DRONACHARYA

360° DIAGNOSTIC & SCHOLARSHIP EXAM

Sample Paper

for Students presently in Class VIII

Paper 4

Physics & Astronomy, Chemistry & Mathematics Olympiad

Duration : 100 minutes   *Maximum Marks : 102*

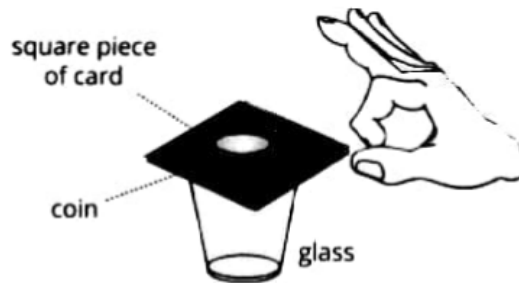### Please read the instructions and guidelines carefully :

Important Note : Please ensure to accurately input the details for the Class and Paper No. as indicated at the top of this sheet into the corresponding columns / fields on the OMR sheet before proceeding with the paper. Incorrectly filled information regarding the class or paper may result in inaccurate outcomes or results.

> *"This paper has been scientifically designed to evaluate your potential – manifested and hidden for the target examinations mentioned in various sections of the paper. Thus, your adherence to the instructions is critical in the evaluation of the same"*

1. This Question paper consists of 3 sections.

2. **Student should devote allotted time for each section. If a section is easy, then it is easy for everyone & was meant to be like that with a goal in mind. Do not switch over to another section if you find the section to be easy. If a section is tough, then it is tough for everyone.** You are advised to spend 40 Minutes on Section-I, 30 Minutes on Section-II and 30 Minutes on Section-III. Dedicating the required time to finish each section successfully is essential. Opening the next section before completing the allotted time for the preceding section is not permitted. This adherence is crucial for assessing your true potential, as each section is meticulously crafted to evaluate your potential for the corresponding competitive examinations.

3. Candidate should open the seal of Section-II only after devoting 40 minutes on Section-I and Seal for Section-III is to be opened only after devoting 30 minutes on Section-II.

4. Sheets will be given to each candidate for rough work. Candidate must fill all details on the rough sheet and submit the same to invigilator along with OMR sheet. Candidate must mention the Question No. while doing the rough work in the sheet.

5. Please note candidates are not allowed to bring any prohibited items into the exam hall such as electronic devices, mobile phones, smart watch, earphones, calculators, books, notes, formula sheets, and bags.

6. Marking scheme is given in table below:

Section	Subject	Question no.	Marking Scheme for each question	
			Correct answer	Wrong answer
SECTION – I (Physics & Astronomy Olympiad) Time Allotted: 40 Minutes	PHYSICS (PART-A)	1 to 8	+3	−1
	MATHEMATICS (PART-B)	9 to 12	+3	−1
SECTION – II (Chemistry Olympiad) Time Allotted: 30 Minutes	CHEMISTRY (PART-A)	13 to 24	+3	−1
SECTION – III (Mathematics Olympiad) Time Allotted: 30 Minutes	MATHEMATICS (PART-A)	25 to 34	+3	−1

Section – I

Time: 40 Minutes

PHYSICS – (PART – A)

*This part contains **8 Multiple Choice Questions** number **1 to 8.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

1. If a block of mass 10 kg is placed on a friction surface. Now two force $F_1 = 10N$ & $F_2 = 10$ N is acting on the block. If the block is rest then, the force of friction on the block will be

    ground

    (A) 1 N left word
    (B) 1 N Right word
    (C) 3 N Right word
    (D) no force of friction

2. Three bulbs B_1, B_2 and B_3 are connected in an electric circuit as shown below:
    s_1, s_2, s_3 and s_4 are four switches.
    To switch on bulb B_1 only, which switch must be closed:
    (A) S_1 only
    (B) S_2 only
    (C) S_3 only
    (D) Both S_1 and S_2

3. What will be the effective resistance between the points P and Q in the following circuit?
    (A) $6 \, \Omega$
    (B) $3 \, \Omega$
    (C) $1 \, \Omega$
    (D) $0 \, \Omega$

4. The waves are produced through earthquake
    (A) Ultrasonic Waves
    (B) Supersonic Waves
    (C) Hypersonic Waves
    (D) Seismic Waves

5. Two metal blocks A & B each having some amount of +ve charge are placed on a rough horizontal table as shown in the figure. If both of them are at rest then the direction of frictional force acting on A & B is respectively:

    (A) Leftwards, Leftwards
    (B) Rightwards, Leftwards
    (C) Rightwards, Rightwards
    (D) Leftwards, Rightwards

6.   Choose the correct option (T - true; F - False):
        (i) Unbalanced forces cannot set a stationary body in motion.
        (ii) A Balanced force acts on a body moving with constant velocity.
        (iii) If net force on a body is zero, its acceleration is zero.
        (A) TFF   (B) FFF
        (C) FTT   (D) FTF

7.   A card is placed on an empty glass and coin is placed on the card right above the center of the glass. A flick is given to the card with finger, the card flies away and the coin falls in the glass. Choose the correct option(s).
        (i) Card flies away due to inertia of rest.
        (ii) Coin falls in the glass due to inertia of rest.
        (iii) Card flies away as it gains momentum from finger.
        (iv) Coin falls in the glass as it does not gain momentum from finger.

        (A) (ii), (iii) and (iv)   (B) (i) and (ii)
        (C) (i) and (iv)   (D) (ii) only

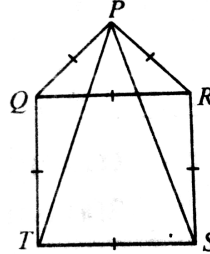8.   Both A and B block of some volume are placed in a same fluid then which of the following is true.

        (A) Density of A > Density of B and weight of A > Upthrust on A
        (B) Density of A = Density of B and weight of A = Upthrust on A
        (C) Density of A < Density of B and weight of A < Upthrust on A
        (D) None of these

MATHEMATICS – (PART – B)
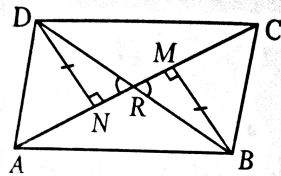
9. In the given figure, PQR is an equilateral triangle and QRST is a square. Then ∠PSR =

    (A) 30º   (B) 15º
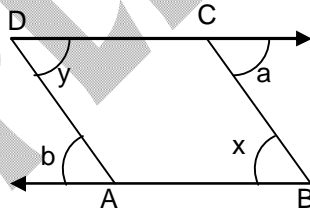   (C) 90º   (D) 60º

10. In quadrilateral ABCD, BM and DN are drawn perpendicular to AC such that BM = DN. If BR = 8 cm, then BD is

    (A) 4 cm   (B) 2 cm
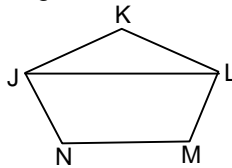   (C) 12 cm   (D) 16 cm

11. In figure, sides BA and CD of the quadrilateral ABCD are produced and AB || CD then

    (A) a + x = b – y   (B) a + b = x + y
    (C) a + b = x – y   (D) None of these

12. If the figure JKLMN is a regular pentagon find ∠JLM

    (A) 36º   (B) 72º
    (C) 108º   (D) None of these

Section – II

Time: 30 Minutes

CHEMISTRY – (PART – A)

*This part contains **12 Multiple Choice Questions** number **13 to 24.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

13. The gas which is always present over the petroleum belts in the earth and drilled out first while drilling crude oil is
    (A) Biogas
    (B) LPG
    (C) Natural gas
    (D) Coal gas

14. Chemical method used in concentration of ore is known as -
    (A) bleaching
    (B) leaching
    (C) roasting
    (D) calcination

15. Which of the following is/are incorrect statement(s)?
    (i) Petroleum is a brown black liquid
    (ii) Coal and petroleum are called fossils fuels
    (iii) High pressure and low temperature under rocks converted dead plants into coal
    (A) Only (i)
    (B) Only (ii)
    (C) Only (iii)
    (D) (i) & (iii)

16. Which of the following metals constitutes the alloy magnalium -
    (A) Al, Cu
    (B) Al, Fe
    (C) Al, Mg
    (D) Al, Mn

17. Which of the following oil is used in froth floatation process?
    (A) Coconut oil
    (B) Palm oil
    (C) Grease oil
    (D) Pine oil

18. Solder is an alloy of lead and tin. It has a :
    (A) Low melting point and is used for welding electrical wires together
    (B) Low melting point and is used for welding heavy iron machinery
    (C) High melting point and is used for welding electrical wires together
    (D) High melting point and is used for welding heavy iron machinery.

19. When a substance is heated in the absence of air to cause decomposition of the substance, the process is called?
    (A) Space Heating
    (B) Fractional distillation
    (C) Destructive distillation
    (D) Power generation

20. Aluminium is oxidised in
    (A) Bayer's process
    (B) Hall's process
    (C) Serpek's process
    (D) Thermite process

21. Zinc Blende is concentrated by
    (A) chemical separation
    (B) magnetic speciation
    (C) froth floatation
    (D) hydraulic washing

22. Consider the following $Coal \xrightarrow[\text{in absence of air}]{\text{Strong heating}} X + Y + Z + $ Volatile impurities
    (i) 'Y' is the almost pure form of carbon and used as an essential raw material for steel industry.
    (ii) A number of useful substances are synthesised from 'Z' such as drugs, explosives roofing materials, naphthalene balls etc.
    Now, choose the correct option.
    (A) Y is coal gas and Z is coke
    (B) Y is coke and Z is coal gas
    (C) Y is coal tar and Z is coke
    (D) Y is coke and Z is coal tar

23. Which of the following is used as a clean Fuel for spaceships?
    (A) Kerosene
    (B) Hydrogen
    (C) Coal
    (D) Paraffin

24. Select composition of roasted galena.
    (A) PbO
    (B) PbS
    (C) Pb
    (D) $PbCO_3$

Section – III

Time: 30 Minutes

MATHEMATICS – (PART – A)

*This part contains **10 Multiple Choice Questions** number **25 to 34**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

25. The simplified form of $\sqrt{125} + \sqrt{245} - \sqrt{845}$ is
    (A) $\sqrt{15}$
    (B) $2\sqrt{5}$
    (C) $-\sqrt{5}$
    (D) $-2\sqrt{5}$

26. If $\sqrt{2^n} = 1024$, then $3^{2\left[\frac{n}{4}-4\right]} = ?$
    (A) 3
    (B) 9
    (C) 27
    (D) 81

27. Value of $\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}}}}}....\infty$ is
    (A) $\frac{81}{64}$
    (B) $\frac{9}{8}$
    (C) $\frac{3}{2}$
    (D) $\frac{3}{2\sqrt{2}}$

28. If $x = 2^{1/3} - 2$ then $x^3 + 6x^2 + 12x = ?$
    (A) 6
    (B) –6
    (C) 8
    (D) –8

29. The absolute value of $|4 - x| + |x - 4|$, if $0 < x < 4$ is
    (A) 0
    (B) 2x
    (C) 8
    (D) 2(4 - x)

30. A father tells his son "I was of your present age when you were born." If the father is 36 now how old was the son five year back?
(A) 13   (B) 15
(C) 17   (D) 18

31. If $3a = 4b = 6c$ and $a + b + c = 27\sqrt{29}$ then, $\sqrt{a^2 + b^2 + c^2}$ is
(A) $3\sqrt{29}$ (B) 81
(C) 87   (D) None of these

32. If $a = \dfrac{\sqrt{5}+1}{\sqrt{5}-1}$ and $b = \dfrac{\sqrt{5}-1}{\sqrt{5}+1}$, the value of $\left(\dfrac{a^2 + ab + b^2}{a^2 - ab + b^2}\right)$ is

(A) $\dfrac{3}{4}$ (B) $\dfrac{4}{3}$

(C) $\dfrac{3}{5}$ (D) $\dfrac{5}{3}$

33. If $\sqrt{0.04 \times 0.4 \times a} = 0.004 \times 0.4 \times \sqrt{b}$, then $\dfrac{a}{b}$ is

(A) 16×10^{-3} (B) 16×10^{-4}
(C) 16×10^{-5} (D) None of these

34. What number should be divide by $\sqrt{0.25}$ to give the result as 25?
(A) 12.5   (B) 25
(C) 50   (D) 125

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ANSWER KEY

1.	**D**	2.	**D**	3.	**B**	4.	**D**
5.	**B**	6.	**C**	7.	**A**	8.	**A**
9.	**B**	10.	**D**	11.	**B**	12.	**B**
13.	**C**	14	**B**	15.	**C**	16	**C**
17	**D**	18.	**A**	19.	**C**	20.	**D**
21.	**C**	22.	**D**	23.	**B**	24.	**A**
25.	**C**	26.	**B**	27.	**A**	28.	**B**
29.	**D**	30.	**A**	31.	**C**	32.	**B**
33.	**C**	34.	**A**				