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GREEKS CLASSES BRINGS…
SCIENCE APTITUDE TEST (2020-21)
SAMPLE PAPER

Class-10th

Max Marks-300
Duration- 3 Hrs

PAPER SCHEME :

- The paper contains 60 Objective Type Questions divided into four sections: **Section - I, Section – II, Section - III** and **Section - IV**
- **Section I** contains **10 Multiple Choice Questions (1-10)** based on Mental Aptitude. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE CHOICE is correct**.
- **Section II** contains **15 Multiple Choice Questions (11-25)** based on Science. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE CHOICE is correct**.
- **Section III** contains **25 Multiple Choice Questions (26-50)** based on Mathematics. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE CHOICE is correct**.
- **Section IV** contains **10 Numerical Value Type Questions (1-10).** The answer to each of these questions ranges from 0 to 99.

MARKING SCHEME :

- **Section I** : For each question, **4 marks** will be awarded for correct answer and **–1 negative marking** for incorrect answer.
- **Section II & III** : For each question, **5 marks** will be awarded for correct answer and **–1 negative marking** for incorrect answer.
- **Section IV :** For each question, **6 marks** will be awarded for correct answer and **No negative marking** for
- incorrect answer.

GENERAL INSTRUCTIONS :

- For answering a question, an **ANSWER SHEET (OMR SHEET)** is provided separately. Please fill your **Name, Roll Number, Seat ID, Date of Birth** and the **PAPER CODE** properly in the space provided in the **ANSWER SHEET.** IT IS YOUR OWN RESPONSIBILITY TO FILL THE OMR SHEET CORRECTLY.
- A blank space has been provided on each page for rough work. You will not be provided with any supplement or rough sheet.
- The use of log tables, calculator and any other electronic device is strictly prohibited.
- Violating the examination room discipline will immediately lead to the cancellation of your paper and no excuses will be entertained.
- No one will be permitted to leave the examination hall before the end of the test.
- Please submit both the question paper and the answer sheet to the invigilator before leaving the examination hall.

SUGGESTIONS:

- *Before starting the paper, spend 2-3 minutes to check whether all the pages are in order and report any issue to the invigilator immediately.*
- Try to attempt the Sections in their respective order.
- Do not get stuck on a particular question for more than 3-4 minutes. Move on to a new question as there are 60 questions to solve.

SECTION - I [MENTAL APTITUDE]

1. In the given question, 3 out of 4 options are same in one way and so form a group. The option that does not belong to the group is :

(A) 2 : 4 **(B)** 4 : 16 **(C)** 8 : 32 **(D)** 10 :100

2. There is a relationship between the 2 groups of letter on the left side. The option which results in the same relationship on the right side : BDF : HJL : : NPR: [?] is :

(A) MNO **(B)** ABC **(C)** DEF **(D)** TVX

3. The next term in the following series is :

16, 32, 64, 128, _____

(A) 144 **(B)** 160 **(C)** 256 **(D)** 192

4. The group of letters that will complete the given series are :

ab___a___baa _ _ bb

(A) *abbb* **(B)** *abab* **(C)** *aabb* **(D)** *aaab*

5. A cube of side 4 *cm* is painted black on the pair of one opposite surfaces, blue on the pair of another opposite surfaces and red on the remaining pair of opposite surfaces. The cube is now divided into smaller cubes of equal side of 1*cm* each. Number of smaller cubes having less than 2 sides painted are :

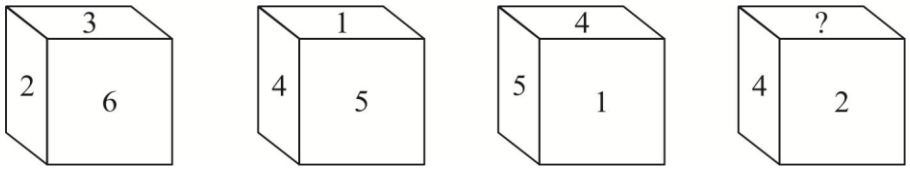
(A) 16 **(B)** 24 **(C)** 32 **(D)** 40

6.

The number which comes in place of '?' is :

(A) 1 **(B)** 5 **(C)** 6 **(D)** 3

7.



The number which comes opposite to 5 is :

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

8.

$$\begin{array}{cccccc} & & 5 & c & 7 \\ & & 3 & 4 & a \\ \hline & b & 8 & 3 & a \\ b & b & c & 8 & \\ 1 & 7 & 0 & 1 & \\ \hline 1 & 9 & b & 6 & 1 & a \end{array}$$

In the above problem, the '*c*' is :

(A) 3 **(B)** 6 **(C)** 1 **(D)** 5

9. The next term in the given series is :

13, 35, 57, 79, 911, ?

(A) 979 **(B)** 1113 **(C)** 1439 **(D)** 1202

10. The option which completes the given alphabet series is :

__y__yy_____yyy__yy__y

(A) *y y y y y x* **(B)** *x x y x x y* **(C)** *y y x x x y* **(D)** *x y x y x y*

SECTION - II [SCIENCE]

11. A current 2A flows in an electric circuit as shown in figure.

The current through branch AB is :

(A) 2A **(B)** $\frac{4}{3}A$

(C) $\frac{2}{3}A$ **(D)** 1A

12. The magnetic field at the centre of a circular loop carrying current I is :

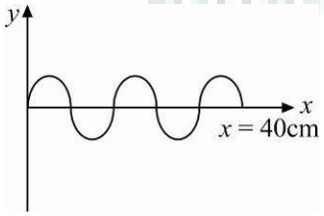
(A) Directly proportional to I **(B)** Inversely proportional to I

(C) Directly proportional to I^2 **(D)** Inversely proportional to I^2

13. A bulb rated (220V, 100W) is connected across a power supply of 110V. The power consumed by bulb is :

(A) 100W **(B)** 50W **(C)** 25W **(D)** 200W

14. For the wave shown in figure, the wavelength of the wave is :



(A) 0.4*m* **(B)** 0.2*m* **(C)** 0.16*m* **(D)** 0.8*m*

15. The length of a second's hand of a clock is 4*cm*. The speed of tip of the second's hand is :

(A) 0.24 *cm/s* **(B)** 0.32 *cm/s* **(C)** 0.42 *cm/s* **(D)** 0.50 *cm/s*

16. A force of 50*N* is required to push a car on a level road with constant speed of 10 *m/s*. The mass of the car is 500 *kg*. The force that should be applied to make the car accelerate at $2m/s^2$ is :

(A) 1100 *N* **(B)** 1050 *N* **(C)** 1000 *N* **(D)** 1500 *N*

17. A bullet of mass 10 *gm* strikes a fixed target and penetrates 8*cm* into it. If the average resistance offered by the target to the bullet is 100 N. The velocity with which the bullet hits the target is:

(A) 35*m/s* **(B)** 45 *m/s* **(C)** 25 *m/s* **(D)** 40*m/s*

18. Which of the following statements about the reaction given below are correct ?

$2Na(s) + Cl_2(g) \longrightarrow 2NaCl(s)$

(A) Na gets oxidised **(B)** Cl_2 gets oxidised

(C) Cl_2 is oxidizing agent **(D)** Both (A) and (C)

19. pH of two solutions A and B are 2 and 5 respectively. This means that :

(A) Solution A is 3 times more basic than B

(B) Solution A is 3 times less basic than B

(C) Solution A is 1000 times more basic than B

(D) Solution A is 1000 times less basic than B

20. Liquid dispersed in gas is called :

(A) Aerosol **(B)** Solid sol **(C)** Sol **(D)** Solid foam

21. When metal Z is added to dilute HCl solution, there is no evolution of gas. Metal is :

(A) K **(B)** Na **(C)** Ag **(D)** Zn

22. Total number of C – H bonds in butene will be :

(A) 2 **(B)** 4 **(C)** 6 **(D)** 8

23. Which of the following has more heat content?

(A) 10g of ice at 0°C **(B)** 10g of water at 0°C

(C) Both have same heat content **(D)** Their heat content cannot be compared

24. In the equation $NaOH + HNO_3 \longrightarrow NaNO_3 + H_2O$, nitric acid is acting as:

(A) an oxidising agent **(B)** an acid

(C) a nitrating agent **(D)** a dehydrating agent

25. What will be the pH value of a solution if salt of strong acid and weak base undergoes hydrolysis?

(A) pH = 7 **(B)** pH > 7 **(C)** pH < 7 **(D)** pH = 1

SECTION - III [MATHEMATICS]

26. In division sum, the divisor is 4 times the quotient and twice the remainder if *a* and *b* are respectively the divisor and the dividend, then :

(A) $\frac{4a - a^2}{a} = 3$ **(B)** $\frac{4b - 2a}{a^2} = 3$ **(C)** $(a+1)^2 = 4b$ **(D)** $\frac{a(a+2)}{b} = 4$

27. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, then the value of '*a*' is :

(A) $\frac{3}{5}$ **(B)** $\frac{-3}{5}$ **(C)** $\frac{-5}{3}$ **(D)** $\frac{5}{3}$

28. If $a+\frac{1}{a}+2=0$, then value of $a^{37}-\frac{1}{a^{100}}$ is :

(A) 0 **(B)** –2 **(C)** 1 **(D)** 2

29. If α, β are the zeroes of the polynomial $2x^2+5x+k$ such that $\alpha^2+\beta^2+\alpha\beta=\frac{21}{4}$, then k is equal to :

(A) 3 **(B)** –3 **(C)** –2 **(D)** 2

30. If $\sin A$ and $\cos A$ are roots of the equation $px^2+qx+m=0$, then the relation among p, q and m is :

(A) $q^2+m^2=(p+m)^2$ **(B)** $q^2-m^2=(p+m)^2$

(C) $q^2+m^2=(p-m)^2$ **(D)** None of these

31. The number of points at which the given polynomial $(x+1)(x+3)x$ intersects with 'x' axis is :

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

32. A dishonest dealer professes to sell his goods at cost price by using false weight and thus gain $11\frac{1}{9}\%$.

For weighing a kilogram, he uses a weight of :

(A) 960 *gm* **(B)** 940 *gm* **(C)** 920 *gm* **(D)** 900 *gm*

33. Three circles of radius a, b and c touch each other externally. The area of the triangle formed by joining their centres is :

(A) $(a+b+c)abc$ **(B)** $(a+b+c)\quad ab+bc+ca$

(C) $ab+bc+ca$ **(D)** None of these

34. If $\frac{2x-3y+1}{2}=\frac{x+9y+8}{3}=\frac{4x+7y+12}{5}$ then the value of $x+y$ is :

(A) 1 **(B)** –3 **(C)** 0 **(D)** –2

35. If $\sqrt{3x^2-4x+34}+\sqrt{3x^2-4x-11}=9$ then value of $\left(\sqrt{3x^2-4x+34}-\sqrt{3x^2-4x-11}\right)$ is :

(A) 0 **(B)** 3 **(C)** 5 **(D)** 9

36. The number of zeroes at the end of $\left(2^{123}-2^{122}-2^{121}\right)\left(3^{223}-3^{222}-3^{221}\right)$ is:

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3

37. If $2^x=4^y=8^z$ and $xyz=288$ then value of $\frac{1}{2x}+\frac{1}{4y}+\frac{1}{8z}$ is:

(A) $\frac{11}{12}$ **(B)** $\frac{11}{96}$ **(C)** $\frac{29}{96}$ **(D)** None of these

38. If $a+b+c=3, a^2+b^2+c^2=6$ and $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=1$ where a, b, c is non-zero, then abc is:

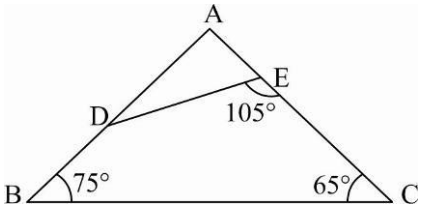
(A) $\frac{1}{3}$ **(B)** $\frac{2}{3}$ **(C)** $\frac{3}{2}$ **(D)** 1

39. In the given figure If $\frac{DE}{BC}=\frac{2}{3}$ and $AE=10\ cm$;

Then the value of AB is equal to :

(A) 16 *cm* **(B)** 12 *cm*

(C) 15 *cm* **(D)** 18 *cm*



40. If $\tan\theta = \frac{P}{q}$, then the value of $\frac{P\sin\theta - q\cos\theta}{P\sin\theta + q\cos\theta}$ is :

(A) $2P$ **(B)** $\frac{q^2 - P^2}{q^2 + P^2}$ **(C)** $\frac{P^2 - q^2}{P^2 + q^2}$ **(D)** $2q$

41. The probability of getting a number greater than 2 and less than or equal to 5 when a dice is thrown is:

(A) $\frac{2}{3}$ **(B)** 1 **(C)** $\frac{3}{12}$ **(D)** $\frac{1}{2}$

42. If the mean of x and $\frac{1}{x}$ is M, then the mean of x^2 and $\frac{1}{x^2}$ is :

(A) M^2 **(B)** $\frac{M^2}{4}$ **(C)** $2M^2 - 1$ **(D)** $2M^2 + 1$

43. The angle of elevation of a Jet plane from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the plane is flying at a constant height of $1500\sqrt{3}m$, then the speed of jet plane is :

(A) $200\ m/s$ **(B)** $180\ m/s$ **(C)** $240\ m/s$ **(D)** $220\ m/s$

44. The height of a cone and the radius of its base are respectively 9 and 3 cm. The cone is cut by a plane parallel to its base so as to divide it into two parts. The volume of frustum of cone is $44\,cm^3$, then the radius of upper circular surface of frustum is $\left\{\text{Use } \pi = \frac{22}{7}\right\}$:

(A) $^3 12cm$ **(B)** $^3 13cm$ **(C)** $^3 6cm$ **(D)** $^3 20cm$

45. The LCM of $\frac{2}{3}, \frac{4}{5}$ and $\frac{5}{7}$ is :

(A) 18 **(B)** 24 **(C)** 20 **(D)** 30

46. If $a^x = b^y = c^z$ and $b^2 = ac$, then y is equal to :

(A) $\frac{x+z}{2}$ **(B)** xy **(C)** $\frac{2xz}{x+z}$ **(D)** $\frac{1}{x} + \frac{1}{z}$

47. The value of the given expression $\sin^2 A + \sin^2 A\tan^2 A$ will be equal to :

(A) $\sin^2 A\cos^2 A$ **(B)** $\tan^2 A$ **(C)** $\sin^2 A$ **(D)** $\cos^2 A$

48. Two isosceles triangles have equal vertical angles and their areas are in the ratio 9:16. Then, their heights are in the ratio :

(A) 16:9 **(B)** 9:16 **(C)** 4:3 **(D)** 3:4

49. A sphere of radius r is inscribed inside a cube. The volume enclosed between the cube and the sphere is:

(A) $\left(16 - \frac{2\pi}{3}\right)r^3$ **(B)** $\left(22 - \frac{2\pi}{3}\right)r^3$ **(C)** $\left(8 - \frac{4\pi}{3}\right)r^3$ **(D)** $\left(12 - \frac{4\pi}{3}\right)r^3$

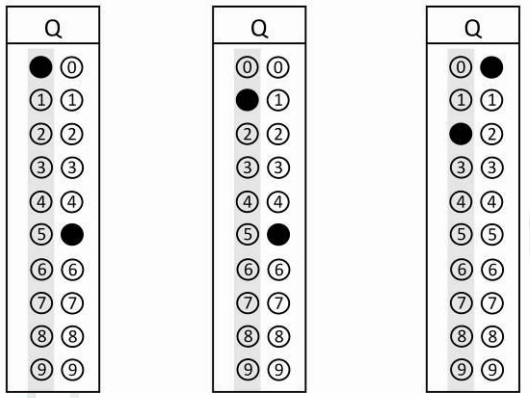
50. A wire is bent to form an equilateral triangle and it encloses an area of $A\,cm^2$. If the same wire is bent to form a circle, then the area of the circle would be :

(A) πA^2 **(B)** $\frac{3\sqrt{3}A}{\pi}$ **(C)** $\frac{A}{\pi}$ **(D)** $\frac{\sqrt{3}A}{\pi}$

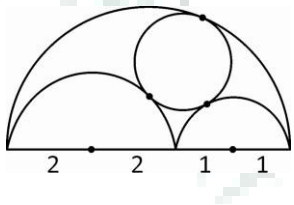
SECTION - IV [NUMERICAL VALUE TYPE QUESTION]

This Section contains 10 Numerical Value Type Questions. Each question has an integer answer between 0 and 99. Fill the answer bubbles in OMR Sheet appropriately and CAREFULLY as shown below :

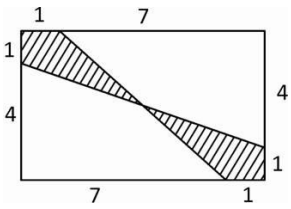
If Ans is 05 / If Ans is 15 / If Ans is 20



1. In the figure, there are 3 semicircles touching each other internally and one circle touching two of them externally and third one internally. Radius of the complete circle (in its lowest form) is $\frac{p}{q}\ (p, q \in N)$, then $p + q$ is_____.



2. The area of the shaded region of the rectangle is $\frac{p}{q}$ (p, q are co-prime natural numbers) then $p + q$ is_____.



3. Number of ordered triplets (x, y, z) of positive integers satisfying LCM$(x, y) = 72$, LCM$(x, z) = 600$ and LCM$(y, z) = 900$ is_____.

4. x, y are natural numbers such that $x > y$. Also $x + y + xy = 80$, then value of x is_____.

5. For any $x \in R$, minimum value of $|x-1|+|2x-1|+|3x-1|+\ldots.+|119x-1|$ is_____.

6. Consider a set of 9 points in coordinate plane say $\{(\pm1, \pm1), (0, \pm1), (\pm1, 0), (0, 0)\}$, number of distinct lines that pass through at least two points from this set is_____.

7. Consider the sequence 2017, 2018, 2019, ..., a_n such that $a_n = a_{n-3} + a_{n-2} - a_{n-1}$ for all $n \geq 4$. i.e., 4th term is $2017 + 2018 - 2019$ and so on, then a_{1990} is_____.

8. The two equations $x^2 + y^2 - 12x - 6y - 4 = 0$ and $x^2 + y^2 - 4x - 12y - k = 0$ have simultaneous real solutions (x, y) if $a \leq k \leq b$ and no other value of k then $b + a$ is_____.

9. In a quadrilateral ABCD, it is given that $\angle A = 120°, \angle B = \angle D = 90°$, AB = 13, AD = 46 then AC is_____.

10. By definition $r! = 1 \times 2 \times 3 \times ..... \times r$ and ${}^{n}C_{r} = \frac{n!}{r!(n-r)!}$, if ${}^{n}C_{1}$, ${}^{n}C_{2}$, ${}^{n}C_{3}$ are in A.P. then value of ${}^{n}C_{1} + {}^{n}C_{2} + {}^{n}C_{3}$ is_____.

Answers to Sample Paper | 2 Year

SECTION - I									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
C	D	C	B	C	D	B	B	B	D
SECTION - II									
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C	A	C	C	C	B	D	D	D	A
21		**22**		**23**		**24**		**25**	
C		D		B		B		C	
SECTION - III									
26	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
D	D	B	D	A	A	D	A	B	C
36	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
B	B	C	C	C	D	C	A	B	C
46		**47**		**48**		**49**		**50**	
C		B		D		C		B	
SECTION - IV									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
13	15	15	26	59	20	30	68	62	63

□ □ □ **End of Sample Paper | 2 Year** □ □ □

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