

FACULTY SELECTION TEST
PRE-FOUNDATION
MATHEMATICS
SAMPLE PAPER

Time: 90 mins.

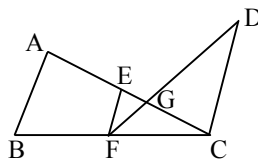
Max. Marks: 240

GENERAL INSTRUCTIONS

1. Write your Name in the Space Provided in the Bottom of this Booklet.
2. The question paper consists of '60' objective type questions.
3. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.
4. Each correct answer carries **4 marks** and each wrong answer **(– 1) Mark**.
5. Use **Black or Blue Ball Point Pen** only for filling particulars.
6. Use of Blank Papers, Clip Boards, Calculator, Log Table, Slide Rule and Mobile or any electronic gadgets in any form is not allowed.
7. In case of any dispute, the answer filled in the OMR sheet available with the institute shall be final.
8. After completion submit the Question Paper back along with the Answer Sheet.

Name: _____

- Q.1** If the altitude of an equilateral triangle is $\sqrt{6}$ cm, its area (in cm^2) is
 (1) $2\sqrt{2}$ (2) $2\sqrt{3}$ (3) $3\sqrt{3}$ (4) $6\sqrt{2}$
- Q.2** If $\sin \theta + \operatorname{cosec} \theta = 2$, then $\sin^2 \theta + \operatorname{cosec}^2 \theta =$
 (1) 1 (2) 4 (3) 2 (4) None of these
- Q.3** If the volume of a sphere is divided by its surface area, the result is 27 cm. The radius of the sphere is -
 (1) 9 cm (2) 27 cm (3) 81 cm (4) 243 cm
- Q.4** The radius of a cylinder is the same as that of a sphere. Their volume are equal. The height of the cylinder is how many times its radius ?
 (1) $4/3$ (2) $2/3$ (3) 1 (4) 2
- Q.5** If AB , EF and DC are parallel in given figure and $EG = 5\text{cm}$, $GC = 10\text{ cm}$, $AB = 15\text{ cm}$, $DC = 18\text{ cm}$, then $EF + AC$ is



- (1) 35 (2) 34 (3) 24 (4) 25
- Q.6** A water tap fills a tank in ' p ' hours & the tap of the bottom of the tank empties it in q hours. If p is less than q & when both taps are open, the tank is filled in r hours, then
 (1) $\frac{1}{r} = \frac{1}{p} + \frac{1}{q}$ (2) $\frac{1}{r} = \frac{1}{p} - \frac{1}{q}$ (3) $r = p + q$ (4) $r = p - q$
- Q.7** How many four digit numbers are there with distinct digits ?
 (1) 5016 (2) 4891 (3) 4703 (4) 4536
- Q.8** Find the quadratic equation whose roots are $\sec^2\theta$ & $\operatorname{cosec}^2\theta$
 (1) $x^2 - x + 1 = 0$ (2) $x^2 - 2x + 2 = 0$ (3) $x^2 - 4x + 4 = 0$ (4) $x^2 - 6x + 6 = 0$



- Q.9** There are 4 numbers. The HCF of each pair is 7 & LCM of all is 1470. What is the product of the 4 numbers.
 (1) 504210 (2) 502410 (3) 504120 (4) 501420
- Q.10** The value of $\left(\sqrt[6]{27} - \sqrt{6\frac{3}{4}}\right)^2$ is equal to
 (1) $\frac{\sqrt{3}}{2}$ (2) $\frac{3}{2}$ (3) $\frac{\sqrt{3}}{4}$ (4) $\frac{3}{4}$
- Q.11** If $q(x) = 3x^4 - 5x^3 + x^2 + 8$ then find the value of $q(-1)$
 (1) 17 (2) 11 (3) 13 (4) 16
- Q.12** If the unit digit in the product $(129 \times 256 \times 47^* \times 1484)$ is 2, the digit in place of (*) is
 (1) 1 (2) 6 (3) 7 (4) 4
- Q.13** How many terms of the geometric series $1 + 4 + 16 + 64 + \dots$ will make the sum 5461 ?
 (1) 6 (2) 7 (3) 8 (4) 9
- Q.14** The inverse of $3 - 2i$ is
 (1) $3 + 2i$ (2) $\frac{3}{13} - \frac{2}{13}i$ (3) $\frac{3}{13} + \frac{2}{13}i$ (4) $3 - 2i$
- Q.15** The vertex of $x^2 + 2y - 3x + 5 = 0$ is
 (1) $(3/2, 11/8)$ (2) $(-3/2, 11/8)$ (3) $(3/2, -11/8)$ (4) $(-3/2, -11/8)$
- Q.16** If a, b are the two roots of a quadratic equation such that $a + b = 24$ and $a - b = 8$, then the quadratic equation having a and b as its roots is
 (1) $x^2 + 2x + 8 = 0$ (2) $x^2 - 4x + 8 = 0$ (3) $x^2 - 24x + 128 = 0$ (4) $2x^2 + 8x + 9 = 0$
- Q.17** The least number which should be subtracted from 11075 to make it a perfect square is
 (1) 25 (2) 50 (3) 55 (4) 75



Q.18 The H.C.F. of two numbers is 12 and their L.C.M. is 168. If the sum of these two numbers is 108, then their difference is

- (1) 36 (2) 48 (3) 60 (4) 72

Q.19 Orthocenter of the triangle whose vertices are (0, 0), (3, 0) and (0, 4) is

- (1) (0, 0) (2) (1, 1) (3) (2, 2) (4) (3, 3)

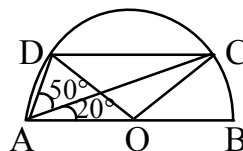
Q.20 The equation of the line passing through the point (−3, 2) and parallel to x – axis is

- (1) $x + 3 = 0$ (2) $x - 3 = 0$ (3) $y - 2 = 0$ (4) $y + 2 = 0$

Q.21 A real number $\frac{2^2 \times 3^2 \times 7^2}{2^5 \times 5^3 \times 3^2 \times 7}$ will have

- (1) Terminating decimal
 (2) Non-terminating decimal
 (3) Non-terminating and non-repeating decimal
 (4) Terminating repeating decimal

Q.22 In the given figure, AB is a diameter of a circle with centre O and $CD \parallel BA$. If $\angle BAC = 20^\circ$, $\angle CAD = 50^\circ$, then $\angle ADC$ is



- (1) 110° (2) 70° (3) 160° (4) 40°

Q.23 If both perpendiculars which are drawn from mid point of any side of a triangle are equal then

- (1) any two angles of Δ are same
 (2) Perimeter of Δ is equal to sum of both perpendiculars
 (3) Perimeter of Δ is equal to half of sum of both perpendiculars
 (4) None of these



Q.24 The number of natural values of x , which are solutions of $15x^2 - 7y^2 = 9$

- (1) 0 (2) 1 (3) 2 (4) 4

Q.25 If $ax^3 + bx + c$ has a factor of the form $x^2 + px + 1$ then $a^2 - c^2 =$

- (1) ab (2) $\frac{1}{2} ab$ (3) \sqrt{ac} (4) $\frac{1}{2} ac$

Q.26 Find the value of $\sqrt[3]{\frac{0.027}{0.008}} - \sqrt{\frac{0.09}{0.04}} - 1$

- (1) 1 (2) -1 (3) 0 (4) $\frac{3}{2}$

Q.27 Robert tosses a coin three times. The probability that he gets atleast two head is :

- (1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{5}$

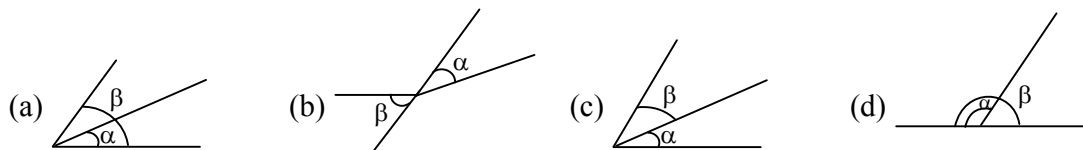
Q.28 The diameter of the wheel of a bicycle is 40 cm. The speed of bicycle if it makes $\frac{1}{2}$ revolution in 10 second is _____.

- (1) 4π cm/min (2) 0.4π cm/sec (3) 4π m/sec (4) None of these

Q.29 If diagonals of quadrilateral divides each other in proportion then quadrilateral is

- (1) Rhombus (2) Parallelogram (3) Trapezium (4) Kite

Q.30 Which are adjacent angles.



- (1) a, d (2) b, c (3) d (4) c

Q.31 Find the last 2 digit of 3^{1997}

- (1) 21 (2) 16 (3) 63 (4) 48



Q.32 If $x < 0$ then $x + \frac{1}{x}$ is

- (1) ≥ 2 (2) ≤ 2 (3) > 2 (4) < 2

Q.33 Successive discounts of $a\%$ and $b\%$ are equivalent to a single discount of

- (1) $(1 + b)\%$ (2) $\left(\frac{a+b}{2}\right)\%$ (3) $\left(a + b + \frac{ab}{100}\right)\%$ (4) $\left(a + b - \frac{ab}{100}\right)\%$

Q.34 The value of remainder if $5x^4 + 4x^3 + 3x - 11$ is divided by $(x - 2)$

- (1) 129 (2) 107 (3) 100 (4) 44

Q.35 If $a = 9 + 4\sqrt{5}$, find $\sqrt{a} - \frac{1}{\sqrt{a}}$

- (1) 4 (2) -4 (3) Both (1) & (2) (4) None of these

Q.36 From a pack of 52 playing cards jacks, queens, kings and aces of red colour are removed. From the remaining, a card is drawn at random. Find the probability that the card drawn is a picture card

- (1) $\frac{3}{22}$ (2) $\frac{1}{22}$ (3) $\frac{9}{22}$ (4) $\frac{7}{22}$

Q.37 If the angle between two lines is $\frac{\pi}{4}$ and slope of one of the line is $\frac{1}{2}$, then slope of other line is,

- (1) 1 (2) $\frac{1}{3}$ (3) -1 (4) $-\frac{1}{3}$

Q.38 If $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$ of an AP then find the sum of first 24 terms of AP.

- (1) 455 (2) 730 (3) 800 (4) 900

Q.39 For a frequency distribution, which is correct

- (1) $2 \text{ mean} = 3 \text{ median} - \text{mode}$ (2) $\text{mode} = 3 \text{ mean} - 2 \text{ median}$
(3) $\text{mode} = 3 \text{ median} + 2 \text{ mean}$ (4) $\text{mean} = 3 \text{ median} - 2 \text{ mode}$



Q.40 If the system of equations

$$3x + y = 1$$

$$(2k - 1)x + (k - 1)y = 2k + 1$$

is inconsistent, then $k =$

- (1) 1 (2) 0 (3) -1 (4) 2

Passage (Q.No. 41 & 42)

The capital letters in each of the following words are coded and written in small letters on the right side of each word, but the small letters do not appear in the same order as the letters in the word. Find out the codes for letters and answer the questions that follow.

K I N G : b d m e

R I N G : d e o b

I N K : e m b

I R K : o e m

Q.41 Which is the code for letter K ?

- (1) e (2) m (3) d (4) b

Q.42 What would be the code (in correct order) for the word K I N ?

- (1) e m b (2) m b e (3) o m e (4) m e b

Q.43 A die is thrown three times and its three different positions are given below.



(i)



(ii)

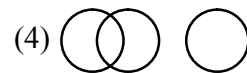
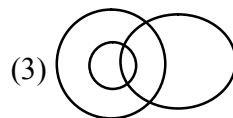
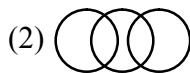
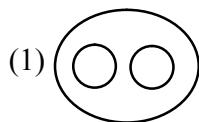


(iii)

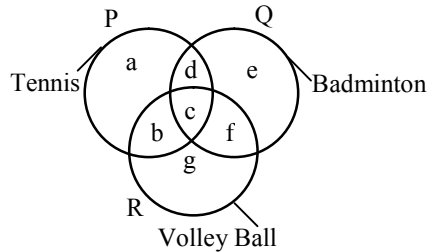
How many dots lie opposite 2 dots ?

- (1) 1 (2) 3 (3) 5 (4) 6

Q.44 Which of the following diagrams correctly illustrates the relationship among the classes :
Elephants, Wolves, Animals ?



Directions (Q.45 to 47) : The figure given below consists of three intersecting circles which represent sets of students who play Tennis, Badminton and Volley Ball. Each region in the figure is represented by a small letter.



On the basis of the above figure, answer the questions given below.

- Q.45** Which letter represents the set of persons who play all the three games ?
 (1) b (2) c (3) f (4) g
- Q.46** Which letter represents the set of persons who play Tennis and Volley Ball but not Badminton ?
 (1) g (2) e (3) c (4) b
- Q.47** Which letter represents the set of persons who play Tennis but neither Badminton nor Volley Ball ?
 (1) a (2) b (3) c (4) d
- Q.48** Which letter represents the set of persons who play Tennis and Badminton but not Volley Ball ?
 (1) b (2) c (3) d (4) f

Directions (Questions 49 to 53): Six friends are sitting around a circular table at equal distance from each other. Sita is sitting two places right of Gita who is exactly opposite to Nita. Nita is on immediate left of Lata, who is exactly opposite to Rita. Mita is also sitting at the table.

- Q.49** Who is the only person sitting between Gita and Sita ?
 (1) Rita (2) Mita (3) Lata (4) Nita



Q.50 Sita is not sitting at equal distance from :

- (1) Rita and Nita (2) Lata and Gita (3) Mita and Lata (4) All of the above

Q.51 Gita is sitting to the

- (1) Left of Mita (2) Right of Rita (3) Left of Rita (4) Right of Nita

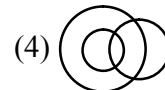
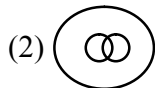
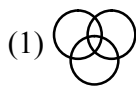
Q.52 The angle subtended by Mita and Nita at the centre of the table is :

- (1) 60° (2) 120° (3) 90° (4) 180°

Q.53 Which of the following statements is not correct ?

- (1) Mita and Sita are exactly opposite to each other
(2) Rita and Mita are equal distance from Gita
(3) Angle subtended by Rita and Mita is same as the angle subtended by Sita and Lata at the centre of the table
(4) Mita is on the immediate left of Lata.

Q.54 Which one of the following diagrams correctly represents the relationship among the classes: Tennis fans, Cricket players, Students ?



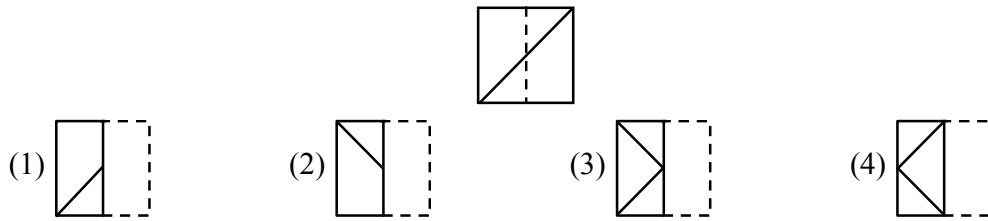
Q.55 Rajan is the brother of Sachin and Manik is the father of Rajan. Jagat is the brother of Priya and Priya is the daughter of Sachin. Who is the uncle of Jagat ?

- (1) Rajan (2) Sachin (3) Manik (4) None of these

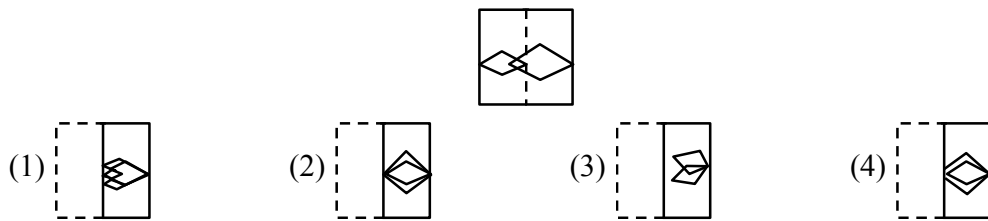
Directions (Questions 56 & 57): In each of the following questions, a square transparent paper with a pattern is given. Find out from amongst the four alternative figures which would look like the one when the paper is folded at the dotted line. [Note that in each question, the top figure is that of the transparent paper and below it the four answer figures are given].



Q.56 Transparent paper



Q.57 Transparent paper



Passage (Q.No. 58 to 60)

There is some relationship between the two terms (figures/letters) on the left side of the sign ($::$). The same relationship exists between the two terms on the right of the sign ($::$) of which one is missing. Find the missing one from the given four alternatives.

Q.58 LLMO : MMNO :: AABD : ?

- (1) BBCE (2) BB CD (3) AABD (4) ABBC

Q.59 9 : 25 :: 49 : ?

- (1) 36 (2) 81 (3) 64 (4) 100

Q.60 : :: : ?

- (1) (2) (3) (4)

