

## TARGET IIT JEE-PMT CLASSES ${ }^{\text {TM }}$

(NTTSE) National Target Talent Search Examination

## (FOR CLASS IX STUDENT)

Time: 2:15 Hrs INSTRUCTIONS FOR THE CANDIDATES
M.M: 540

| Parts | Section | Subject | No. of <br> Questions | Mark per <br> Question | Negative <br> Marking | Total Marks |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| PART - I | A | Physics | 15 | 4 | $-1 / 4^{\text {th }}$ | 60 |  |  |  |  |  |
|  | B | Chemistry | 15 | 4 | $-1 / 4^{\text {th }}$ | 60 |  |  |  |  |  |
|  | C | Biology | 15 | 4 | $-1 / 4^{\text {th }}$ | 60 |  |  |  |  |  |
|  | D | Mathematics | 45 | 4 | $-1 / 4^{\text {th }}$ | 180 |  |  |  |  |  |
| PART - II | E | Mental Ability | 25 | 4 | $-1 / 4^{\text {th }}$ | 100 |  |  |  |  |  |
|  | F | Reasoning | 20 | 4 | $-1 / 4^{\text {th }}$ | 80 |  |  |  |  |  |
| Total |  |  |  |  |  |  |  | 135 |  |  | 540 |

* Read each question carefully.
* Do not use white - fluid or any other rubbing material on sheet. No change in the answer once marked.
* Student can not use log tables and calculators or any other electronic material in the examination hall.
* Rough work is to be done on the rough sheet provided for this purpose with the booklet
* Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.
- Marking Scheme:
a. If darkened bubble is RIGHT answer: 4 Marks.
b. If no bubble is darkened in any question: No Mark.
c. If darkened bubble is WRONG answer: $\mathbf{- 1 / 4}$ Marks (Minus)
* If you are found involved in cheating or disturbing others then your OMR Sheet will be cancelled.
* Do not put any stain on OMR Sheet and hand it over back properly to the invigilator.


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## PART I SECTION -A: PHYSICS

This section contains 15 Multiple Choice Questions. Each question has four choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

1. According to Kelper`s law the relationship between $T$ (time period of revolution of a planet) and $r$ (the semimajor axis of ellipse) is
(a) $T^{2} \propto r$
(b) $T^{2} \propto r 2$
(c) $T^{2} \propto r^{-3}$
(d) $T \infty r^{3 / 2}$
2. The value of $g$ is zero
(a) At the top of the atmosphere
(b) At 20 km below the surface of the earth
(c) At 20 km above the surface of the earth
(d) At the centre of the earth
3. The speed-time graph for the motion of a motorcycle is shown here. What is the average speed over 12 s interval?

(a) $4.38 \mathrm{~m} \mathrm{~s}^{-1}$
(b) $5.58 \mathrm{~m} \mathrm{~s}^{-1}$
(c) $1.75 \mathrm{~m} \mathrm{~s}^{-1}$
(d) $3.17 \mathrm{~m} \mathrm{~s}^{-1}$

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4. A block accelerates down a slope, as shown in the figure. The upper portion of the slope is smooth and lower portion is rough. On the lower portion,

(i) The speed of the block may increase, decrease or remain same.
(ii) The acceleration of block reduces.
(iii) The mass of block reduces.

Which of the following is/are correct?
(a) (i) only
(b) (i) and (ii) only
(c) (ii) and (iii) only
(d) (i), (ii) and (iii)
5. At a certain place, value of $g$ is $1 \%$ less than its value on the surface of Earth. If the radius of Earth is given to be 6400 km , then the place is $\qquad$ .
(a) 64 km below the surface of the Earth
(b) 64 km above the surface of the Earth
(c) 30 km above the surface of the Earth.
(d) 32 km below the surface of the Earth.

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6. A body falling from rest describes distances $S_{1}, S_{2}$ and $S_{3}$ in the first, second and third seconds of its fall. Then the ration of $S_{1}: S_{2}: S_{3}$ is :
(a) $1: 1: 1$
(b) $1: 3: 5$
(c) $1: 2: 3$
(d) $1: 4: 9$
7. A body is dropped from a 100 m high cliff and at the same time another body is thrown from the ground with 2 : $\mathrm{m} / \mathrm{s}$ velocity in upward direction. Where the two will meet?
(a) 50 m
(b) 40 m
(c) 20 m
(d) 10 m
8. According to Newton`s Second law of Motion
(a) $f=m \times v$
(b) $\mathrm{F}=\mathrm{mxa}$
(c) $f=\frac{m}{a}$
(d) $f=\frac{m}{v}$
9. Two planets ' $A$ ' and ' $B$ ' of same mass and same radius are shown in the figure. $p_{1}$ and $p_{2}$ are densities of the materials in the planets and $\mathrm{p}_{1}>\mathrm{p}_{2}$. If the accelerations due to gravity on the surfaces of the planets A and B are $g_{A}$ and $g_{B}$ respectively, then


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(a) Given information is not sufficient
(b) $\mathrm{g}_{\mathrm{A}}<\mathrm{g}_{\mathrm{B}}$
(c) $g_{A}>g_{B}$
(d) $g_{A}=g_{B}$
10. Match the column I with column II and select the correct option from the given codes.

## Column-I

(a) A child running to catch The school bus
(b) A man blowing a balloon
(c) A woman pushing a table
(d) A cricketer catching a ball
(a) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
(b) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)
(c) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)
(d) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
11. If the distance between earth and sun increases by $125 \%$ of its present value suddenly, then the duration of one year will be
(a) 365 days
(b) $\frac{25}{16} \times 365$ days
(c) $\frac{27}{8} \times 365$ days
(d) $\frac{9}{6} \times 365$ days

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12. The displacement (s) and time (t) graphs for two moving objects $A$ and $B$ are straight lines inclined at $30^{\circ}$ with the time axis and $30^{\circ}$ with the displacement axis respectively. Then what would be their velocity ratio $\left(v_{A} / v_{B}\right) ?$
(a) $\frac{1}{3}$
(b) $\frac{1}{2}$
(c) $\frac{1}{4}$

(d) 2
13. Pick the fundamental la of motion.
(a) Newton`s first law of motion. (b) Newton's second law of motion (c) Newton`s third law of motion
(d) All laws of motion
14. A planet had density $p$, radius $R$ and acceleration due to gravity as $g$. If the radius of the planet were doubled, keeping the density same, the acceleration due to gravity at the surface will be
(a) 4 g
(b) 2 g
(c) G
(d) $g / 2$

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15. a car accelerates from rest at a constant rate $\alpha$ for some time, after which it decelerates at a constant rate $\beta$ anc comes to rest. If total time elapsed is $t$, then maximum velocity acquired by car will be
(a) $\frac{\left(\alpha^{2}-\beta^{2}\right) t}{\alpha \beta}$
(b) $\frac{\alpha \beta t}{\alpha+\beta}$
(c) $\frac{\left(\alpha^{2}+\beta^{2}\right) t^{2}}{\alpha \beta}$
(d) $\frac{\left(\alpha^{2}+\beta^{2}\right) t}{\alpha \beta}$

## SECTION -B: CHEMISTRY

This section contains 15 Multiple Choice Questions. Each question has four choices (a), (b), (c) and (d) out of which ONLY ONE is correct.
16. What type of a process is evaporation?
(a) Exothermic
(b) Endothermic
(c) Photochemical
(d) Biochemical
17. The density of water is maximum at
(a) $0^{0} \mathrm{C}$
(b) 277 K
(c) $100^{0} \mathrm{C}$
(d) 283 K
18. If we add common salt in water then its freezing point
(a) Increase
(b) Decreases
(c) Remains constant
(d) Can't be determined
19. Which one of the following is correctly matched?
(a) Emulsion - curd
(b) Foam - mist
(c) Aerosol - smoke
(d) Solid sol - cake
20. While using the given apparatus, what must be kept in mind?

(a) The mixture in the distillation flask must contain a solid.
(b) The temperature difference between the boiling points of components of the mixture must be less than $25^{\circ} \mathrm{C}$
(c) The temperature difference between the boiling points of components of the mixture must be more than $25^{0} \mathrm{C}$.
(d) All of these.
21. Which method cannot be used for purification of liquids?
(a) Chromatography
(b) Distillation
(c) Sublimation
(d) Fractional distillation
22. All samples of carbon dioxide contain carbon and oxygen in the mass ratio $3: 8$. This is in agreement with the law of
(a) Conservation of mass
(b) Constant proportions
(c) Multiple proportions
(d) Gaseous volumes.

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23. Chemical formula of ferric oxide is
(a) FeO
(b) $\mathrm{Fe}_{2} \mathrm{O}_{3}$
(c) $\mathrm{Fe}_{3} \mathrm{O}_{4}$
(d) None of these
24. Number of moles of water present in 180 g of water will be
(a) 5
(b) 10
(c) 15
(d) 18
25. "All mater is made up of very small particles which cannot be further broken down. These particles are called atoms". This statement is one of the assumptions of
(a) Rutherford`s nuclear theory (b) Bohr`s theory
(c) Dalton`s atomic theory
(d) Kinetic theory of gases.
26. Weight of $6.022 \times 10^{20}$ atoms of silver (at. Mass 108 u ) is
(a) $108 \times 10^{3} \mathrm{~g}$
(b) 108 g
(c) 0.108 g
(d) 10.8 g
27. A mixture of sulphur and carbon disulphide is
(a) Heterogeneous and shows Tyndall effect
(b) Heterogeneous and does not shows Tyndall effect
(c) Homogenous and shows Tyndall effect
(d) Homogeneous and does not show Tyndall effect.
28. Match the column I with column II and select the correct option from the given codes.

## Column I

P. Foam
Q. Aerosol
R. Gel
S. Emulsion
T. Sol

P $\quad \mathbf{Q} \quad \mathbf{R}$
(a) (ii) (iv)
(i)
(iii)
(v)
(b)
(ii)
(iv)
(iii)
(c)
(iii) (ii)
(iv)
(v)
(i)
(d)
(iv) (v)
(i) (ii)
(iii)
29. The substance which is known as "dry ice" is
(a) Potassium permanganate
(b) Copper sulphate
(c) Sulphur dioxide
(d) Solid carbon dioxide.

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30. Given figure shows the effects of pressure and temperature on the changes among three states of matter.


Select the correct statements.
I. Change 1 is carried out under high temperature and low pressure.
II. Change 4 is carried out under low temperature and high pressure.
III. Change 2 is carried out under low temperature and high pressure.
IV. Change 3 i carried out under low temperature and high pressure.
(a) II and III
(b) I and II
(c) I, II and IV
(d) I, II and III

## SECTION - C : BIOLOGY

This section contains 15 Multiple Choice Questions. Each question has four choices (a), (b), (c) and (d) out of which ONLY ONE is correct.
31. Cell theory was proposed by
(a) Robert Hooke
(b) Beadle and Tatum
(c) Schleiden and Schwann
(d) Hargovind Khorana.
32. Besides nucleus, DNA is also present in
(a) Ribosomes
(b) Mitochondria
(c) Lysosomes
(d) Golgi complex.
33. A mature plant cell has
(a) Protoplasm and vacuole
(b) Vacuole and cell wall
(c) Cell wall and protoplasm
(d) Protoplasm, cell wall and vacuole.
34. Find out the false statement.
(a) Nucleus, plastids and mitochondria contain DNA and hence are able to make their own structural proteins.
(b) Mitochondria are said to be the 'power house' of the cell.
(c) Lysosomes are chlorophyll containing bags surrounded by a single unit membrane.
(d) Ribosome are also called Palade particles and are the 'protein factories' of the cell.
35. Main difference between animal cell and plant cell is
(a) Nutrition
(b) Growth
(c) Movement
(d) Respiration.
36. Tracheids, vessels, wood fibres, and parenchymatous tissues are found in
(a) Xylem
(b) Cambium
(c) Cortex
(d) Phloem
37. Which is not a tissue?
(a) Xylem
(b) Phloem
(c) Collagen
(d) Cambium
38. A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years the nail will.
(a) Move downwards
(b) Move upwards
(c) Remain at the same position
(d) Move sideways.

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39. "Lock jaw' is another name of
(a) Malaria
(b) Kala-azar
(c) Tetanus
(d) Diphtheria.
40. The antibodies are
(a) Proteins
(b) Carbohydrates
(c) Lipids
(d) Germs.
41. Match the disease in column I with the appropriate items (pathogen / prevention / treatment) in column II

## Column I

(A) Amoebiasis
(B) Diphtheria
(C) Cholera
(D) Syphilis

## Column II

(i) Treponema pallidum
(ii) Use only sterilized food and water
(iii) DPT vaccine
(iv) Use oral rehydration therapy
(a) A - (i), B - (iii), C - (ii), D - (iv)
(b) $\mathrm{A}-$ (ii), B - (iii), C - (iv), D - (i)
(c) $\mathrm{A}-$ (i), B - (ii), C - (iii), D - (iv)
(d) A - (ii), B - (iv), C - (i), D - (iii)

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42. In this disease, caused due to protein deficiency face and limbs are swollen
(a) Kwashiorkor
(b) Marasmus
(c) Rickets
(d) Pellagra.
43. Refer to the diagrammatic representations of parts of two different tissues, $X$ and $Y$.


Now, read the following statements and select the correct ones regarding these tissues.
(i) X is an animal tissue whereas Y is a plant tissue.
(ii) X is the major water conducting tissue in vascular plants and gives mechanical strength to plant body.
(iii) X is composed of all dead cells whereas Y is composed of all living cells.
(iv) X conducts water in vascular plants in downward direction.
(v) In animals, $\gamma$ helps in conduction of nerve impulses from various organs to brain and spinal cord and vice versa.
(a) (i) and (ii) only
(b) (iv) only
(c) (v) only
(d) (iii), (iv) and (v) only

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44. $\qquad$ smoothens bone surface at joints and is also present in the nose, ear, trachea and latynx.
(a) Tendons
(b) Ligament
(c) Areolar tissues
(d) Cartilage
45. Which disease is spread through influenza virus $\mathrm{H}_{1} \mathrm{~N}_{1}$ ?
(a) Dengue
(b) Chikungunya
(c) AIDS
(d) Swine flu

## SECTION - D : MATHEMATICS

This section contains 45 Multiple Choice Questions. Each question has four choices (a), (b), (c) and (d) out of which ONLY ONE is correct.
46. AB is parallel to CD , EF intersects them at M and N . The bisectors of M and B meet at Q . If $\mathrm{AME}=80^{\circ}$, then MQN is :
(a) $90^{\circ}$
(b) $70^{0}$
(c) $80^{0}$
(d) $60^{0}$

47. If $y=a+\frac{b}{x}$ where " a " and " b " are constants and if $\mathrm{y}=1$ when $\mathrm{x}=-1$, and $\mathrm{y}=5$; when $\mathrm{x}=-5$, then $\mathrm{a}+\mathrm{b}$ equals:
(a) -1
(b) 0
(c) 1
(d) 11
48. A rectangle of length "a" and breadth "b" is resolved $360^{\circ}$ about its length. The volume of the resulting cylindes is :
(a) $2 \pi a b^{2}$
(b) $\pi a^{2} b$
(c) $\pi a b$
(d) $2 \pi a b$
49. Arithmetic mean of " $n$ " observations is m . if two observations O and m are added, then the new mean will be:
(a) m
(b) $\frac{m}{n+1}$
(c) $\frac{m n}{n+1}$
(d) $\frac{m(n+1)}{n+2}$
50. What is the probability that there are 53 Sundays in a leap year?
(a) $\frac{1}{6}$
(b) $\frac{2}{7}$
(c) $\frac{3}{8}$
(d) $\frac{4}{9}$
51. The remainder when $x^{4}-3 x^{3}+2 x^{2}$ is divided by $x$ is :
(a) $x^{3}-3 x^{2}+2 x$
(b) $2 x^{2}-3 x^{3}$
(c) 1
(d) 0
52. If $\frac{x y}{x+y}=a, \frac{x z}{x+z}=\operatorname{band} \frac{y z}{y+z}=c$, where $\mathrm{a}, \mathrm{b}$, and c are other than zero, than x equals:
(a) $\frac{a b c}{a b+b c+c a}$
(b) $\frac{2 a b c}{a b+b c+c a}$
(c) $\frac{2 a b c}{a b+a c-b c}$
(d) $\frac{2 a b c}{b c+c a-a b}$
53. $X, Y, Z, U$ are four points in a straight line. If distance from $X$ to $Y I 15, Y$ to $Z$ is $5, Z$ to $U$ is 8 and $X$ to $U$ is 2 , then the correct sequence of the points will be:
(a) $\mathrm{X}-\mathrm{Y}-\mathrm{Z}-\mathrm{U}$
(b) $\mathrm{X}-\mathrm{Z}-\mathrm{Y}-\mathrm{U}$
(c) $\mathrm{X}-\mathrm{U}-\mathrm{Z}-\mathrm{Y}$
(d) $\mathrm{X}-\mathrm{Z}-\mathrm{U}-\mathrm{Y}$
54. If $A B C$ is a triangle and $D, E$ and $F$ are respectively mid-points of $A B, B C$ and $C A$, then the triangle $A B C$ is:
(a) Similar to $\triangle$ DEF but not $\triangle \mathrm{DBE}$
(b) Similar to $\triangle$ DEF but not $\triangle$ ECF
(c) Similar to the triangle DBE, ECF, ADF and DEF
(d) Not similar to any of the triangles DBE, ECF, ADF and DEF
55. If the figure given below, if $\angle \mathrm{AOP}=75^{\circ}$ and $\angle \mathrm{AOB}=120^{\circ}$, then what is $\angle \mathrm{AQP}$ ?

(a) $45^{0}$
(b) $37.5^{0}$
(c) $30^{0}$
(d) $22.5^{0}$
56. If the volume of two cubes are in the ratio $27: 1$, the ratio of their edges is :
(a) $3: 1$
(b) $27: 1$
(c) $1: 3$
(d) $1: 27$
57. A man ha certain number of chickens and goats. Their head count is 30 . If the total number of their legs is 84 , what is the ratio between the number of chickens and goats?
(a) $1: 2$
(b) $2: 3$
(c) $3: 2$
(d) $3: 4$

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58. If $(x-2)$ is common factor of $x^{3}-4 x^{2}+a x+b$ and $x^{3}-a x^{2}+b x+8$, then the values of $a$ and $b$ are respectively
(a) 3 and 5
(b) 2 and -4
(c) 4 and 0
(d) 0 and 4
59. The sides of a triangle are 5 cm .12 cm and 13 cm , then its area is:
(a) $0.0024 \mathrm{~m}^{2}$
(b) $0.0026 \mathrm{~m}^{2}$
(c) $0.003 \mathrm{~m}^{2}$
(d) $0.0015 \mathrm{~m}^{2}$
60. In fig. $\angle \mathrm{ABP}=\angle \mathrm{ACQ}, \angle \mathrm{BAC}=68^{\circ}$ measure of $\angle \mathrm{ABC}$ is:

(a) $124^{0}$
(b) $56^{\circ}$
(c) $60^{0}$
(d) $52^{0}$
61. The area of the triangle formed between lines $x=0, y=0$ and $2 x-3 y+6=0$ is :
(a) 3 Sq. units
(b) 4 Sq. units
(c) 2 Sq. units
(d) 5 Sq. units

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62. If $37 \mathrm{a}=37 \mathrm{~b}=5661$, what is the average of and b ?
(a) 74.5
(b) 151
(c) 76.5
(d) 153
63. A rectangle and a parallelogram have equal areas. The base of the palarrelogram is 20 cm and the altitude is 6 cm . Which one of the following cannot be the ratio of dimensions of the rectangle? (The dimensions are of integral values.
(a) $6: 5$
(b) $4: 3$
(c) $15: 2$
(d) $30: 1$
64. $\mathrm{P}=5+2 \sqrt{6}$ and $q=\frac{1}{p}$ then, $\mathrm{p}^{2}+\mathrm{q}^{2}$ is :
(a) 49
(b) 98
(c) 100
(d) None of these
65. Straight line passing through the points $(-1,1),(0,0)$ and $(1,-1)$ has equation:
(a) $y=x$
(b) $x+y=0$
(c) $y=2 x$
(d) $2+3 y=7 x$
66. If the co-ordinates of the point p are $(3,-5)$, the the perpendicular distance of p from the y -axis with proper ' + ' or '-' sign prefixed is :
(a) -5
(b) 5
(c) 3
(d) -3
67. Consider the following statements relating to the congruency of two right - angled triangles.
I. Equality of sides of one triangle with some two sides of the second makes the triangles congruent.
II. Equality of the hypotenuse and a side of one triangle with the hypotenuse and a side of the second respectively makes the triangles congruent.
III. Equality of the hypotenuse and an acute angle of one triangle with the hypotenuse and an angle of the second respectively makes the triangles congruent.

Which of the above statements are true?
(a) I, II and III
(b) I and II only
(c) I and III only
(d) II and III only
68. If $\sqrt{6}=2.449$, then the value of $\frac{3 \sqrt{2}}{2 \sqrt{3}}$ is close to:
(a) 1.225
(b) 0.816
(c) 0.613
(d) 2.449
69. For the equation $\frac{1+x}{1-x}=\frac{N+1}{N}$ to be true, where ' N ' is positive, ' x ' can have:
(a) Any positive value less than 1
(b) Any value less than 1
(c) Any non-negative value
(d) Any value
70. If CE is parallel to $D B$ in the given figure, then the value of ' $x$ ' will be:

(a) $30^{0}$
(b) $45^{0}$
(c) $75^{0}$
(d) $85^{0}$
71. The polygon(s) formed by $y=3 x+2, y=-3 x+2$ and $y=-2$ is/are:
(a) An equilateral triangle
(b) An isosceles triangle
(c) A right angled triangle
(d) A triangle and a trapezoid
72. The bottom, side and front areas of a rectangular box are known. The product of these areas is equal to:
(a) The volume of the box
(b) The square root of the volume
(c) Twice the volume
(d) The square of the volume
73. ABCD is a parallelogram. ' P ' is a point on AD such that $\mathrm{AP}=\frac{1}{3} A D$ and ' Q ' is a point on BC such that $\mathrm{CQ}=$ $\frac{1}{3} \mathrm{BC}$. Then AQCP is a :
(a) Parallelogram
(b) Rhombus
(c) Rectangle

(d) Square
74. Two parallel chords of a circle whose diameter is 13 cm are respectively, 5 cm and 12 cm in length. If both the chords lie in a semi-circle, then the distance between the chords is:
(a) 8.5 cm
(b) 5 cm
(c) 3.5 cm
(d) 3 cm
75. The degree measure of each of the three angles of a triangle is an integer. Which of the following could not be the ratio of their measures?
(a) $2: 3: 4$
(b) $3: 4: 5$
(c) $5: 6: 7$
(d) $6: 7: 8$
76. Two adjacent side of a parallelogram are 51 cm and 37 cm . One of its diagonals is 20 cm , then its area is:
(a) $412 \mathrm{~cm}^{2}$
(b) $512 \mathrm{~cm}^{2}$
(c) $612 \mathrm{~cm}^{2}$
(d) $712 \mathrm{~cm}^{2}$
77. If the radius of a circle is a rational number, then its area is given by a number which is :
(a) Rational
(b) Irrational
(c) Integral
(d) A perfect square
78. If $\left(a+\frac{1}{a}\right)^{2}=3$, then $a^{3}+\frac{1}{a^{3}}$ equals:
(a) $\frac{10 \sqrt{3}}{3}$
(b) $3 \sqrt{3}$
(c) 0
(d) $6 \sqrt{3}$
79. The solution set of the system of equations $\frac{4}{x}+5 y=7, \frac{3}{x}+4 y=5$ is:
(a) $\left(\frac{1}{3},-1\right)$
(b) $\left(\frac{-1}{3}, 1\right)$
(c) $\left(\frac{-1}{3},-1\right)$
(d) $\left(\frac{1}{3}, 1\right)$
80. If the arms of one agle are respectively parallel to the arms of another angle, then the two angles are:
(a) Neither equal nor supplementary
(b) Not equal but supplementary
(c) Equal but not supplementary
(d) Either equal or supplementary

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81. $A B C D$ is a parallelogram of area ' $S$ '. $E$ and $F$ are the mid-points of the sides $A D$ and $B C$ respectively. If $G$ is any point on the line $E F$, then the area of $\Delta A G B$ is equal to:
(a) $\frac{S}{2}$
(b) $\frac{S}{3}$
(c) $\frac{S}{4}$
(d) $\frac{3 S}{4}$
82. Mid-points of the sides AB and AC of a $\Delta \mathrm{ABC}$ are $(3,5)$ and $(-3,-3)$ respectively, then the length of the side BC is:
(a) 10 units
(b) 15 units
(c) 20 units
(d) 30 units
83. Given a circle and a quadrilateral ABCD inscribed in it as shown. If $\angle \mathrm{B}=125^{\circ}$, then $\angle \mathrm{E}$ equal to :

(a) $55^{\circ}$
(b) $125^{0}$
(c) $130^{\circ}$
(d) $62.5^{0}$

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84. A right circular cone has for its base a circle having the same radius as a given sphere. The volume of the cone is one-half that of the sphere. The ratio of the altitude of the cone to the radius of its base is:
(a) $\frac{1}{1}$
(b) $\frac{1}{2}$
(c) $\frac{2}{1}$
(d) $\frac{2}{3}$
85. In the figure given below, if $S<50^{\circ}<\mathrm{t}$, then:

(a) $\mathrm{t}<80^{\circ}$
(b) $\mathrm{s}+\mathrm{t}<130^{\circ}$
(c) $50^{\circ}<\mathrm{t}<80^{\circ}$
(d) $t>80^{\circ}$
86. If $A B C$ is a triangle right angled at $B$ and $M, N$ are the mid-points of $A B$ and $B C$, then $4\left(A N^{2}+C M^{2}\right)$ is equal to:
(a) $4 \mathrm{AC}^{2}$
(b) $5 \mathrm{AC}^{2}$
(c) $\frac{5}{4} \mathrm{AC}^{2}$

(d) $6 \mathrm{AC}^{2}$
87. In the given figure, ' O ' is the centre of circle and $\mathrm{AB}=\mathrm{BC}$ and $\angle \mathrm{AOB}=90^{\circ}$ then $\angle \alpha$ is:

(a) $30^{0}$
(b) $45^{0}$
(c) $60^{0}$
(d) None of these
88. Which of the following four numbers is/are rational?
I. $\sqrt{\pi^{2}}$
II. $\sqrt[3]{0.8}$
III. $\sqrt[4]{0.00016}$
IV. $\sqrt[3]{-1} \cdot \sqrt{(0.09)^{-1}}$
(a) I and IV
(b) I only
(c) IV only
(d) All of the given
89. Find the value of ' $a$ ', if the polynomials $2 x^{3}+a x^{2}+3 x-5$ and $x^{3}+x^{2}-4 x-a$ leave the same reminder when divided by $(x-1)$.
(a) $\mathrm{a}=-1$
(b) $\mathrm{a}=1$
(c) $\mathrm{a}=2$
(d) $a=-2$
90. the line $x-7=0$ is :
(a) parallel to $y$-axis
(b) parallel to x -axis
(c) passing through the origin
(d) none of these.

## PART II <br> SECTION - E: MENTAL ABILITY

This section contains 25 Multiple Choice Questions. Each question has four choices (a), (b), (c) and (d) out of which ONLY ONE is correct.
91. Choose the diagram which represent the boy, girl and a dog?
(a)

(b)

(c)

(d)

92. What are the factors of the given expression?

$$
16 x^{2}-72 x y+81 y^{2}-12 x+27 y
$$

(a) $(6 x-7 y)(6 x-7 y-5)$
(b) $(4 x-9 y)(4 x-9 y-3)$
(c) $(4 x+9 y)(4 x+9 y+3)$
(d) $(6 x+7 y)(6 x-7 y+5)$
93. In the figure $\mathrm{AB} \| C D$, find the value of $\angle \mathrm{a}$.

(a) $93^{0}$
(b) $103^{0}$
(c) $83^{0}$
(d) $97^{0}$
94. A boy walks a while failing towards the sun he turns to his right and continues to walk, later he turns left and finally, turning to his right, he stops. Which direction is he facing now?
(a) North
(b) South
(c) East
(d) West
95. 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) $4 \pi$
(c) 20
(d) $5 \pi$
96. The following facts are known about an unknowns 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 statement 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

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97. The average age of $\mathrm{A}, \mathrm{B}$ 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
98. $X$ 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
99. 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 figure 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

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100. If $\mathrm{A}, \mathrm{B}, \mathrm{C}, \mathrm{D}$ are distinct decimal digits, then which of the following options is correct?

A 4 B C
$1 \frac{\mathrm{XC}}{\mathrm{A} 1 \mathrm{DC}}$
(a) $\mathrm{A}=3$
$B=7$
$C=5$
$\mathrm{D}=9$
(b) $\mathrm{A}=2$
$B=3$
$C=6$
D $=5$
(c) $\mathrm{A}=3$
$B=8$
$C=6$
$\mathrm{D}=5$
(d) $\mathrm{A}=2$
$B=3$
$C=5$
$\mathrm{D}=7$
101. 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) X and $\div$
(c) + and $x$
(d) $\div$ and -
102. What will be the number in the blank box?

| 1 | 3 |
| ---: | :--- |
| 2 | 14 |


| 4 | 6 |
| :--- | :--- |
| 5 | 77 |


| 7 | 9 |
| :--- | :--- |
| 8 |  |

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

DIRECTIONS:- Read the following information carefully and answer the questions given below it.
103. There are five men $A, B, C, D$ and $E$ and six women $P, Q, R, S, T$ and $U$. $A, B, R$ is advocates, $C, D, P, Q$ and $S$ are doctors and the rest are teachers. Some teams are to be selected from amongst these eleven persons subject to the following conditions:-

| A, $P$ and $U$ have to be together |
| :--- |
| B cannot go with $D$ or $R$ |
| E and $Q$ have to be together |
| C and T have to be together |
| D and $P$ cannot go together |
| C cannot go with Q. |

If the team is to consist of one advocate, two doctors, three teachers and C may not go with T , the members of the team are: -
(a) A, E, P, Q, S, U
(b) A, E, P, Q, T, U
(c) $\mathrm{B}, \mathrm{E}, \mathrm{Q}, \mathrm{S}, \mathrm{T}, \mathrm{U}$
(d) E, Q, R, S, T, U
104. What comes next?

105. Find the odd one
(a)

(b)

(c)

(d)

106. In a certain code, MONKEY is written as XDJMNL. How is TIGER written in that code?
(a) QDFHS
(b) SDFHS
(c) SHFDQ
(d) UJHFS
107.

Directions: In the following questions, different alphabets stand for various symbols as indicated below:
$\mathbf{R}$ stands for addition; $\mathbf{S}$ stands for subtraction;
T stands for multiplication; $\mathbf{U}$ stands for division;
V stands for equal to ; W stands for greater than;
$\mathbf{X}$ stands for less than.
Out of the four alternatives given in these questions, only one is correct according to the above letter symbols, identify the correct answer.
(a) 30 U 6 R 2 V 4 T 3
(b) 30 S 6 U 2 U 4 V 3
(c) 30 U 6 S 2 X 4 T 3
(d) 30 R 6 U 2 V 4 T 3

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108. Find the missing numbers. $3,9,27,81, \ldots . .$.
(a) 243
(b) 324
(c) 342
(d) 432
109. Find the missing numbers. 216, 221, 231, 246, 266,......
(a) 289
(b) 271
(c) 281
(d) 291
110. A three centimetre cube has been painted red on all its sides. It is cut into one centimeter cubes. How many cubes will be there with only one side painted red?
(a) 4
(b) 6
(c) 1
(d) 9
111. Directions: In the following figure, the circle denotes intelligent persons the triangle is for creative persons, while the rectangle consists of lazy persons. Refer to this figure to answer these questions: Who are creative and lazy but not intelligent persons?
(a) A, C and F
(b) F
(c) C and F
(d) D, E and F

112. Find the number which replaces the question mark.
(a) 21
(b) 12
(c) 32

(d) 22
113. Directions: Read the following information carefully and answer the questions given below it. There are five men A, B, C, D and E and six women P, Q, R, S, T and U. A, B and R are advocates; C, D, P, Q and S are doctors and the rest are teachers. Some teams are to be selected from amongst these eleven persons subject to the following conditions:

| A, $P$ and U have to be together. |
| :--- |
| B cannot go with $\mathbf{D}$ or $R$. |
| E and $\mathbf{Q}$ have to be together. |
| C and T have to be together. |
| D and $P$ cannot go together. |
| C cannot go with $Q$. |

If the team is to consist of one advocate, three doctors and one male teacher, the members of the team are:
(a) A, D, P, S, U
(b) $C, D, R, S, T$
(c) $D, E, Q, R, S$
(d) $\mathrm{D}, \mathrm{E}, \mathrm{Q}, \mathrm{R}, \mathrm{T}$
114. A is $B$ 's wife and $C$ is A's sister. D is the father Of $C$, while $E$ is $D$ 's son. What is the relation of $E$ to $B$ ?
(a) Brother
(b) Brother-in-law
(c) Cousin
(d) Father-in-law

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115. Directions: Choose the odd one out from given four words.
(a) Run
(b) Climb
(c) Swim
(d) Listen

## SECTION - F: REASONING

This section contains $\mathbf{2 0}$ Multiple Choice Questions. Each question has four choices (a), (b), (c) and (d) out of which ONLY ONE is correct.
116. In a certain code language
(i) 'Count me out' is written as '874'.
(ii) 'you can count' is written as ' 719 '.
(iii) 'you and me' is written as ' 924 '.

How will 'and' be written in that code language?
(a) 4
(b) 7
(c) 9
(d) 2
(e) None of these
117. In the following venn diagram, identify the letter which denotes Film Actors who are Singers but not

Directors.

(a) D
(b) C
(c) E
(d) F
(e) None of these
118. The diagram represents Teachers. Singers and players. Study the diagram and find out the number of teachers who are also singers.

(a) 30
(b) 28
(c) 14
(d) 13
(e) None of these
119. The figure represents three classes of youth in a village. Find the number of youth who are educated but poor?

(a) 28
(b) 22
(c) 20
(d) 14
(e) None of these
120. Given that

1. A is the brother of B
2. C is the father of A
3. D is the brother of E
4. E is the daughter of B

Then, the uncle of D is
(a) A
(b) B
(c) C

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(d) E
(e) None of these
121. Examine the following three figures in which the numbers follow a specific pattern.

Find the missing number (?) in the third figure.

(a) 7
(b) 16
(c) 21
(d) 28
(e) None of these
122. Find the missing letter in the following table.

(a) B
(b) N
(c) M
(d) L
(e) None of these
123. Starting from point ' $A$ ' Sushil travels 10 metres towards East. Then he travels 10 metres towards North and reaches to the base of a 5 metres hiegh pole. The vertex of which has a red coloured light switching on and off. Find out the exact distance between point A with that of the red light
(a) 10 metres
(b) 18 metres
(c) 20 metres
(d) 15 metres
(e) None of these
124. Consider the following statements:

Assertion (A): People and their problems are unique.
Reason (R): Active listening conveys something to the person who is listened to.
On the basis of the above, choose the correct option in your answer.
(a) Both (a) and (R) are true, but (R) is not the correct
(b) (A) is true, but (R) is false
(c) (A) is false, but (R) is true
(d) Both (A) and (R) are true and (R) correctly explains (A)
(e) None of these
125. While sitting in a park, you observe that a man comes to the place on a motorbike, leaves it there and goes away with someone else in a car. You would:
(a) Chase the person.
(b) Inform the police
(c) Call back the person.
(d) Remain engaged in your enjoyment.
(e) None of these
126. Six students - A, B, C, D, E and F are sitting in a ground, A and B have come from Delhi while other from Bangalore. D and F are tall and all others are short. A, C and D are girls while other are boys. Who is the tall girl hailing from Bangalore?
(a) C
(b) D
(c) E
(d) F
(e) None of these
127. Select the answer figure in which the question figure is hidden/embedded.


Answer figures:

(B)

(D)

128. $P, Q, R, S, T$ and $U$ are 6 members of a family in which there are two married couples. T, a teacher is married to a doctor who is mother of R and U . Q , the lawyer is married to P . P has one son and one grandson. Of the two married ladies one is a housewife. There is also one student and one male engineer in the family.
Which of the following is true about the grand-daughter of the family?
(a) She is a student
(b) She is a lawyer.
(c) She is an engineer
(d) She is a doctor
(e) None of these
129. In a certain code language,
"only in serial order" is written as "ve pun a to"
"order in the state" is written as "li ve su pu"
"the logical idea only" is written as "su na ri jo"
and "in idea or theory" is written as "zt job kpu"

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The code 'li ri to ve' may represent which of the following?
(a) Serial order theory only
(b) Only idea state order
(c) State logical serial order
(d) Serial theory state the
(e) None of these
130. $A$ is the son of $C ; C$ and $Q$ are sisters; $Z$ is the mother of $Q$ and $P$ is the son of $Z$. which of the following statements is true?
(a) P and A are cousins
(b) P is maternal uncle of A
(c) Q is maternal grandfather of A
(d) C and P are sisters.
131. Some translated words in an artificial Language (in which the word order is not necessarily same) are given below

| mie | Pie | sie | good | person | sing |
| :--- | :---: | :---: | :---: | :---: | :--- |
| pie | sie | rie | sing | good | lyrics |
| tie | rie | sie | love | good | lyrics |

What is the translocation for "prson love lyrics"?
(a) pie tie rie
(b) tie rie sie
(c) rie mie tie
(d) sie mie pie
132. In the given sequence, some letters are missing. Which of the given options can fill the blanks in the correct order from left to right?
ab_ab_aaa_bbaaa_bbbb
(a) abab
(b) abba
(c) aabb
(d) baba

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133. Choose appropriate option from given alternatives such that the relationship defined by ' $:$ ' is preserved. PNLJ : LIFC and VTRP: $\qquad$
(a) ROLI
(b) SOLH
(c) RPOM
(d) DMEN
134. If South-East becomes North ; and North-East becomes West; then West becomes
(a) North - East
(b) South - East
(c) North - West
(d) South - West
135. 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
Conclusion:
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

## ANSWER KEYS

(FOR CLASS IX NTTSE)

| Part - I |  | Physics |  | Q. (1-15) |  | Part-II |  <br> Reasoning |  | Q.(91-135) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Chemistry |  | Q. (15-30) |  |  |  |  |  |
|  |  | Biology |  | Q.(31-45) |  |  |  |  |  |
|  |  | Mathematics |  | Q.(46-90) |  |  |  |  |  |
| 1. | D | 30. | C | 59. | C | 88. | C | 117. | A |
| 2. | D | 31. | C | 60 | B | 89. | A | 118. | D |
| 3. | D | 32. | B | 61. | A | 90. | A | 119. | A |
| 4. | B | 33. | D | 62 | D | 91. | A | 120. | A |
| 5. | A | 34. | C | 63. | B | 92. | B | 121. | B |
| 6. | B | 35. | A | 64. | B | 93. | A | 122. | C |
| 7. | C | 36. | A | 65. | B | 94. | C | 123. | D |
| 8. | B | 37. | C | 66. | C | 95. | C | 124. | D |
| 9. | D | 38. | C | 67. | D | 96. | B | 125. | B |
| 10. | A | 39. | C | 68. | A | 97. | A | 126. | B |
| 11. | C | 40. | A | 69. | A | 98. | B | 127. | D |
| 12. | A | 41. | B | 70. | D | 99. | D | 128. | A |
| 13. | D | 42 | A | 71. | B | 100. | D | 129. | C |
| 14. | B | 43. | C | 72. | D | 101. | C | 130. | B |
| 15. | B | 44. | D | 73. | A | 102. | D | 131. | C |
| 16 | B | 45. | D | 74. | C | 103. | B | 132. | B |
| 17. | B | 46. | A | 75. | D | 104. | A | 133. | A |
| 18. | B | 47. | D | 76. | C | 105. | D | 134. | B |
| 19. | C | 48. | B | 77. | B | 106. | A | 135. | B |
| 20. | C | 49. | D | 78. | C | 107. | C |  |  |
| 21. | C | 50 | B | 79. | A | 108. | A |  |  |
| 22. | B | 51. | D | 80 | D | 109 | D |  |  |
| 23. | B | 52. | D | 81. | C | 110. | B |  |  |
| 24. | B | 53. | C | 82. | C | 111. | B |  |  |
| 25. | C | 54. | C | 83. | A | 112. | D |  |  |
| 26. | C | 55. | B | 84. | C | 113. | C |  |  |
| 27. | D | 56. | A | 85. | D | 114. | B |  |  |
| 28. | D | 57. | C | 86. | B | 115. | D |  |  |
| 29. | D | 58. | C | 87. | B | 116. | D |  |  |

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