

# SYLLABAX

OLYMPIAD PRACTICE SERIES

## Class 7 — Olympiad Practice Paper

Total Questions: 50 | Mathematics · Science · Logical Reasoning · English · General Knowledge

✓ All answers verified | ✓ Olympiad level | ✓ Free to download

**Instructions:** Each question carries 1 mark. Only one option (A/B/C/D) is correct. No negative marking. Answer key is provided at the end of this paper. | **Time suggested:** 45 minutes.

### MATHEMATICS

- If  $x + y = 10$  and  $x^2 + y^2 = 68$ , find  $xy$ .  
A) 12  
B) 14  
C) 16  
D) 18
- The equation  $x^2 - kx + 9 = 0$  has equal roots. What is the value of  $k$ ?  
A) 3  
B) 4  
C) 6  
D) 9
- The area of an equilateral triangle with side 6 cm is:  
A)  $9 \text{ cm}^2$   
B)  $9\sqrt{3} \text{ cm}^2$   
C)  $18 \text{ cm}^2$   
D)  $36 \text{ cm}^2$
- In an AP, the sum of first  $n$  terms is  $S_n = 3n^2 + 2n$ . What is the 5th term?  
A) 25  
B) 27  
C) 29  
D) 31
- A geometric progression has first term 3 and common ratio 2. What is the sum of the first 6 terms?  
A) 126  
B) 162  
C) 189  
D) 252
- How many 3-digit numbers are divisible by 13?  
A) 67  
B) 68  
C) 69  
D) 70
- If  $\log_3 x = 4$ , what is  $x$ ?  
A) 12  
B) 27  
C) 64  
D) 81



17. An electron gains  $3.2 \times 10^{-19}$  J. How many electron-volts is this? ( $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$ )
- A) 1 eV  
B) 2 eV  
C) 4 eV  
D) 8 eV
- 
18. For  $A + B \rightleftharpoons C + D$ ,  $K_c = 4$ . If  $[A] = [B] = 1 \text{ M}$  at equilibrium, what is  $[C] = [D]$ ?
- A) 1 M  
B) 2 M  
C) 4 M  
D) 8 M
- 
19. When a gas condenses to a liquid, the entropy change  $\Delta S$  is:
- A)  $\Delta S > 0$   
B)  $\Delta S = 0$   
C)  $\Delta S < 0$   
D) Cannot be determined
- 
20. A photon has wavelength  $6 \times 10^{-7} \text{ m}$ . Its energy = ? ( $h = 6.6 \times 10^{-34} \text{ J}\cdot\text{s}$ ,  $c = 3 \times 10^8 \text{ m/s}$ )
- A)  $1.1 \times 10^{-19} \text{ J}$   
B)  $2.2 \times 10^{-19} \text{ J}$   
C)  $3.3 \times 10^{-19} \text{ J}$   
D)  $6.6 \times 10^{-19} \text{ J}$
- 
21. In a hydrogen atom, the electron jumps from  $n=3$  to  $n=1$  orbit. The emitted photon belongs to the \_\_\_ series:
- A) Lyman  
B) Balmer  
C) Paschen  
D) Brackett
- 
22. In Mendel's experiment, when a pure tall plant (TT) was crossed with a pure dwarf plant (tt), what percentage of  $F_1$  offspring were tall?
- A) 25%  
B) 50%  
C) 75%  
D) 100%
- 
23. The second law of thermodynamics states that the entropy of an isolated system:
- A) Always decreases  
B) Always remains constant  
C) Always increases or stays the same  
D) Can increase or decrease equally
- 
24. What is the hybridisation of carbon in ethene ( $\text{C}_2\text{H}_4$ )?
- A) sp  
B)  $\text{sp}^2$   
C)  $\text{sp}^3$   
D)  $\text{sp}^3\text{d}$
- 
25. Two identical waves moving in the same direction with a phase difference of  $\pi$  undergo:
- A) Constructive interference  
B) Destructive interference  
C) No interference  
D) Diffraction
- 
26. In a transformer, primary has 200 turns at 400V. Secondary has 50 turns. Output voltage = ?
- A) 50V  
B) 100V  
C) 200V  
D) 400V
- 
27. Which quantum number determines the SHAPE of an orbital?
- A) Principal (n)  
B) Azimuthal (l)  
C) Magnetic (m)  
D) Spin (s)
- 
28. A buffer solution resists changes in pH when:
- A) A strong acid is added only  
B) A strong base is added only  
C) Small amounts of acid or base are added  
D) Temperature changes

29. Which type of bond involves sharing of 3 electron pairs between two atoms?

- A) Single bond
- B) Double bond
- C) Triple bond
- D) Ionic bond

30. The phenomenon of TOTAL INTERNAL REFLECTION requires:

- A) Light going from denser to rarer medium at an angle exceeding critical angle
- B) Light going from rarer to denser medium
- C) Any light hitting a reflective surface
- D) Polarised light only

## LOGICAL REASONING

31. Find the next term: 2, 5, 11, 23, 47, \_\_\_

- A) 89
- B) 93
- C) 95
- D) 97

32. Find the odd one out: 2, 5, 10, 17, 26, 35, 50

- A) 10
- B) 17
- C) 35
- D) 50

33. What comes next in the pattern shown?



- A) Triangle
- B) Square
- C) Circle
- D) Star

34. P is the father of Q. R is the brother of S. Q is the wife of S. How is P related to R?

- A) Father
- B) Father-in-law
- C) Uncle
- D) Brother

35. If TRIANGLE is coded as SUHDQJOH (each letter -1), what does NBUIT decode to?

- A) MATHS
- B) LOGIC
- C) ATLAS
- D) MATCH

36. A watch shows 3:15 PM. What is the acute angle between the hour and minute hands?

- A)  $0^\circ$
- B)  $7.5^\circ$
- C)  $15^\circ$
- D)  $22.5^\circ$

37. In a group of 50 people: 30 speak English, 25 speak French, 10 speak both. How many speak NEITHER?

- A) 3
- B) 4
- C) 5
- D) 6

38. In a  $5 \times 5$  grid, how many squares of ALL sizes are there?

- A) 25
- B) 50
- C) 55
- D) 60

39. A number is divisible by 9 and by 11. It lies between 1000 and 1100. What is it?

- A) 1008
- B) 1053
- C) 1089
- D) 1098

40. There are 10 points on a circle. How many chords can be drawn?

- A) 40
- B) 45
- C) 50
- D) 55

## ENGLISH

41. Choose the SUBJUNCTIVE mood: 'If I \_\_\_ the president, I would fix the roads.'

- A) am
- B) was
- C) were
- D) will be

42. Identify the DANGLING MODIFIER: 'Running down the street, the rain soaked me.'

- A) Running down the street
- B) the rain
- C) soaked
- D) me

43. Choose the word that BEST completes the analogy: Sycophant is to FLATTERY as Demagogue is to:

- A) Wisdom
- B) Logic
- C) Rhetoric
- D) Silence

44. What is the meaning of the Latin phrase 'PRIMA FACIE'?

- A) At first glance
- B) After the fact
- C) Under obligation
- D) By chance

45. Identify the OXYMORON:

- A) The sun set slowly
- B) She ran fast
- C) Living death
- D) A bright star

## GENERAL KNOWLEDGE

46. Which country has the highest number of natural UNESCO World Heritage Sites?

- A) USA
- B) China
- C) Australia
- D) Brazil

47. The Heisenberg Uncertainty Principle states that we cannot simultaneously know precisely:

- A) Mass and charge
- B) Position and momentum
- C) Speed and temperature
- D) Energy and time

48. Which programming paradigm treats computation as the evaluation of mathematical functions?

- A) Object-oriented
- B) Procedural
- C) Functional
- D) Imperative

49. What is the name of the phenomenon where light bends around massive objects (predicted by General Relativity)?

- A) Doppler effect
- B) Gravitational lensing
- C) Redshift
- D) Parallax

50. The Kyoto Protocol (1997) was an international agreement to reduce:

- A) Nuclear weapons
- B) Greenhouse gas emissions
- C) Ocean pollution
- D) Ozone-depleting substances

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## Answer Key – Class 7 Olympiad Practice Paper

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1. C	2. C	3. B	4. C	5. C	6. C	7. D	8. B	9. C	10. C
11. B	12. C	13. D	14. D	15. B	16. C	17. B	18. B	19. C	20. C
21. A	22. D	23. C	24. B	25. B	26. B	27. B	28. C	29. C	30. A
31. C	32. C	33. B	34. B	35. A	36. B	37. C	38. C	39. C	40. B
41. C	42. A	43. C	44. A	45. C	46. B	47. B	48. C	49. B	50. B

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