

## ACE OF PACE OBJECTIVE SECTION (120 marks)

### Instructions for this Section

All 40 questions are compulsory

Marking Scheme: Each question carries +3 for correct answer -1 for wrong answer and 0 for not attempting

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- Read the following statements made by three idiots.  
Idiot 1: The value of  $\sin 53^\circ$  equals to  $\cos 37^\circ$   
Idiot 2: If all three vertices of a triangle lie on a circle and one of the sides passes through the centre of the circle. The triangle is an obtuse angled triangle  
Idiot 3: If two parallelograms have same area and same perimeter then they are congruent  
Which of the three idiots is speaking a false statement?  
(A) Idiot 1                      (B) Idiot 2                      (C) Idiot 3                      (D) None of these
- Find the sum of this series.  
1, 3, 5, 7, 9, 11, 13, 15, . . . . .197, 199  
(A) 10000                      (B) 10500                      (C) 10550                      (D) None of these
- Find the next term of the series  
3,5,9,17,33,65,129...  
(A) 235                      (B) 245                      (C) 247                      (D) 257
- How many three digit numbers can be formed by the use of digits 1, 2, 3 if repeating of digits is allowed?  
(A) 9                      (B) 12                      (C) 21                      (D) 27
- The average age of a family of 5 members is 20 years. If the age of the youngest member be 10 years then what was the average age in years of the family at the time of the birth of the youngest member?  
(A) 13.5                      (B) 14                      (C) 15                      (D)12.5
- The symbol  $[x]$  for a real number  $x$  denotes the greatest integer less than or equal to  $x$ . Hence  $[3.1] = 3$ ,  $[2.9] = 2$  and  $[5] = 5$ . Find the value of  $[3] + [5.7] + [0.9] + [-1.2]$   
(A) 7                      (B) 5                      (C) 6                      (D) None of these
- The symbol  $[x]$  for a real number  $x$  denotes the greatest integer less than or equal to  $x$ . Hence  $[3.1] = 3$ ,  $[2.9] = 2$  and  $[5] = 5$ . Find the value of  $\sin [\sin 37^\circ] + \cos [\sin 37^\circ]$   
(A) 0                      (B) 1  
(C) Cannot be determined without calculator                      (D) None of these

8. If  $x$  is a real number such that  $-3 \leq x \leq 5$ . Also  $m$  is the minimum value of  $x^2$  while  $M$  is the maximum value of  $x^2$  possible. Find  $M + m$   
 (A) 34 (B) 16 (C) 25 (D) None of these
9. Two concentric circles have radii  $a$  and  $b$ . It is given that  $a < b$ . It is also given that area of smaller circle equals to area of region which is inside bigger circle and outside smaller circle. Then the ratio  $b/a$  equals  
 (A) 2 (B)  $\sqrt{2}$  (C) 1.5 (D) None of these
10. Find the remainder when  $2010^{1020} + 1020^{2010}$  is divided by 3  
 (A) 1 (B) 2 (C) Zero (D) None of these
11. Let  $x$  be a hypothetical number such that  $x = \sqrt{-1}$ ,  $x^2 = -1$ ,  $x^3 = -\sqrt{-1}$  and  $x^4 = 1$ . Find the value of  $(x-1)(x+1)(4+x)(4-x)$   
 (A) 17 (B) -34 (C) 34 (D) None of these
12. If an unbiased dice is rolled, what is the probability of getting an even number?  
 (A)  $\frac{1}{2}$  (B)  $\frac{1}{3}$  (C)  $\frac{1}{6}$  (D) None of these
13. If  $x$  and  $y$  are real numbers such that  $2^x + 3y = 35$  and  $2^{x-3} + 2y = 6$  find  $x + y$   
 (A) 7 (B) 8 (C) 6 (D) None of these
14. In a race of 600 meters, Pathan beats Raina by 60 meters and in a race of 500 meters Raina beats Sachin by 25 meters. By how many meters will Pathan beat Sachin in a 400 meter race.  
 (A) 48 mts (B) 52 mts (C) 56 mts (D) 58 mts
15. If  $\sqrt{\sqrt{10+y}} = 2$  and  $\sqrt{2x+y} = y$ , then find  $x$  and  $y$  :  
 (A) 30, 6 (B) 15, 6 (C) 15, 17 (D) 16, 17
16. A person gains 10 % profit by selling a commodity. If he increases selling price by 20 Rs. his profit is 20%. Find the cost price.  
 (A) 100 (B) 200 (C) 300 (d) 50
17. The value of :  $\operatorname{cosec}(65^\circ + \theta) - \sec(25^\circ - \theta)$ .  
 (A) 25 (B) 65 (C) 5 (D) 0
18. The LCM of 5, 8, 12, 20 will not be a multiple of  
 (A) 3 (B) 9 (C) 8 (D) 5
19. Find two natural numbers whose sum is 85 and the least common multiple is 102  
 (A) 30 and 55 (B) 17 and 68 (C) 35 and 55 (D) 51 and 34

20. The average marks of a group of 20 students in a test is reduced by 4 when the topper who scored 90 marks is replaced by a new student. How many marks did the new student score?  
 (A) 8 (B) 20 (C) 15 (D) 10
21. The ages of Shaurya and Kauravki are in the ratio 2 : 6. After 5 years , the ratio of their ages will becomes 6 : 8 . Find the average of their ages after 10 years.  
 (A) 12 (B) 13 (C) 17 (D) 24
22. If a job takes 12 men , 4 hours to complete ; how long should it take for 15 men to complete the job ?  
 (a) 2 hrs 40 min. (b) 3 hrs (c) 3 hrs 12min. (d) 3 hrs 24 min.
23. Which of the following sets of numbers can be used as the lengths of the sides of the triangles?  
 (I) [ 5 , 7 , 12 ] (II) [ 2 , 4 , 10 ] (III) [ 5 , 7 , 9 ]  
 (a) I only (b) III only (c) I & II only (d) I & III only
24. If  $\theta$  is an acute angle and  $\tan \theta + \cot \theta = 2$  , then the value of  $\tan^7 \theta + \cot^7 \theta$  is  
 (A) 128 (B) 14 (C) 2 (d) none
25. An aeroplane flying horizontally 1 km above the ground is observed at an elevation of  $60^\circ$ . After 10 seconds, its elevation is observed to be  $30^\circ$ . The minimum speed of the aeroplane in km/hr is :  
 (A) 154 . 7 (B) 451 . 7 (C) 415 . 7 (D) 86 . 4
26. Evaluate without using trigonometric tables:  $\frac{\cos 75^\circ}{\sin 15^\circ} + \frac{\sin 12^\circ}{\cos 78^\circ} - \cos 18^\circ \operatorname{cosec} 72^\circ$ .  
 (a) 0 (b) 1 (c) 2 (d) 3
27. If X is an odd integer & Y is an even integer , Which of the following statements is (are) always true ? (I) X + Y is odd (II) XY is odd (III) 2 X + Y is even  
 (A) I only (B) III only (C) I & III only (D) II & III only
28. An object is thrown vertically up with a velocity 10 m/s from the ground. After how much time does it reach back to the ground. [  $g = 10 \text{ m/s}^2$  ]  
 (A) 1 sec (B) 2 sec (C) 3 sec (D) 4 sec
29. The coefficient of  $x^{26}$  in the expansion of  $(x - a) (x - b) (x - c) \dots\dots\dots(x - z)$  is  
 (A) 0 (B) 1  
 (C) abcdefgh .....z (D) None of these
30. Determine the ratio of the areas of the inscribed and the circumscribed circles of an equilateral triangle

(A) 2 : 3                      (B) 1 : 2                      (C) 1 : 3                      (D) 1 : 4

31. You drive to the store at 20 kmph and return by the same route at 30 kmph. Discounting the time spent at the store, what was your average speed?  
(A) 25 kmph                      (B) 20 kmph                      (C) 30 kmph                      (D) 24 kmph
32. In a cricket match score of India after 3.4 overs after start was 34 runs while after 7.2 overs of start the score was 72. We can say that the run rate of India (runs per over)  
(A) Increased in this period                      (B) Decreased in this period  
(C) Remained same                      (D) None of these
33. The denominator of a fraction is 4 more than twice the numerator. When both the numerator & denominator are decreased by 6, then the denominator becomes 12 times the numerator. The fraction is :-  
(A)  $7/18$                       (B)  $7/49$                       (C)  $5/25$                       (D)  $4/16$
34. If three times the larger of the two numbers is divided by the smaller one, we get 4 as quotient and 3 as remainder. Also, if seven times the smaller number is divided by the larger one, we get 5 as quotient and 1 as remainder, then the numbers respectively in the order of appearance are  
(A) 6 and 36                      (B) 18 and 25                      (C) 25 and 18                      (D) 36 and 6
35. A man has Rs. 210 in coins alone. The coins consist of one rupee, 50p and 25p whose numbers from a ratio of 5 : 6 : 8 respectively. How many coins are there in the 50p denomination?  
(A) 210                      (B) 105                      (C) 126                      (D) 168
36. A shopkeeper sells a pair of sunglasses at a profit of 25%. If he had bought it at 25% less and sold it for Rs.10 less, he would have gained 40%. Determine the cost price of the pair of sunglasses.  
(A) Rs.50                      (B) Rs.25                      (C) Rs.75                      (D) RS.60
37. If  $X + 1/X = Z$  and  $X^2 - 1/X^2 = Y$  then  
(A)  $Y^2 = Z(Z + 2)$                       (B)  $Z^2 - Y^2 + ZY = 0$   
(C)  $Z^2 + Y^2 = 0$                       (D)  $Z^4 - 4Z^2 - Y^2 = 0$
38. If  $ax^2 = (a - b)^2 (x + 1)$  then :  $\sqrt{1 + \frac{4}{x} + \frac{4}{x^2}}$  is equal to :  
(A)  $\frac{a+b}{a-b}$                       (B)  $\frac{a-b}{a+b}$                       (C)  $a^2 + ab$                       (D) None
39. One day Rajinikanth's cheetah Rancho gets fed up of Rajinikanth's torture and starts running away from him at a speed of 150 Km/hr. 30 minutes after Rancho's departure Rajinikanth

realises that his pet is missing. Being one of the fastest runners on the planet, Rajinikanth starts chasing Rancho at a speed of 200 Km/hr. After how long will Rajini meet Rancho?

(A) 90 minutes (B) 60 minutes (C) 75 minutes (D) None of these

- 40 AB and CD are two parallel chords of a circle such that  $AB = 10$  cm and  $CD = 24$  cm. If the chords are on the opposite sides of the centre and the distance between them is 17 cm, the radius of the circle is:–

(A) 13 cms (B) 14 cms (C) 15 cms (D) 16 cms

## Subjective Type Question

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### ACE OF PACE CHALLENGING SECTION (30 Marks)

#### Instructions for this Section

#### Both questions are compulsory

Marking Scheme: Each question carries 15 marks for correct answer only, No negative marking, No step marking

- 41: I was born on  $x/y/198z$  (i.e. on the  $x^{\text{th}}$  day of the  $y^{\text{th}}$  month of the year 198z, where z is the unit's digit). If it is known that y is a prime number &  $z = 2y$ . At a particular year in 21<sup>st</sup> century, which is a perfect square, I will be exactly ' $x \times y$ ' years old. Find my date of birth.
42. Let ABC be an equilateral triangle with side 10 cm and let P be a point inside the triangle, at a distance of 2 cm from the side AB. If PD, PE and PF are the perpendiculars to the three sides, find out the sum  $PD + PE + PF$

