MENTORS EDUSERV TALENT REWARD EXAM (METRE)
SAMPLE TEST PAPER
[For Students presently in Class 9 going to Class 10 in 2019]

Time : 2 hours **Maximum Marks: 300**

DO NOT BREAK THE SEALS ON THIS BOOKLET, AWAIT INSTRUCTIONS FROM THE INVIGILATOR.

SEAL

INSTRUCTIONS

[A] General

1. This Question paper contains **FIVE** Parts, **A to E** (Physics, Chemistry, Mathematics, Biology & Mental Ability).
2. This Question Paper contains **16 pages.**
3. This question paper contains total **100 questions** (**20** questions each in Physics, Chemistry, Mathematics, Biology and Mental Ability).
4. The Question Paper has blank spaces at the bottom of each page for rough work. No additional sheets will be provided for rough work.
5. Blank papers, clip boards, log tables, slide rule, calculators, cellular phones, pagers and electronic gadgets, in any form, are **NOT** allowed.
6. The **OMR** (Optical Mark Recognition) sheet shall be provided separately.

[B] Answering on the OMR

7. In all the parts, each question will have **4 choices** out of which **only one choice is correct**.
8. Darken the bubble with **Ball Pen (Blue or Black) ONLY.**

[C] Filling OMR

9. On the **OMR sheet**, fill all the details properly and completely, otherwise your OMR will not be checked.
10. Do not write anything or tamper the barcode in the registration no. box.

[D] Marking Scheme:

11. For each question you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY** and **zero (0) marks** if no bubble is darkened. In all other cases, **minus one (–1) mark** will be awarded.

Name :.....

Registration No.: | | | | | | | | | | | | | | | |

PART-A : PHYSICS

1. An athlete completes one round of a circular track of radius R in 40 sec. What will be his displacement at end of 2 min 40 sec?

(A) zero (B) 2R (C) $2\pi R$ (D) $7\pi R$

2. The area under velocity-time graph gives:

(A) acceleration (B) speed (C) displacement (D) Velocity

3. A bullet of mass 10 g travelling horizontally with a velocity of 160 ms^{-1} strikes a stationary wooden block and comes to rest in 0.02 s. The distance of penetration of the bullet into the block will be :

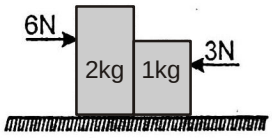
(A) 1.20 m (B) 1.60 m (C) 2.00 m (D) 2.40 m

4. A body covers half of a distance with a speed of 20 m/s and the other half with 30 m/s. The average speed of the body during the whole journey is

(A) Zero (B) 24 m/s

(C) 25 m/s (D) None of the above

5. Two forces of 6N and 3N are acting on the two blocks of 2kg and 1 kg kept on frictionless floor. What is the force exerted on 2kg block by 1 kg block ?



(A) 1N (B) 4N (C) 2N (D) 5N

6. A body of mass 2 kg is moving on a smooth floor in straight line with a uniform velocity of 10 m/s. Resultant force acting on the body is

(A) 20 N (B) 10 N (C) 2N (D) 0

Space for rough work

7. An apple falls from a tree because of gravitation between the earth and apple. If F_1 is the magnitude of force exerted by the earth on the apple and F_2 is the magnitude of force exerted by apple on earth, then:

(A) F_1 is very much greater than F_2 (B) F_2 is very much greater than F_1

(C) F_1 is only a little greater than F_2 (D) F_1 and F_2 are equal

8. If g is acceleration due to gravity on the surface of the earth having radius R, find the height above the surface of earth at which the acceleration due to gravity reduces to g/2.

(A) $h = \left(\sqrt{2} - 1\right)R$ (B) $h = \left(\sqrt{2} - 2\right)R$ (C) $h = \left(\sqrt{3} - 1\right)R$ (D) $h = \left(\sqrt{3} - 3\right)R$

9. According to Kepler, the period of revolution of a planet (T) and its mean distance from the sun (r) are related by the equation

(A) T^2r^3 = constant (B) T^2r^{-3} = constant

(C) Tr^3 = constant (D) T^2r = constant

10. The radius of the orbit of a geosynchronous satellite is 36000 km, then the period of revolution of a satellite with its orbital radius 9000 km would be

(A) 24 hrs (B) 12 hrs (C) 6 hrs (D) 3 hrs

11. The gravitational force between two objects of mass 1 kg each, separated by a distance of 1m in vacuum will be

(A) zero (B) 6.675×10^{-11} N

(C) 13.350×10^{-11} N (D) 3.337×10^{-11} N

12. A ball is thrown vertically upward. It rises to a height of 50 m and comes back to the thrower, then

(A) the total distance covered by the ball is zero

(B) the net displacement of the ball is zero

(C) the displacement is 100 m

(D) none of the these

Space for rough work

13. A 50 m long train passes over a 250 m long bridge at a velocity of 60 km/h. How long will it take to pass completely over the bridge ?

(A) 18 s (B) 20 s (C) 24 s (D) None of these

14. The intitial velocity of a train which is stopped in 20 s by applying brakes (retardation due to brakes being 1.5 ms^{-2}) is

(A) 30 $m\ s^{-1}$ (B) 30 $cm\ s^{-1}$ (C) 20 $cm\ s^{-1}$ (D) 24 $m\ s^{-1}$

15. Momentum gives a measure of

(A) mass (B) weight (C) velocity (D) quantity of motion

16. A and B are two objects with masses 6 kg and 34 kg respectively. Then

(A) A has more inertia than B (B) B has more inertia than A

(C) A and B have same inertia (D) None of these

17. A man is standing in a boat in still water. If he tries to walk towards the shore, the boat will

(A) move away from the shore (B) remain stationary

(C) sink (D) move towards the shore

18. The SI unit of G is

(A) $Nm^2\ kg^{-1}$ (B) $Nm^2\ kg^{-2}$ (C) $Nm^{-2}\ kg$ (D) $N^{-1}m^2\ kg^{-2}$

19. As we go from the equator to the poles, the value of 'g'

(A) remain the same (B) decreases (C) increases (D) None of these

20. 10 kg wt is equal to

(A) 9.8 N (B) 98 N (C) 980 N (D) $\frac{1}{9.8}$ N

Space for rough work

PART-B : CHEMISTRY

21. The disperse phase, dispersion medium and nature of colloidal solution (lyophilic or lyophobic) of 'gold sol' respectively are

(A) solid, solid, lyophobic (B) liquid, liquid, lyophobic

(C) solid, liquid, lyophobic (D) solid, liquid, lyophilic

22. Tyndal effect shown by colloids is due to

(A) scattering of light by the particles (B) movement of particles

(C) reflection of light by the particles (D) coagulation of particles

23. An example of dispersion of a liquid in a gas is

(A) milk (B) vegetable oil (C) foam (D) mist

24. An emulsifier is a substance which

(A) stabilises the emulsion (B) homogenises the emulsion

(C) coagulates the emulsion (D) accelerates the dispersion of liquid in liquid

25. An emulsion is a colloidal dispersion of

(A) a liquid in a gas (B) a liquid in a liquid

(C) a solid in a liquid (D) a gas in a solid

26. Fog is a colloidal solution of

(A) solid in gas (B) liquid in gas (C) gas in liquid (D) gas in solid

27. An aerosol is a

(A) dispersion of a solid or liquid in a gas (B) dispersion of a solid in a liquid

(C) dispersion of a liquid in a liquid (D) solid solution

Space for rough work

28. The movement of colloidal particles towards their respective electrodes in the presence of an electric field is known as

(A) electrolysis (B) Brownian movement

(C) dialysis (D) electrophoresis

29. A 15% alcohol solution means

(A) 15 mL alcohol and 85 mL water (B) 15 mL alcohol and 100 mL water

(C) 15 mL water and 85 mL alcohol (D) 15 mL alcohol and 50 mL water

30. Which of the following is not an emulsion?

(A) Butter (B) Ice cream (C) Milk (D) Clouds

31. The sky looks blue due to

(A) dispersion effect (B) reflection effect

(C) transmission effect (D) scattering effect

32. A colloidal system in which gas bubbles are dispersed in a liquid is known as

(A) foam (B) aerosol (C) sol (D) emulsion

33. In which of the following, Tyndall effect is not observed?

(A) Smoke (B) Emulsion (C) Sugar solution (D) Gold sol

34. Which of the following describes the liquid phase?

(A) It has a definite shape and a definite volume.

(B) It has a definite shape but not definite volume.

(C) It has a definite volume but not a definite shape.

(D) It has neither a definite shape nor a definite volume.

Space for rough work

35. Which is the most favourable condition for liquefaction of ammonia?

(A) High pressure, high temperature (B) High pressure, low temperature

(C) Low pressure, low temperature (D) Low pressure, high temperature

36. Which of the following has more heat content

(A) 10 g of ice at 0°C (B) 10 g of water at 0°C

(C) both have same heat content (D) their heat content cannot be compared

37. The density of water is maximum at

(A) 0°C (B) 277 K (C) 100°C (D) 283 K

38. Which method is used to separate drugs from blood?

(A) Fractional distillation (B) Crystallisation

(C) Chromatography (D) Distillation

39. Separation of petroleum into its components is done by

(A) chromatography (B) sublimation

(C) distillation (D) fractional distillation.

40. Which of the following is not a chemical change

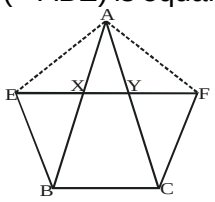
(A) electrolysis of water (B) boiling of water

(C) digestion of food (D) burning of magnesium

Space for rough work

PART-C : MATHEMATICS

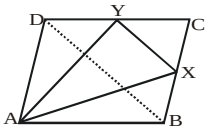
41. In figure, XY is a line parallel to the side BC and BE || AC and CF || AB meet XY in E and F respectively. Also EX = FY, then ar(ΔABE) is equal to



(A) ar(ΔABC) (B) ar(ΔACF)

(C) ar(ΔXEB) + ar(ΔYFC) (D) None of these

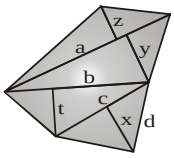
42. ABCD is a parallelogram X and Y are the mid points of BC and CD respectively. Then, area of (parallelogram ABCD) is



(A) 4 × ar(ΔAXY) (B) 2 × ar(ΔAXY) (C) $\frac{8}{3}$ × ar(ΔAXY) (D) None of these

43. A surveyor in his field book has drawn the plot as shown in the given figure.

The area of the plot is :



(A) $\frac{1}{2}$ (az + by + ct + dx) (B) $\frac{1}{2}$ (bt + cx + ay + az)

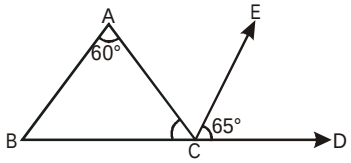
(C) $\frac{1}{2}$ (cx + bt + by +az) (D) $\frac{1}{2}$ (d + t) (c + x) + $\frac{1}{2}$ (a + b) (y + z)

Space for rough work

44. In a ΔABC if $2\angle A = 3\angle B = 6\angle C$ then $\angle A$, $\angle B$, $\angle C$ are

(A) 30°, 60°, 90° (B) 90°, 60°, 30° (C) 30°, 90°, 60° (D) None of these

45. In the adjoining figure, it is given that $\angle A = 60°$, CE || BA and $\angle ECD = 65°$ then $\angle ACB$ is equal to



(A) 60° (B) 55° (C) 70° (D) 90°

46. When $x^{13} + 1$ is divided by $x + 1$, the remainder is

(A) –1 (B) 0 (C) 1 (D) 2

47. When $x^3 + 2x^2 + 2x - 4$ and $x^3 + 2x^2 - 3x + 6$ are divided by $x - 2$, the remainder are R_1 and R_2 respectively. Which of the following statements is true for R_1 and R_2

(A) $R_1 = 2R_2$ (B) $2R_1 = R_2$ (C) $R_1 = R_2$ (D) $R_1 + R_2 = 0$

48. If A(2, 2), B(– 4, – 4) and C(5, – 8) are the vertices of a triangle, then the length of the median through vertex C is

(A) $\sqrt{65}$ (B) $\sqrt{117}$ (C) $\sqrt{85}$ (D) $\sqrt{113}$

49. If the points (k, 2k), (3k, 3k) and (3, 1) are collinear, then k is equal to

(A) $\frac{1}{3}$ (B) $-\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $-\frac{2}{3}$

50. If A(5, 3), B(11, –5) and P(12, y) are the vertices of a right triangle right angled at P, then y is equal to

(A) –2, 4 (B) –2, –4 (C) 2, –4 (D) 2, 4

51. The ratio in which the x-axis divides the segment joining (3, 6) and (12, –3) is

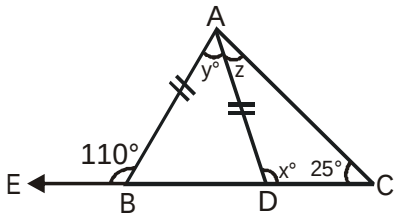
(A) 2 : 1 (B) 1 : 2 (C) –2 : 1 (D) 1 : –2

Space for rough work

52. In a ΔABC, $\angle A = 90°$, AB = 5 cm and AC = 12 cm. If AD $\perp$ BC, then the length of AD is

(A) $\frac{13}{2}$ cm (B) $\frac{2\sqrt{15}}{13}$ cm (C) $\frac{60}{13}$ cm (D) $\frac{13}{60}$ cm

53. In the figure given below $\angle Z$ equals



(A) 40° (B) 110° (C) 45° (D) None of these

54. The value of x^2 if $x = \frac{2\left(\sqrt{2}+\sqrt{6}\right)}{3\sqrt{2+\sqrt{3}}}$ is

(A) $\frac{14}{9}$ (B) $\frac{16}{9}$ (C) $\frac{13}{9}$ (D) None

55. $\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} + \frac{2\sqrt{3}}{\sqrt{6}+2} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}}$ equals

(A) 0 (B) 1 (C) 3 (D) 2

56. If $\sqrt{10+2\sqrt{21}} = \sqrt{7}+\sqrt{x}$, then x is equal to

(A) 1 (B) 2 (C) 3 (D) 7

57. The base of a triangular field is 540m and its height is 235m. Then the cost of levelling the field at Rs. 25 per sq.m. is equal to

(A) Rs. 1586250 (B) Rs. 2021150 (C) Rs. 2521450 (D) Rs. 3044750

Space for rough work

58. Length of a rectangle is 12 m and its diagonal is 15 m. Then the area of the rectangle is

(A) 60 m^2 (B) 72 m^2 (C) 108 m^2 (D) 120 m^2

59. If the radius of a sphere is tripled, then the percentage of increase in the surface area is

(A) 200 (B) 400 (C) 600 (D) 800

60. The dimensions of a cuboid are in the ratio 6:4:3. If total surface area is 1728 sq.units, then its lateral surface area is

(A) 960 m^2 (B) 950 m^2 (C) 980 m^2 (D) 920 m^2

PART-D : BIOLOGY

61. The cell organelle taking part in photorespiration is

(A) Glyoxysome (B) Dictyosome

(C) Peroxisome (D) Endoplasmic reticulum

62. Ribosomes are composed of

(A) 1 subunit (B) 5 subunits (C) 2 subunits (D) 4 subunits

63. Membrane - less cell organelle is

(A) Ribosome (B) Mitochondria (C) Golgi complex (D) Nucleus

64. The first layer of cell wall is

(A) Tertiary wall, if present (B) Secondary wall

(C) Primary wall (D) Middle lamella, if present

65. Main function of plasma membrane is to

(A) Control cell movements (B) Control cell activities

(C) Maintain cell shape and size (D) Regulate exchange of materials

66. Bases of leaves and internodes have-

(A) lateral meristem (B) apical meristem (C) intercalary meristem (D) none of these

Space for rough work

67. Sieve tubes and companion cells occur in-

(A) xylem (B) cambium (C) meristem (D) phloem

68. Elongated lignified cells with pointed ends belong to

(A) collenchyma (B) parenchyma (C) sclerenchyma (D) none of these

69. Fat is abundant in

(A) liver cells (B) alveolar tissue (C) lymph glands (D) adipose tissue

70. Cartilage is produced by

(A) osteoblasts (B) epithelium (C) fibroblasts (D) chondroblasts

71. Bone marrow is important for

(A) breakdown of WBC (B) production of RBC

(C) breakdown of RBC (D) production of blood cells

72. Striated muscles are found in

(A) gall bladder (B) wall of bronchi (C) leg muscles (D) lungs

73. Canaliculi canals occur in

(A) Cartilage (B) Bone (C) Internal ear (D) Liver

74. The process of preparing manure with the help of earthworms and kitchen wastes is called

(A) green manuring (B) manuring (C) Vermicoposting (D) farming

75. Growing two or more crops at the same time in a field is called

(A) mixed farming (B) mixed cropping (C) intercropping (D) (B) and (C)

76. The science of improving crop varieties is called

(A) hybridization (B) selection (C) plant breeding (D) introduction

Space for rough work

77. Plant breeding aims to produce

(A) disease-free varieties (B) high-yielding varieties

(C) early-maturing varieties (D) all the above

78. Which of the following is not a "Greenhouse gas" ?

(A) SO_2 (B) CO_2 (C) N_2O (D) CH_4

79. Often in water bodies subjected to sewage pollution, fishes die because of the :

(A) pathogens released by sewage

(B) reduction of dissolved oxygen caused by microbial activity

(C) clogging of their gills by solid substances

(D) foul smell

80. Spraying of DDT on crops produces pollution of

(A) Air only (B) Air and soil only

(C) Air and water only (D) Air, soil and water

PART-E : MENTAL ABILITY

DIRECTIONS (Q.Nos. 81-83) : In the following questions, select the related word/letters/numbers from the given alternatives.

81. Marathon : Race : : Hibernation " ?

(A) Winter (B) Bear (C) Dream (D) Sleep

82. Elated : Despondent : : Enlightened : ?

(A) Aware (B) Tolerant (C) Ignorant (D) Miserable

83. BFJN : KOSW : : DHLP : ?

(A) FJNR (B) MQUY (C) NRVZ (D) CGKO

Space for rough work

DIRECTIONS (Q.Nos.84-86) : In the following questions, select the one which is different from other three alternatives.

84. (A) Cyclone (B) Famine (C) Flood (D) Earthquake

85. (A) Nullify (B) Expunge (C) Enforce (D) Revoke

86. (A) 2401 (B) 149 (C) 49 (D) 343

87. Which one of the given responses would be a meaningful order of the following?

1. Large intestine
2. Rectum
3. Small intestine
4. Mouth
5. Stomach

(A) 4, 2, 1, 3, 5 (B) 4, 3, 2, 5, 1

(C) 4, 5, 3, 1, 2 (D) 5, 4, 2, 3, 1

88. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete it?

ab_b_cbacba_ba_cabcb

(A) cbbb (B) bccb (C) acbc (D) caba

DIRECTIONS (Q.Nos.89-90) : In the following questions, a series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.

89. AER, DIT, GMV, ?

(A) JQX (B) QJX (C) XJQ (D) JXQ

90. 3, 11, 38, 102, 227, ?

(A) 487 (B) 474 (C) 443 (D) 245

91. Arun is heavier than Govind. Manoj is lighter than John. Pravin is heavier than John but lighter than Govind. Who is the heaviest?

(A) John (B) Arun (C) Pravin (D) Govind

Space for rough work

92. From the given alternative words, select the word which can be formed using the letters of the given word.

KNOWLEDGE

(A) WONDER (B) WEALTH (C) FETCH (D) WEDGE

93. Some letters are given with numbers from 1 to 8. Select the sequence of numbers which arranges the letters into a meaningful word.

l d w o a o n d

l 2 3 4 5 6 7 8

(A) 4, 2, 1, 6, 5, 8, 3, 7 (B) 2, 4, 3, 7, 1, 6, 5, 8

(C) 6, 3, 2, 1, 8, 5, 4, 7 (D) 1, 8, 3, 5, 2, 4, 6, 7

94. If in a certain code DICKINSON is written as 357950210 and DIPP is written as 3566, then how can PICNIC be written in the same code?

(A) 657057 (B) 657507 (C) 560757 (D) 650757

DIRECTIONS (Q.No. 95) : In the following questions, select the missing number from the given responses.

95.

6	11	25
8	6	16
12	5	?

(A) 12 (B) 16 (C) 18 (D) 22

96. From his house, Ram went 15 km to the North. Then,he turned to his left and covered 10 km. Then, he again turned to his left and covered 5 km. Finally turning to the East, he covered 10 km. In which direction is he from his house?

(A) East (B) West (C) North (D) South

Space for rough work

DIRECTIONS (Q.Nos. 97-98) : Among the four answer figures which can be formed from the cut out pieces given in question figure.

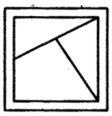
97. **Question Fig.**

Answer Fig.

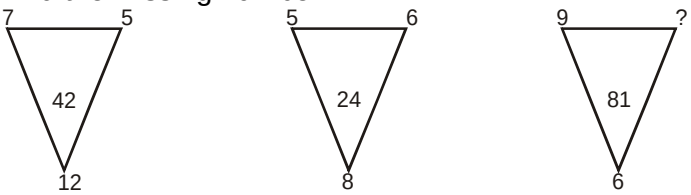
(A)  (B)  (C)  (D) 

98. **Question Fig.**

Answer Fig.

(A)  (B)  (C)  (D) 

99. Find the missing number :



(A) 14 (B) 16 (C) 15 (D) 11

100. In a certain code GARNISH is written as RGAINHS. How will GENIOUS be written in that code ?

(A) ENGOIUS (B) NEGIOUS (C) NGEOISU (D) GENOISU

Space for rough work

ANSWER - KEY

PART- A : PHYSICS

1. (A)	2. (C)	3. (B)	4. (B)
5. (B)	6. (D)	7. (D)	8. (A)
9. (B)	10. (D)	11. (B)	12. (B)
13. (A)	14. (A)	15. (D)	16. (B)
17. (A)	18. (B)	19. (C)	20. (B)

PART- B : CHEMISTRY

21. (C)	22. (A)	23. (D)	24. (A)
25. (B)	26. (B)	27. (A)	28. (D)
29. (A)	30. (D)	31. (D)	32. (A)
33. (C)	34. (C)	35. (B)	36. (B)
37. (B)	38. (C)	39. (D)	40. (B)

PART- C : MATHEMATICS

41. (B)	42. (C)	43. (B)	44. (B)
45. (B)	46. (B)	47. (C)	48. (C)
49. (B)	50. (C)	51. (A)	52. (C)
53. (C)	54. (B)	55. (A)	56. (C)
57. (A)	58. (C)	59. (D)	60. (A)

PART- D : BIOLOGY

61. (C)	62. (C)	63. (A)	64. (C)
65. (D)	66. (C)	67. (D)	68. (C)
69. (D)	70. (D)	71. (D)	72. (C)
73. (B)	74. (C)	75. (D)	76. (C)
77. (D)	78. (A)	79. (B)	80. (D)

PART- E : MENTAL ABILITY

81. (D)	82. (C)	83. (B)	84. (D)
85. (C)	86. (B)	87. (C)	88. (B)
89. (A)	90. (C)	91. (B)	92. (D)
93. (B)	94. (A)	95. (B)	96. (C)
97. (D)	98. (D)	99. (C)	100. (C)