oplus}$
- (3) $\text{K}^{\oplus}$
- (4) $\text{Cs}^{\oplus}$

56. Which of the following diatomic molecules would be stabilised by the removal of an electron?

- (1) O_2
- (2) $\text{CN}^{\ominus}$
- (3) N_2
- (4) C_2

57. Which of the following is a positive overlap which leads to bonding?



58. Dipole moment of H_2O is 1.84D. If the bond angle is 105° and $\text{O}-\text{H}$ bond length is $0.94\text{\AA}$, what is the magnitude of charge on the oxygen atom in water molecule?

- (1) $2 \times 10^{-10} \text{esu}$
- (2) $3.28 \times 10^{-10} \text{esu}$
- (3) $3.22 \times 10^{-10} \text{esu}$
- (4) $1.602 \times 10^{-19} \text{C}$

59. In the reaction $2\text{PCl}_5 \rightleftharpoons \text{PCl}_4^{\oplus} + \text{PCl}_6^{\ominus}$, the change in hybridisation is from

- (1) sp^3d to sp^3 and sp^3d^2
- (2) sp^3d to sp^2 and sp^3
- (3) sp^3d to sp^3d^2 and sp^3d^3
- (4) sp^3d^2 to sp^3 and sp^3d

60. Orthonitrophenol is steam volatile but paranitrophenol is not because

- (1) Orthonitrophenol has intramolecular hydrogen bonding while paranitrophenol has intermolecular hydrogen bonding.
- (2) Both ortho and paranitrophenol have intramolecular hydrogen bonding.
- (3) Orthonitrophenol has intermolecular hydrogen bonding and paranitrophenol has intramolecular hydrogen bonding.
- (4) van der Waals forces are dominant in orthonitrophenol.

Section-III (MENTAL ABILITY)

61. The following number series follows a particular pattern. One of the numbers in the given series is wrong. Identify that wrong number.

3 15 63 129 1023 4095

- (a) 15 (b) 63 (c) 129 (d) 4095

Direction(Que. 62) : Read the following passage and answer the question given below:

In the administrative structure of an academic institution, the highest body is the Executive Council (EC). There are Academic Programme Committee (APC), Finance Committee (FC), Planning Division (PD) who have to report to the EC. The Vice Chancellor chairs the APC, FC and PD while the Chancellor chairs the EC. The Schools of Studies (Science / Humanities / Social Science / Commerce / Education / Engineering and Technology) come under the jurisdiction of APC.

62. Which among the following statement is correct in respect of hierarchy?

- (a) EC, APC and PD are at the same level.
(b) APC, PD and FC are at the same level.
(c) EC, APC and FC are at the same level.
(d) APC is above EC which is above FC and PD.

63. An old couple with memory issues had forgotten their anniversary and were trying to recollect the date. The lady clearly remembers that they got married in the month of February of the year 1955. The man clearly remembers that he celebrated his 21st birthday with same year, and it was Thursday, the 3rd of February, as a bachelor. The lady then remembers that they definitely got married before the 13th of February. The man knows it had to be a weekend, since he was working on other days from Monday to Friday. The lady and the man then agree that it was a Sunday. Help them find the date of their wedding which was in the year 1955?

- (a) 5th of February (b) 6th of February
(c) 8th of February (d) 12th of February

64. The objects or words given below form a certain group. Which one of the following does not belong to the group?

Spectacles, Earrings, Bicycle, Shoes, Bangles

- (a) Bicycle (b) shoes (c) Earrings (d) Spectacles

Rough work

65 What is the date today?

Statement:

- (i) We are in the second week of March.
(ii) The date today is an odd number.

- (a) Only statement (i) is sufficient to answer the question.
(b) Only statement (ii) is sufficient to answer the question.
(c) Both statement (i) and statement (ii) are needed to answer the question.
(d) Neither statement (i) nor statement (ii) is sufficient to answer the question.

Directions (Question 66 - 67): In the following questions, the symbols @, \$, #, © and % are used with the following meanings as illustrated below:

P\$Q means 'P' is not smaller than 'Q'.

P©Q means 'P' is neither greater nor equal to Q.

P#Q means 'P' is neither smaller nor equal to Q.

P%Q means 'P' is not greater than Q.

P@Q means 'P' is neither greater nor smaller than Q.

Assuming the given statements to be true, find which of the conclusions given below is definitely true?

66. Statement: T%R, R\$M, M@D, D©H

Conclusions:

I. D %R

II. H#R

III. T©M

IV. T%D

- (a) Only I (b) I and III (c) I and IV (d) III and IV

67. Statement: M@B, B#N, N\$R, R©K

Conclusions:

I. K©R

II. R©B

III. M\$R

IV. N©M

- (a) I and III (b) I, II and III (c) II, III and IV (d) I, III and IV

Direction (Que -68): study the following information and answer the question below

Dr. Ashutosh is available at a clinic from 12 Noon to 4 Pm on Tuesday, Thursday and Sunday.

Dr. Dhanwantri is available at the same clinic from 10 AM to 2 PM on Monday, Thursday, Friday and Sunday.

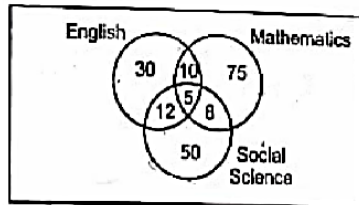
Dr. Shehnaz is available at the same clinic between 9 AM to 12:30 PM on Monday, Wednesday and Thursday, and 2 PM to 4 PM on Friday, Saturday and Sunday.

Rough work

68. At what time duration of a week are all the doctors available at the clinic?

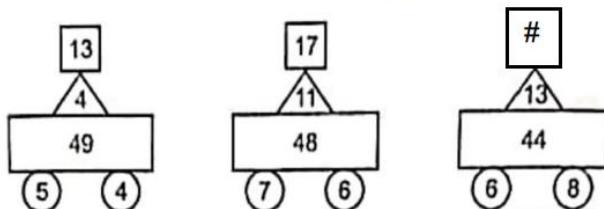
- (a) Sunday for 3 hrs
(b) Thursday for $\frac{1}{2}$ hr
(c) Thursday for 1 hr
(d) Sunday for 1 hr

69. In a certain school, 62% of candidates qualified all the three subjects, namely English, Mathematics and Social Science. The following diagram gives the number of candidates who are not qualified in different subjects. What is the percentage of candidates who are not qualified in at least two subjects?



- (a) 2.63
(b) 6.00
(c) 7.00
(d) 18.42

70. Find the value of # in the figure given below:



- (a) 10
(b) 15
(c) 19
(d) 21

71. In a class 45% students study Mathematics, 55% study Physics, 40% study Chemistry, 30% study Mathematics and Physics, 15% study Physics and Chemistry, 25% study Mathematics and Chemistry and 10% study all three subjects. What percentage do not read any subject?

(a) 10%
(b) 15%
(c) 25%
(d) 20%

Rough work

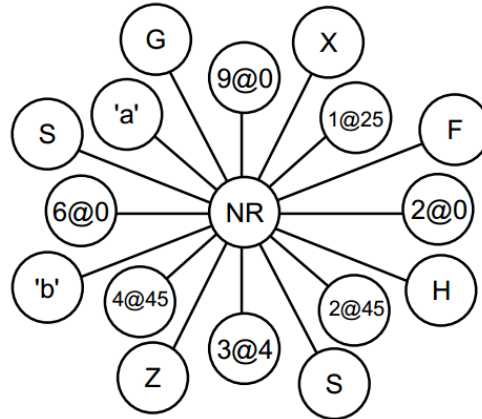
72. Find the missing value of 'a' and 'b'?

(a) 8@3, B

(b) 7@3, G

(c) 7@25, M

(d) 8@25, L



Direction (Q. 73): In an Immunization drive in a hospital, receptionist was asked to allow one male patient when color-code announced is Blue (B), one female patient when color-code announced is Pink(P), two male and three female patients when color-code announced is Green(G). She had been asked to allow exit of one male and two female patients from the doctor's room when announced Red(R). The 1st sequence followed by receptionist is:

[BPGBBGPBRBPBGBGRBGBBGPPrGB]

In the 2nd sequence, she replaced 'Green' at odd position with 'Blue' code and 'Pink' at even position with 'Red' code.

73. How many female patients are still left in the hospital for immunization?

(a) 18

(b) 21

(c) 24

(d) 25

Direction (Que. 74): A clock is so placed that at 12 Noon its minute hand points towards West. The mathematical operators have been placed at the minute hand position at particular time given below:

'<' at fifteen minutes before noon

'=' at ten minutes past two

'>' at half past six

'×' at twenty minutes past seven

'+' at quarter past eight

'-' at nine o'clock

'÷' at five minutes to ten

74. Which is the correct mathematical expression based on above information?

(a) [6N4SW8NE2E9W6NE2SW3E3NE2SW1W5]

(b) [6S4NW8SE2E9W6SE2NW3E3SE2NW1W5]

(c) [6N4SW8NE2W9E6NE2SW3E3NE2SW1E5]

(d) [6S4SW8NW2W9E6NW2E3W3NE2N1E5]

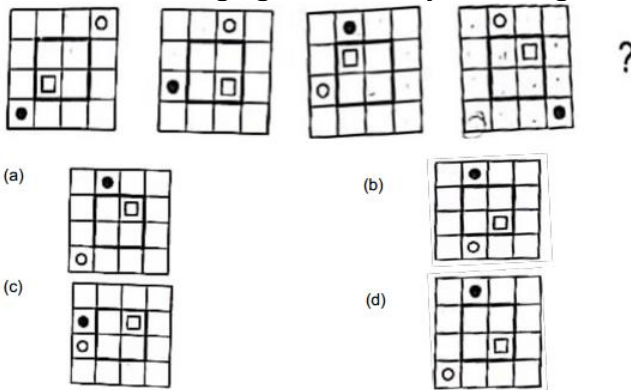
Rough work

75. According to the given matrix if MERCURY is coded as ' 3379288 ' , JUPITER is coded as ' 3359468 ' , then NEPTUNE will be coded as?

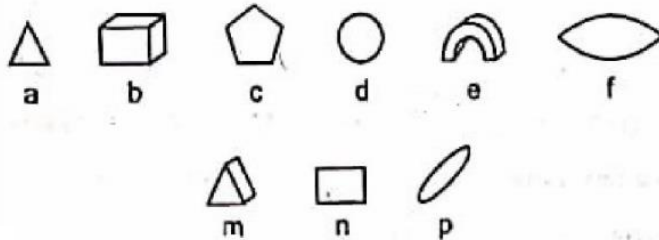
0	1	2	3	4	5	6	7	8
1	Y	U	F	T	D	Q	E	Q
2	R	A	X	W	M	S	J	D
3	P	D	I	Y	N	C	F	J
4	Z	N	U	B	V	P	C	Q
5	U	M	F	E	H	O	K	G
6	M	A	H	T	N	B	I	V
7	C	L	G	K	H	E	B	W
8	R	S	Y	G	X	T	V	L

- (a) 3354336 (b) 3357236 (c) 3554668 (d) 3594688

76. Complete the following figure series by choosing the correct answer form the given alternatives.



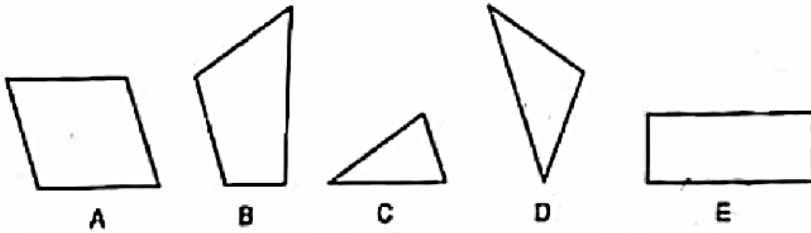
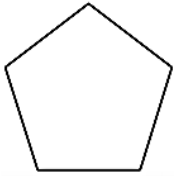
77. Nine figures are given below. Identify the correct group of classification.



- (a) a, d, m; b, e, n; c, f, p (b) a, b, m; c, d, n; e, f, p
(c) a, d, f; b, e, p; c, m, n (d) a, c, n; b, e, m; d, f, p

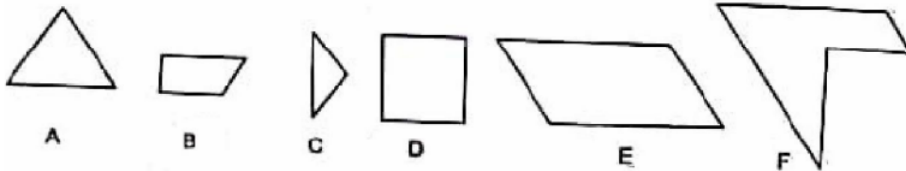
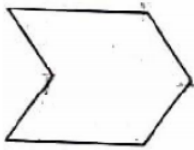
Rough work

78. A pentagonal figure is given below. Identify which two of the pieces among A, B, C, D and E given below will NOT be required to complete the pentagonal figure.



- (a) Both A and C (b) Both B and D (c) Both A and D (d) Both B and E

79. A hexagonal figure is given below. Identify which among the pieces A, B, C, D, E and F given below will NOT be required to complete the hexagonal figure.



- (a) B (b) D (c) E (d) F

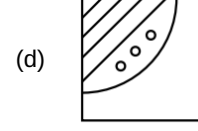
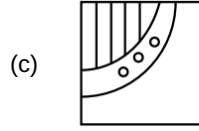
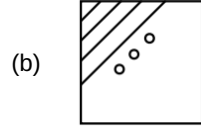
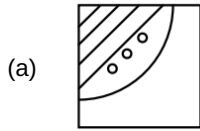
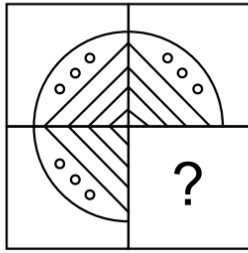
80. The number are arranged in a certain pattern. The values of a, b and c respectively in the pattern are

		6	17	19	11	4		
	7	a	14	24	10	5	9	
1	6	8	13	34	b	9	7	3
	5	2	13	21	15	2	5	
		5	16	20	12	c		

- (a) 4, 16, 5 (b) 3, 16, 7 (c) 3, 15, 5 (d) 2, 18, 7

Rough work

81. Which figure takes the place of ' ? ' ?

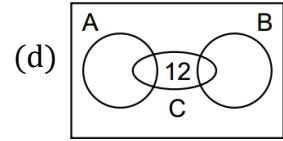
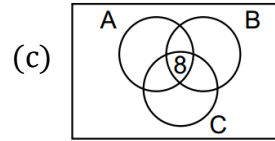
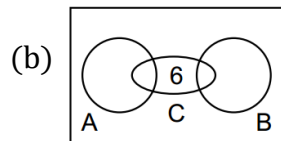
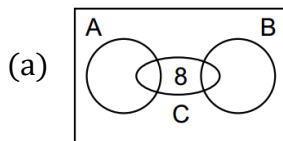


82. If 7th day of the month is 4 days after Friday, what day will it be on the thirty-first day of the month?

- (a) Tuesday (b) Thursday (c) Friday (d) Sunday

83. Details of a survey conducted among 200 students of a school on a particular day is as follows:

40% of the students came by bicycle, 50% of the students came by walk and the remaining came by bus. 30% of the students who came by bicycle and 40% of the students who came by walk play cricket. 40% of the students who come by bus do not play cricket. If we represent students who came by walk as A, students who came by bicycle by B and students who play cricket by C, then choose the diagram which shows the survey result.



84. In 2020, January 3rd is Friday. Then what will be the day of January 3rd in 2021?

- (a) Friday (b) Saturday (c) Sunday (d) Tuesday

Rough work

Direction (Question 85):

Study the following information carefully and answer the following question.

A word arrangement machine, when given an input line of words, rearranges them following a particular rule in each step. The following is an illustration of input and the steps of rearrangement.

Input → Ability, Logical, Reasoning, Competence, Success, Hardwork

Step I → Competence, Reasoning, Hardwork, Logical, Success, Ability

Step II → Ability, competence, Hardwork, Logical, Reasoning, Success

Step III → Logical, Competence, Reasoning, Hardwork, Success, Ability

Step IV → Hardwork, Ability, Reasoning, competence, Logical, Success

85. Which of the following will be Step VI for the input?

- (a) Logical, Success, Ability, Reasoning, Competence, Hardwork
- (b) Reasoning, Success, Logical, Ability, Competence, Hardwork
- (c) Logical, Reasoning, Competence, Hardwork, Success, Ability
- (d) Reasoning, Logical, Competence, Hardwork, Success, Ability

Direction (Q. 86)

I. $\triangle$, $\circ$, $\square$, $\otimes$ and $\cup$ are cousins

II. $\triangle$ is twice as old as $\circ$

III. $\square$ is half the age of $\circ$

IV. $\triangle$ is half the age of $\cup$

V. $\square$ is twice the age of $\otimes$

86. Who all are younger to $\circ$.

(a) $\square$, $\otimes$

(b) $\cup$, $\triangle$

(c) $\square$, $\circ$

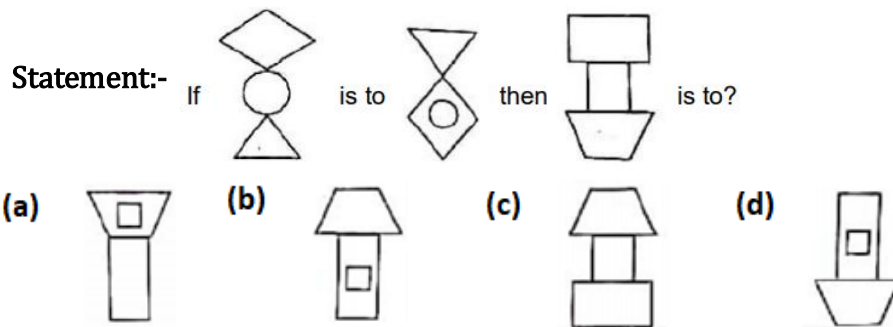
(b) $\cup$, $\otimes$

Rough work

87. What are the numbers of blocks to be crossed for covering the shortest path from 'A' to 'B'? One cannot move diagonally and on a block with the number '2'.

A	1	2	1			2	2	2	2
2	1	1	2			3	3	1	2
1	3	2	1			1	2	3	2
1	2	1	1			1	2	3	2
3	2	1	3	1	3	2	3	1	
1	2	2	1			2	2	2	1
1	1	2	3			3	1	3	1
2	3	2	1			1	2	2	2
1	1	3	1			3	3	1	B

- (a) 15 (b) 19 (c) 27 (d) 37
88. Which figure completes the statement?

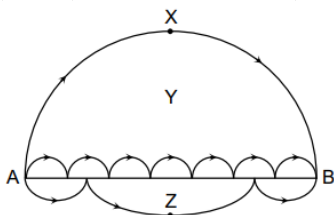


Direction for (Q-89) Study the following information and answer the given questions.

- I. B and E are good at Fine Arts and Social Science.
 II. A and B are good at Social Sciences and Chemistry.
 III. A, D and C are good at Chemistry and Biology.
 IV. C and A are good at Chemistry and Physics.
 V. D and E are good at Biology and Fine Arts

89. Who is good in Social Sciences, Biology and Fine Arts?
 (a) A (b) B (c) D (d) E

Rough work

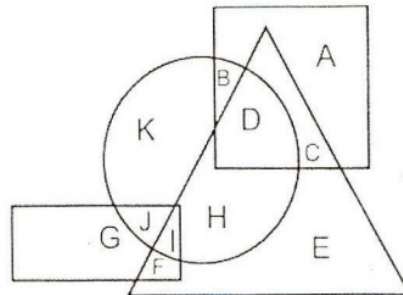
90. A solid cube of 4 cm side, painted on all its faces, is cut up into small cubes of 1 cm side. What is the ratio of the cubes without paint to the cubes with paint on exactly two faces?
 (a) 1. 1 : 2 (b) 2. 1 : 3
 (c) 3. 2 : 3 (d) 4. 3 : 2
91. If $2833 \rightarrow 213281$ and $14122 \rightarrow 122241$, then $3858 \rightarrow ?$
 (a) 305080 (b) 315182 (c) 325283 (d) 335588
92. A is a number of the type 1223334444.... What will be the 198th digit from left?
 (a) 1 (b) 5 (c) 6 (d) 8
93. If $6 \rightarrow 4$, $12 \rightarrow 6$, $18 \rightarrow 6$, $24 \rightarrow 8$, $30 \rightarrow 8$ and $36 \rightarrow 9$, then $42 \rightarrow ?$
 (a) 5 (b) 6 (c) 8 (d) 9
94. There are three paths from A to B each consists of one or more semi-circles of unknown radii. The paths AXB, AYB, AZB are called I, II and III respectively. Which of the following is true?
- 
- (a) The longest path is I
 (b) The longest path is II
 (c) The smallest path is III
 (d) Path III is mean of the paths I and II (as per the distance)
95. Complete the series:
 D3Y104, G9U91, J27Q78, M81M65
 (a) P243I39 (b) Q243I52 (c) P243I52 (d) Q162J39

Directions (Questions 96-97): There are eight people A, B, C, D, E, F, G and H sitting around a circular table facing centre. B is sitting second to the left of G who is sitting third to the right of F. Only E is sitting between A and C. C is sitting third to the left of B. Only one person is sitting between E and H.

96. Which of the following is correct?
 (a) D is sitting third to the left of H (b) F is sitting third to the left of G
 (c) C is sitting third to the left of D (d) H is sitting second to the right of C

Rough work

97. Which of the following is the correct order of sitting of persons right of A?
 (a) E C H D G B F (b) E C H F B D G
 (c) E B H D C F G (d) C H B E D G F
98. In the question given below, there are three statements followed by three conclusions numbers I, II and III. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions, and then decide which of the given conclusions (s) logically follows from the given statements disregarding commonly known facts.
 Statements: All teachers are professors.
 No professor is male.
 Some males are designers.
 Conclusions: I. No designer is professor.
 II. Some designers are professors.
 III. No male is teacher.
 (a) Only III follows (b) Both I and II follows
 (c) Either I or II follows (d) Either I and III follows; or II and III follows
99. In the following figures, square represents professors, circle represents males, triangle represents cricketers and rectangle represents trainers.



- On the basis of information given in the above diagram, which of the following is correct?
 (a) C represents male professors who are cricketers too
 (b) I represents male trainers who play cricket
 (c) B represents male professors who are trainers
 (d) F represents male trainers who are not cricketers

Rough work

Direction (Ques - 100) : Five periods of Hindi, English, Science, Mathematics and Sanskrit are to be taken by five different teachers A, B, C, D and E in five different periods 1,2,3,4 and 5 . Each teacher will teach only one subject and takes only one period. Science is not the 3rd period. 5th period is taken by D who does not teach Hindi or Sanskrit. A takes 3rd period. The one who teaches Sanskrit takes 4th period. There are two periods after and two periods before Mathematics period. Hindi period is between Science and Mathematics period. B teaches Science. E takes period just before D's period.

After reading the above information, answer the following questions.

100. Which of the following is the correct sequence of subject period teacher?
- (a) Mathematics – 3 – D (b) Sanskrit – 4 – E
(c) Mathematics – 2 – A (d) Hindi – 2 – E

Rough work

Rough work



RESULTS PRIZE DISTRIBUTION DETAILS

ANSWER KEY
AVAILABLE

25-28
OCT.2023

RESULT DECLARATION
TOP 10

01
NOV.2023

PRIZE DISTRIBUTION
FUNCTION

05
NOV.2023

RESULT DECLARATION
OF ALL PARTICIPANTS

18
NOV.2023

Aspire is registered with Govt. Scholarship Program



मेधा प्रोत्साहन योजना



स्वर्ण जयंती

Super 100



ASPIRE
IIT & MEDICAL
AN INITIATIVE BY IIT'ANS

ASPIRE SHIMLA

94184-11117
98823-72779

ASPIRE UNA

93172-68601
93172-68603

ASPIRE HAMIRPUR

62302 31676
80913 13676