



SAMPLE PAPER

International Olympiad Foundation



EXCELLENCE IN EDUCATION

International Olympiad Foundation

14+

OLYMPIADS

MCQ

FORMAT

0

NEGATIVE MARKS

OLYMPIAD

Mathematics Olympiad

International Olympiad Foundation (IOF) · www.iof.education

CLASS / GRADE

Class 10

SUBJECT

IFMO

DURATION

60 Min

MAX MARKS

50

GENERAL INSTRUCTIONS

- All questions are Multiple Choice Questions (MCQs) with options A, B, C, D, E
- Each correct answer carries 1 mark. No negative marking for wrong answers.
- Rough work should be done separately. Do not write on question paper.

PAPER HIGHLIGHTS

• **Multiple Choice Questions (MCQ)**

Five options per question (A, B, C, D, E). Select the single most appropriate answer.

• **No Negative Marking**

1 mark per correct answer. Zero deductions — attempt every question.

• **Conducted by IOF**

International Olympiad Foundation — fostering excellence among students across India.

SUBJECTS

- Cyber
- English
- Entrepreneurship
- Mathematics
- Commerce
- Economics
- GK & Current Affairs
- Science
- Western Music
- Sanskrit
- Indian Music
- Hindi
- Reasoning & Aptitude
- Spell Talent

ALL IOF OLYMPIAD PROGRAMMES

| | | | | | | |
|---|---|---|--|---|--|---|
| IFCO International Foundation Cyber Olympiad | IFEO International Foundation English Olympiad | IFEnO International Foundation Entrepreneurship Olympiad | IFMO International Foundation Mathematics Olympiad | ICS Institute of Company Secretaries of India Commerce Olympiad | IFeCO International Foundation Economics Olympiad | IFGCO International Foundation General Knowledge & Current Affairs Olympiad |
| IFSO International Foundation Science Olympiad | IFWMuO International Foundation Western Music Olympiad | IFSaO International Foundation Sanskrit Olympiad | IFIMuO International Foundation Indian Music Olympiad | IFHO International Foundation Hindi Olympiad | IFRAO International Foundation Reasoning & Aptitude Olympiad | IFSTO International Foundation Spell Talent Olympiad |

Q1. Which word completes the second pair in the same way as first pair?

[+1]

Mature : Regressed :: Varied : ?

[-0]

- A. Rhythmic
- B. Monotonous
- C. Decorous
- D. Obsolete
- E. None of these

Q2. Choose the correct option.

[+1]

Preface is to Book as overture is to _____ .

[-0]

- A. Ballad
- B. Opera
- C. Novel
- D. Symphony
- E. None of these

Q3. Select the lettered pair that has the same relationship as the original pair of words.

[+1]

Sculptor : Atelier

[-0]

- A. Painter : Portrait
- B. Miner : Quarry
- C. Poet : Sonnet
- D. Man : House
- E. None of these

Q4. Choose the odd one out.

[+1]

Nerves , Auricle , Artery , Valve

[-0]

- A. Nerves
- B. Auricle
- C. Artery
- D. Valve
- E. None of these

Q5. Choose the odd one out from the given options.

[+1]

- A. 24 - 21
- B. 46 - 32
- C. 62 - 23
- D. 84 - 24
- E. None of these

[-0]

Q6. Choose the wrong term.

8 , 13, 21, 32, 47, 63, 83

- A. 13
- B. 21
- C. 32
- D. 47
- E. None of these

Q7. Choose the correct option to continue the series.

ejo tyd ins xch ?

- A. nrw
- B. mrw
- C. msx
- D. nsx
- E. None of these

Q8. If in a certain language, MACHINE is coded as LBBIHOD, which word would be coded as SLTMFNB?

- A. RKSLEMA
- B. TKULGMC
- C. RMSNEOA
- D. TMUNQOC
- E. None of these

Q9. Manik walked 40 meters towards North, took a left turn and walked 20 meters. He again took a left turn and walked 40 meters. How far and in which direction is he from the starting point?

- A. 20 meters East
- B. 20 metres North
- C. 20 metres South
- D. 20 metres West
- E. None of these

Q10. E is the son of A. D is the son of B, E is married to C, C is B's daughter. How is D related to E?

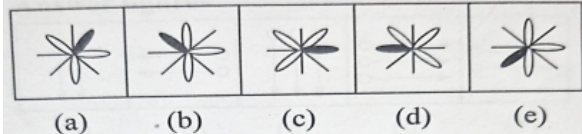
- A. Brother
- B. Uncle
- C. Father-in-law
- D. Brother-in-law
- E. None of these

Q11. Arrange the given words as in a dictionary and select the one which will come in the middle.

Nozzle , Nausea , Nostril , Normal , Nomenclature

- A. Nozzle
- B. Nausea
- C. Nostril
- D. Normal
- E. Nomenclature

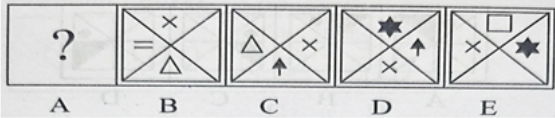
Q12. Choose the figure which is different from others.



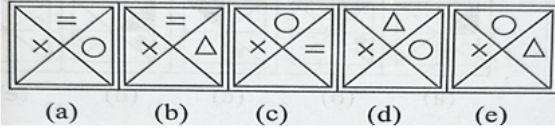
- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. (e)

Q13. Select one of the figures from the set of Answer figures which will complete the sequence of problem figures.

Problem Figure



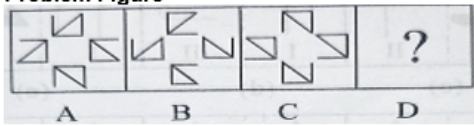
Answer Figure



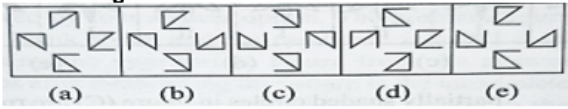
- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. (e)

Q14. Which figure completes the second pair in the same way as first pair? [+1]

Problem Figure [-0]

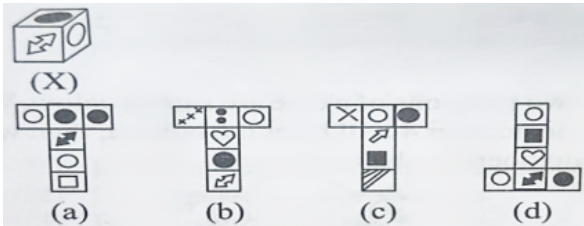


Answer Figure



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. (e)

Q15. Select the option which can be formed by unfolding the given cube(X). [+1]



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

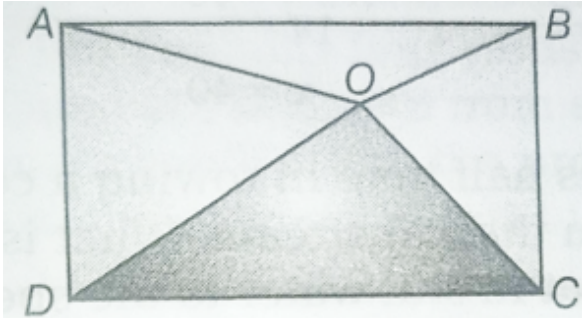
Q16. If ΔABC is an equilateral triangle such that $A(2,2)$ and centroid of the triangle is $(-2,2)$, then find the length of its side. [+1]

- A. 4 units [-0]
- B. 6 units
- C. $4\sqrt{3}$ units
- D. 9 units
- E. None of these

Q17. The sum of the first 'p' odd natural numbers is 100 and the sum of the first 'q' even natural numbers is 90, find the value of $(p+q)$. [+1]

- A. 18 [-0]
- B. 19
- C. 20
- D. 21
- E. None of these

- Q18.** In the given figure, ABCD is a rectangle such that area of $\Delta AOB = am^2$, area of $\Delta AOD = bm^2$, area of $\Delta COD = cm^2$. What is the area of ΔBOC (in m^2)? [+1]



- A. $a+b+c$
 B. $a+b-c$
 C. $b+c-a$
 D. $a+c-b$
 E. None of these
- Q19.** Choose the correct option. [+1]

If $(2^x - 4)^3 + (4^x - 2)^3 = (4^x + 2^x - 6)^3$, then the sum of all real values of x is [-0]

- A. 0.5
 B. 1.5
 C. 2.5
 D. 3.5
 E. None of these
- Q20.** Choose the correct option. [+1]

If $\operatorname{cosec} x + \cot x = a$, then the value of $\cos x$ is [-0]

- A. $a^2 + \frac{1}{a^2}$ B. $\frac{a^2+1}{a^2-1}$
 C. $\frac{a^2-1}{a^2+1}$ D. $\frac{a^2+1}{2a}$

- A. A
 B. B
 C. C
 D. D
 E. None of these

- Q21.** In an AP 2, 5, 8, 11, 452, the mean of 15th, 16th, 136th and 137th terms is [+1]

- A. 120
 B. 227
 C. 220
 D. 454
 E. None of these [-0]

Q22. The product of two 2-digits numbers is 2160 and their HCF is 12. Find the sum of the numbers.

- A. 72
- B. 84
- C. 96
- D. 60
- E. None of these

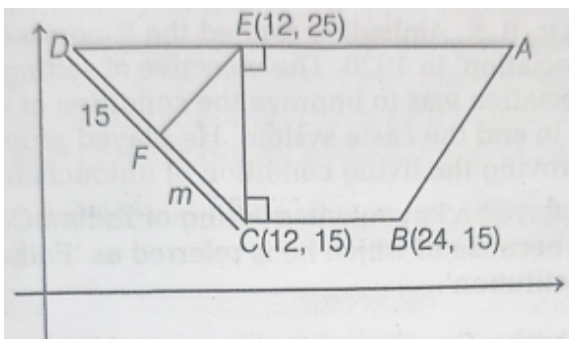
Q23. The angles of a pentagon are in arithmetic progression. What is the sum of the smallest and largest angle?

- A. 172°
- B. 108°
- C. 180°
- D. 216°
- E. None of these

Q24. If p , q , r and s are distinct prime numbers such that $p+q+r = 72$, $p+r+s = 74$, $q+r+s=89$. The largest of these p,q,r and s is

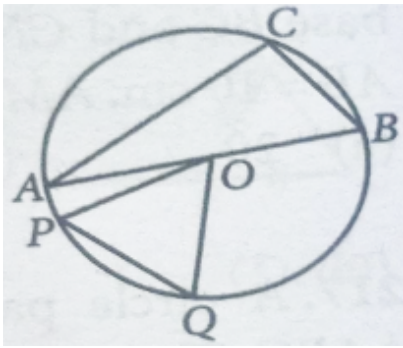
- A. $r = 53$
- B. $q = 53$
- C. $s = 53$
- D. $s = 49$
- E. None of these

Q25. In the given figure, find the value of m .



- A. 5
- B. 10
- C. 7
- D. 12
- E. None of these

- Q26.** AB is a diameter of the circle shown in the figure and O is the centre of it. If $m\angle A=30^\circ$ and $m\angle POQ=60^\circ$, what is the ratio between the areas of ΔPOQ and ΔABC ? [+1]



- A. $\sqrt{3} : 2$
 B. $\sqrt{3} : 1$
 C. $3 : 2$
 D. $1 : 2$
 E. None of these

- Q27.** The line containing the points $(c,8)$ and $(a,0)$ is perpendicular to the line containing the points $(-c, c)$ and $(3c,a)$. If $a = 10$, then what is the value of $a + c$? [+1]

- A. 22
 B. 12
 C. 10
 D. 6
 E. None of these

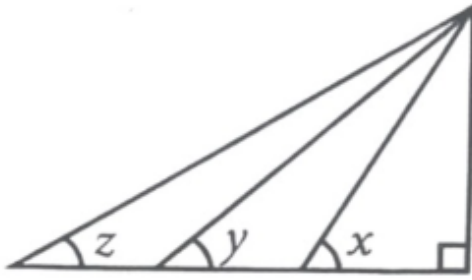
- Q28.** A circle having centre at origin passes through the point $(\frac{13}{2}, 0)$. Which of the following points does not lie inside the circle? [+1]

- A. $(-\frac{3}{4}, 1)$ B. $(2, \frac{7}{3})$
 C. $(5, \frac{1}{2})$ D. $(-6, \frac{5}{2})$

- A. A
 B. B
 C. C
 D. D
 E. None of these

Q29. The base of a right triangle is trisected as shown in the figure.

What is $\tan x : \tan y : \tan z$?



- A. 2 : 3 : 6
- B. 3 : 2 : 1
- C. 1 : 2 : 3
- D. 6 : 3 : 2
- E. None of these

Q30. Choose the correct option.

If $\cos \theta + \sin \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = v$, then the value of v is.

- A. $\frac{p^2}{2p-1}$
- B. $\frac{2p-1}{p^2}$
- C. $\frac{2p}{p^2-1}$
- D. $\frac{p^2-1}{2p}$
- E. None of these

- A. A
- B. B
- C. C
- D. D
- E. E

Q31. If the height of right circular cylinder is increased by 10% while the radius of base is decreased by 10% then curved surface area of cylinder

- A. Remains same
- B. Decreases by 1%
- C. Increases by 1%
- D. Increases by 0.1%
- E. None of these

Q32. The areas of three adjacent faces of a cuboid are a , b and c respectively. Twice of its volume is

- A. $2abc \text{ m}^3$
- B. $2\sqrt{a^2 + b^2 + c^2} \text{ m}^3$
- C. $2\sqrt{abc} \text{ m}^3$
- D. $6\sqrt{abc} \text{ m}^3$

- A. A
- B. B
- C. C
- D. D
- E. None of these

Q33. In a class average height of all students is 'p' cm. Among them, average height of 10 students is 'q' cm and the average height of the remaining students is 'r' cm. The number of students in the class is [+1] [-0]

A. $\frac{p(q-r)}{(p-r)}$

B. $\frac{q-r}{p-r}$

C. $\frac{q-r}{10(p-r)}$

D. $\frac{10(q-r)}{(p-r)}$

- A. A
- B. B
- C. C
- D. D
- E. None of these

Q34. On dividing a natural number x by 11, the remainder is 3, and on dividing x by 17, the remainder is 9. If the number x lies between 300 and 400, then the remainder on dividing x by 21 is [+1] [-0]

- A. 9 but not 11
- B. 11 but not 9
- C. Both 9 and 11
- D. Neither 9 nor 11
- E. None of these

Q35. Suppose the graphs of $15x + 20y = -2$ and $x - y = -2$ intersect at a point P. If the graph of $2x + 3y = k^2$ passes through P, then k is [+1] [-0]

- A. an integer
- B. a positive integer
- C. a negative integer
- D. not an integer but rational
- E. None of these

Q36. A number is picked up at random from the numbers from 1 to 1000. The probability that it is of the form m^n (where $m > 1, n > 1$) is [+1] [-0]

A. $\frac{1}{20}$

B. $\frac{1}{25}$

C. $\frac{1}{30}$

D. $\frac{1}{39}$

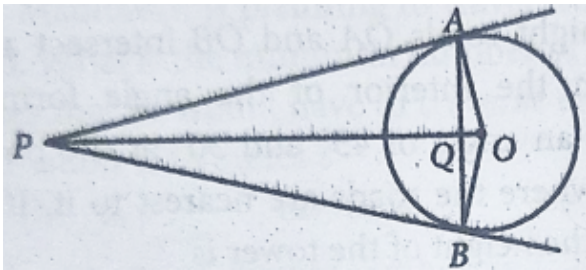
- E. None of these

Q37. Let $A(-5, 5)$, $B(4, -5)$ and $C(4, 5)$ be the vertices of the triangle ABC . If a circle passes through the vertices of $\triangle ABC$, then the area (in sq. units) lying inside the circle but outside the $\triangle ABC$ is

- A. $\frac{181}{2} \pi - 45$ B. $\frac{181}{2} \pi - 40$
 C. $\frac{181}{4} \pi - 45$ D. $\frac{181}{4} \pi - 40$

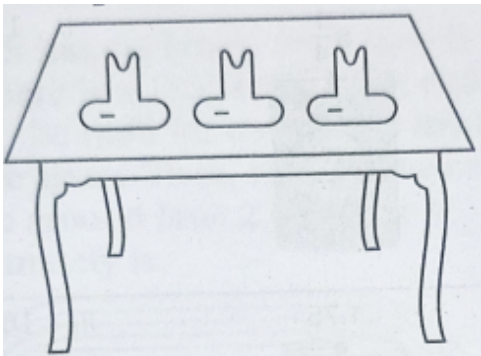
- A. A
 B. B
 C. C
 D. D
 E. None of these

Q38. Two tangents PA and PB are drawn to a circle with centre O from an external point P . The chord AB intersects the line segment PO at Q such that $AB \perp PO$ then the , square of the radius of the circle is



- A. $OQ \times QP$
 B. $OQ \times OP$
 C. $PQ \times AB$
 D. $PA \times PB$
 E. None of these

Q39. A magician places three hats on a table from left to right, as shown below, inside each of the hats, a distinct number has been written but the magician is unaware about this. What is the probability that the hats have been placed in increasing order of the number written inside?



- A. $\frac{2}{3}$
 B. $\frac{1}{2}$
 C. $\frac{1}{6}$
 D. $\frac{1}{3}$
 E. None of these

Q40. Choose the correct option.

[+1]

If r and s are zeroes of the polynomial $t^2 - 4t + 3$, then $\frac{1}{r} + \frac{1}{s} - 2rs + \frac{14}{3}$ is equal to

[-0]

- A. 0
- B. 1
- C. 2
- D. -1
- E. None of these

Q41. The line segment joining the points (a, b) and (c, d) subtends an angle θ at the origin such that $ac + bd = 0$, then what is the measure of angle θ ?

[+1]

- A. 60°
- B. 30°
- C. 45°
- D. 90°
- E. None of these

Q42. If mean of 10 consecutive odd numbers is 120, then the mean of first five odd numbers among them is

[+1]

- A. 113
- B. 115
- C. 114
- D. 116
- E. None of these

[-0]

Q43. The diameter of a sphere is decreased by 25%. By what percent does its curved surface area decrease?

[+1]

- A. 25%
- B. 56.25%
- C. 43.75%
- D. 62.5%
- E. None of these

[-0]

Q44. The angles of elevation of the top of a 12m high tower from two points in opposite directions with it are complementary. If distance of one point from its base is 16m, then distance of second point from tower's base is

[+1]

- A. 24m
- B. 9m
- C. 12m
- D. 18m
- E. None of these

[-0]

Q45. In a circle of 10cm radius, two chords $AB=AC=12$ cm, then the length of the chord BC is

[+1]

- A. 12cm
- B. 9.6cm
- C. 19.2cm
- D. 7.2cm
- E. None of these

[-0]

Q46. Choose the correct option.

[+1]

It is known that area of a cyclic quadrilateral is $\sqrt{(s-a)(s-b)(s-c)(s-d)}$ where a, b, c, d are the sides and $s = \frac{a+b+c+d}{2}$. If a circle can also be inscribed in the cyclic quadrilateral, then what is the area of quadrilateral?

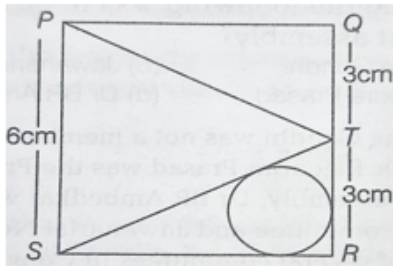
[-0]

- A. $\sqrt{(ab)^2 + (cd)^2}$ B. \sqrt{abcd}
 C. $\sqrt{(ac)^2 + (bd)^2}$ D. $\sqrt{(ad)^2 + (bc)^2}$

- A. A
 B. B
 C. C
 D. D
 E. None of these

Q47. In the given figure, PQRS is a square of side 6cm each and T is midpoint of QR. What is the radius of circle inscribed in ΔTSR .

[-0]



- A. $\frac{3}{3-\sqrt{5}}$ B. $\frac{6}{3+\sqrt{5}}$
 C. $\frac{2}{3+\sqrt{5}}$ D. $3 + \sqrt{5}$

- A. A
 B. B
 C. C
 D. D
 E. None of these

Q48. The sum of the squares of the third and the thirteenth terms of an A. P. is 5 and the product of the fourth and twelfth terms is R. Then, the product of the third and thirteenth terms of the A. P. is

[+1]

[-0]

- A. $\frac{80+50R}{41}$ B. $\frac{80+50R}{82}$
 C. $\frac{100R-45}{82}$ D. $\frac{100R-45}{41}$

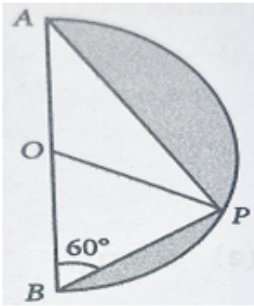
- A. A
 B. B
 C. C
 D. D
 E. None of these

Q49. A rectangular plot is of length 28m and width 14m. A conical pit of diameter 7m and depth 3m with flat surface upward and vertex downward is dug at one corner of the plot. The soil dug out is spread uniformly over the remaining area of the plot. The best approximation value of the increment in the level of the remaining plot is _____ .

(take $\pi = \frac{22}{7}$)

- A. 10.5 cm
- B. 10.9 cm
- C. 9.9 cm
- D. 9.5 cm
- E. None of these

Q50. In the given figure, a semicircle with centre 'O' is drawn on AB. If $\angle ABP = 60^\circ$, then the ratio of area of larger to smaller shaded region is (Scroll down to view complete question)



- | | |
|--|--|
| A. $\frac{4\pi - 2\sqrt{3}}{2\pi - 2\sqrt{3}}$ | B. $\frac{4\pi - 3\sqrt{3}}{3\pi - 3\sqrt{3}}$ |
| C. $\frac{4\pi - 3\sqrt{3}}{2\pi - 3\sqrt{3}}$ | D. $\frac{2\pi - 2\sqrt{3}}{\pi - 2\sqrt{3}}$ |

- A. A
- B. B
- C. C
- D. D
- E. None of these



CLASS / GRADE

Class 10

SUBJECT

IFMO

TOTAL QUESTIONS

50

MAX MARKS

50

ANSWER SHEET — 50 QUESTIONS

| Q# | ANS | Q# | ANS | Q# | ANS | Q# | ANS | Q# | ANS |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Q01 | B | Q11 | D | Q21 | B | Q31 | B | Q41 | D |
| Q02 | B | Q12 | A | Q22 | C | Q32 | C | Q42 | B |
| Q03 | B | Q13 | A | Q23 | D | Q33 | D | Q43 | C |
| Q04 | A | Q14 | C | Q24 | A | Q34 | A | Q44 | B |
| Q05 | C | Q15 | B | Q25 | A | Q35 | A | Q45 | C |
| Q06 | D | Q16 | C | Q26 | D | Q36 | B | Q46 | B |
| Q07 | B | Q17 | B | Q27 | B | Q37 | C | Q47 | B |
| Q08 | B | Q18 | D | Q28 | D | Q38 | B | Q48 | C |
| Q09 | D | Q19 | D | Q29 | D | Q39 | C | Q49 | B |
| Q10 | D | Q20 | C | Q30 | C | Q40 | B | Q50 | C |

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