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**TEST # VIII - 01, May 2023**

NAME: \_\_\_\_\_

Total. Time: 1:30 Hr

M.M: 150

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**INSTRUCTIONS**

1. The paper consists of two sections A & B. Section A – Mathematics & Section B - Science.
2. The objective paper is designed by considering School Exam, NTSE & IIT Foundation.
3. The marking system is given just before the start of the Part in each section.
4. Blank papers, clipboards, log tables, slide rules, calculators, cameras, cellular phones, pagers and electronic gadgets are NOT allowed during exam.
5. The maximum mark allotted to the paper is 150.
6. Total time allotted for the exam is 1:30 Hours.
7. SECTION – A (MATHEMATICS) Questions No's: 1 – 15.  
SECTION – B (SCIENCE) Questions No's 16 – 45.

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**SECTION – A (MATHEMATICS)**

**PART - I**

**SINGLE OPTION CORRECT (+ 4, - 1, 0)**

1. The value of  $\sqrt{388 + \sqrt{127 + \sqrt{289}}}$  is  
 (A) 21 (B) 22 (C) 20 (D) None of these
2. If  $\sqrt{1 + \frac{27}{169}} = 1 + \frac{x}{13}$  then x = \_\_\_\_\_  
 (A) 0 (B) 1 (C) 2 (D) 3
3. What must be added to 24136 to make it a perfect square?  
 (A) 100 (B) 200 (C) 111 (D) None of these
4. The value of  $\sqrt{2^{22}}$ , is  
 (A)  $2^{21}$  (B)  $2^{11}$  (C)  $2^{22}$  (D) none of these
5. Value of x which satisfies  $2^{x+1} = 4^{x+7}$   
 (A)  $x = -13$  (B)  $x = 13$  (C)  $x = -12$  (D)  $x = 11$
6.  $\left(\frac{a}{b}\right)^{x-1} = \left(\frac{b}{a}\right)^{x-3}$ , where  $a \neq b$ ,  $a \neq 0$ ,  $b \neq 0$  then value of x is \_\_\_\_  
 (A) 1/2 (B) 1 (C) 2 (D) 7/2

**ROUGH SPACE**

←~■: ☺ ☺ Best of Luck! ☺ ☺ :■~→

7. Which expression represents the description  $n \times n \times n \times n$ ?

- (A)  $n \times 4$  (B)  $n^4$  (C)  $4^n$  (D)  $-n$

8.  $(25)^{7.5} \times (5)^{2.5} \div (125)^{1.5} = 5^x$ ; then  $x =$

- (A) 8.5 (B) 13 (C) 16 (D) 17.5

9. The value of  $\frac{2^{2001} + 2^{1999}}{2^{2000} - 2^{1998}}$  is

- (A) 2 (B)  $10/3$  (C)  $2^{1000} + 1$  (D) 10

10. If  $\frac{a^{2b-3} \times (a^2)^{b+1}}{(a^4)^{-3}} = (a^3)^3 \div (a^6)^{-3}$ , then find the value of  $b$

- (A) 2 (B) 4 (C) 8 (D) 12

## PART – II

MULTI OPTION CORRECT (+ 4, -1, 0).

11. Which of the following triplets is/are Pythagorean?

- (A) (8, 15, 17) (B) (18, 80, 82) (C) (14, 48, 51) (D) (12, 35, 38)

12. Select the correct options

(A)  $\left\{ \left( \frac{4}{3} \right)^{-1} - \left( \frac{1}{4} \right)^{-1} \right\}^{-1} = -\frac{4}{13}$

(B)  $(2^{-1} \times 5^{-1})^{-1} \div 4^{-1} = 32$

(C)  $\left\{ \left( -\frac{2}{3} \right)^{-2} \right\}^2 = \frac{81}{16}$

(D)  $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}} = 5^5$

ROUGH SPACE

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13. Select the correct Statement(s)

- (A)  $11111^2 = 123454321$
- (B)  $1 + 3 + 5 + 7 + \dots$  Upto 19 terms = 361
- (C) Unit digit of a perfect square can't be 2, 3, 7 & 8
- (D)  $I^2$  is of type  $4k + 1$  or  $4k$ , where I & k are Integers

14. Select the correct option(s)

- (A)  $\sqrt{176} + \sqrt{2401} = 15$
- (B) 1728 is a perfect square
- (C)  $(3k, 4k, 5k)$  is a Pythagorean Triplet where  $k \in \mathbb{R}^+$
- (D)  $\sqrt{1234321} = 1111$

15. Consider  $N = 1500$ , Select the correct statements

- (A)  $1500 + a = n^2$  where a and n are Natural No then least value of a is 31.
- (B)  $N \div$  smallest natural a = Perfect square then a is 15.
- (C) Perfect square just larger than N is 1521
- (D)  $\overline{a0b}^2$  will leave remainder  $b^2$  on division by 100. Where a & b are two digits.

ROUGH SPACE

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**SECTION – B (SCIENCE)**

**PART – I (PHYSICS)**

**SINGLE OPTION CORRECT (+ 3, - 1, 0)**

16. Select the Wrong statement (N is Newton)

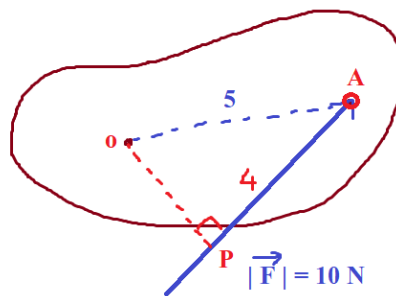
- (A) 1 Kgf = 980 N  
(B) 1 atm = 76 cm of mercury column  
(C) 1 atm =  $1.013 \times 10^5$  Pa  
(D) 1 N  $\approx$  10 gf

17. Select the Wrong statement

- (A) Force = Thrust / Area  
(B) S.I. Unit of Pressure is Pascal  
(C) Gravitational Pull is Minimum at Pole  
(D) Dyne is unit of Force in CGS System

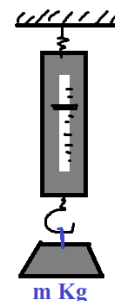
18. Consider the figure as shown. AP = 4 m, OA = 5 m. Force of Magnitude 10 N applied on the rigid body point A. O is a pivotal point. Select the correct statement

- (A) Moment of force = 40 Nm  
(B) Moment of force = 50 Nm  
(C) Maximum Torque by 10 N force at A is 30 Nm  
(D) 1 Nm =  $10^7$  Dyne cm



19. The weighing machine measured the weight of a mass m Kg as 12 Kgf as shown in the figure. The mass of the body is

- (A) 9.8 Kg  
(B) 10 Kg  
(C) 12 Kg  
(D) None of these



**ROUGH SPACE**

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20. Select wrong statement about force effect(s)?

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| (A) Stationary object to move        | (B) Deform the shape of object       |
| (C) Change the direction of movement | (D) Force can't stop a moving object |

21. Select the wrong statement

- (A) Muscular and Frictional force is a contact force
- (B) Gravitational pull is a contact force on the earth
- (C) Electrostatic force is much stronger than Gravitational pull
- (D) Contact force is always perpendicular to the surface.

22. Select the correct statement

- (A) Increase in area increases the pressure
- (B) Increasing the thrust on a fixed area decreases the pressure
- (C) Pressure is Inversely proportional to the area on which thrust applied
- (D) Dyne is the unit of Pressure in CGS System

23. Atmosphere applied \_\_\_\_\_ Pascal pressure on the sea water surface.

- |          |            |         |         |
|----------|------------|---------|---------|
| (A) 1000 | (B) 100000 | (C) 980 | (D) 9.8 |
|----------|------------|---------|---------|

24. 150 Nm = \_\_\_\_\_ Dyne cm

- |                       |                     |                       |                   |
|-----------------------|---------------------|-----------------------|-------------------|
| (A) $1.5 \times 10^7$ | (B) $3 \times 10^8$ | (C) $1.5 \times 10^9$ | (D) None of these |
|-----------------------|---------------------|-----------------------|-------------------|

25. A boy opens a nut by applying a force of 150 N using the wrench of length 30 cm. If he wants to open it by a force of 100 N, what should be the length of the wrench?

- |           |           |           |           |
|-----------|-----------|-----------|-----------|
| (A) 90 cm | (B) 15 cm | (C) 45 cm | (D) 10 cm |
|-----------|-----------|-----------|-----------|

ROUGH SPACE

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**PART – II (CHEMISTRY)**

**SINGLE OPTION CORRECT (+ 3, - 1, 0)**

26. The gas which is present in the coal mines and is the cause of explosion in coal mines is  
(A) methane (B) carbon monoxide (C) hydrogen (D) carbon dioxide
27. Which of the following is true?  
(A) Our demand for energy has decreased over the years.  
(B) We must use fossil fuels sparingly.  
(C) Coal as a fuel will last forever.  
(D) Fossil fuels do not create any pollution
28. Water gas is a mixture of  
(A)  $CO + N_2$  (B)  $CO + H_2$  (C)  $CO + CO_2$  (D)  $CO + N_2 + H_2$
29. Crude petroleum is also called  
(A) black gold (B) yellow gold (C) brown gold (D) white gold.
30. Mark the incorrect statement.  
(A) Burning of coal in a sufficient amount of oxygen produces carbon dioxide.  
(B) When coal burns in insufficient amount of oxygen, carbon monoxide is formed.  
(C) Charcoal is a better fuel than kerosene  
(D) LPG is considered to be a good fuel for domestic use.
31. When a substance X is hit with a hammer, it expands in size but does not break. This is because the substance is  
(A) ductile (B) hard (C) elastic (D) malleable.
32. Non-metals do not conduct electricity because  
(A) they have free electrons (B) they do not have free electrons  
(C) they are electron donors (D) they are electron acceptors
33. A copper coin is kept immersed in a solution of silver nitrate for some time. What will happen to the coin and the colour of the solution?  
(A) Silver metal will be deposited on coin and solution will turn blue.  
(B) Solution will remain colourless and coin will  
(C) Both solution and the coin will turn blue.  
(D) Both solution and the coin will become colourless

34. Tungsten is used in electric bulbs because

- |                                  |                               |
|----------------------------------|-------------------------------|
| (A) it is sonorous               | (B) it has high melting point |
| (C) it has high tensile strength | (D) it has high density       |

35. Mercury is used in thermometers because

- |                                    |                           |
|------------------------------------|---------------------------|
| (A) it does not stick to the glass | (B) it expands on heating |
| (C) it is a liquid                 | (D) all of these.         |

### PART – III (BIOLOGY)

#### SINGLE OPTION CORRECT (+ 3, - 1, 0)

36. Which of the following reproduces only inside a host cell

- |              |            |           |            |
|--------------|------------|-----------|------------|
| (A) Bacteria | (B) Amoeba | (C) Virus | (D) Fungus |
|--------------|------------|-----------|------------|

37. The two micro-organisms which live in symbiotic association in lichens are

- |                       |                         |
|-----------------------|-------------------------|
| (A) Fungus & protozoa | (B) bacteria & protozoa |
| (C) alga & Fungus     | (D) alga & bacteria     |

38. The gas released in the preparation of bread is

- |            |              |                     |                    |
|------------|--------------|---------------------|--------------------|
| (A) Oxygen | (B) Nitrogen | (C) Sulphur dioxide | (D) carbon dioxide |
|------------|--------------|---------------------|--------------------|

39. Pathogenic micro-organisms present in host cells are killed by

- |                 |                 |              |                |
|-----------------|-----------------|--------------|----------------|
| (A) Pain Killer | (B) antibiotics | (C) vaccines | (D) antibodies |
|-----------------|-----------------|--------------|----------------|

40. A disease caused by virus is

- |             |               |               |             |
|-------------|---------------|---------------|-------------|
| (A) Typhoid | (B) dysentery | (C) influenza | (D) cholera |
|-------------|---------------|---------------|-------------|

41. The disease caused by a protozoan and spread by an insect is

- |            |           |             |             |
|------------|-----------|-------------|-------------|
| (A) Dengue | (B) polio | (C) malaria | (D) measles |
|------------|-----------|-------------|-------------|

42. The process of conversion of sugar into alcohol is

- |                  |                     |                   |                |
|------------------|---------------------|-------------------|----------------|
| (A) fermentation | (B) crystallization | (C) sedimentation | (D) filtration |
|------------------|---------------------|-------------------|----------------|

43. Who discovered penicillin

- |                       |                   |                   |                   |
|-----------------------|-------------------|-------------------|-------------------|
| (A) Alexander Fleming | (B) Louis Pasteur | (C) Edward Jenner | (D) None of these |
|-----------------------|-------------------|-------------------|-------------------|



44. Streptomycin, erythromycin is example of

- (A) vaccines                      (B) Antibodies                      (C) Antibiotics                      (D) none of these

45. Which one of following methods of preserving food pasteurization

- (A) sugar    (B) preservatives  
(C) Heat and cold treatments                      (D) chemical method

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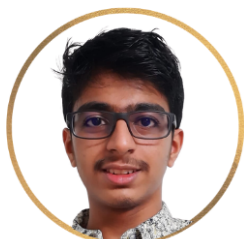
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