AROMATIC
IIT-JEE | MEDICAL | FOUNDATION
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Test Booklet Code

E4

# Aptitude Cum Scholarship Test

SAMPLE PAPER

**Time : 1 hrs. 30 min** **Max. Marks : 180**

| Q. No. | Subject | Nature of Questions | No. of Questions | Marks | Negative | Total |
|---|---|---|---|---|---|---|
| 1 to 15 | **PART-I** **MATHEMATICS** | MCQ | 15 | 4 | 0 | 60 |
| 16 to 25 | **PART-II** **PHYSICS** | | 10 | 4 | 0 | 40 |
| 26 to 35 | **PART-III** **CHEMISTRY** | | 10 | 4 | 0 | 40 |
| 36 to 45 | **PART-IV** **BIOLOGY** | | 10 | 4 | 0 | 40 |
| 46 to 60 | **PART-V** **MENTAL ABILITY** | | 15 | 4 | 0 | 60 |
| **Total** | | | **60** | **Total** | | **240** |

## Important Instructions:

1. The test is of 1hours 30 min duration and Test Booklet contains 60 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response Zero marks. The maximum marks are 240.
2. Use Blue/Black Ball point Pen only for writing particulars on this page/marking responses.
3. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
4. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/ Hall. *The candidates are allowed to take away* this *Test Booklet with them*.
5. The CODE for this Booklet is E4.
6. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
7. Each candidate must show on demand his/her Admission Card to the Invigilator.
8. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
9. Use of Electronic/Manual Calculator is prohibited.
10. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.
11. No part of the Test Book let and Answer Sheet shall be detached under any circumstances.
12. The candidates will write the Correct Test Booklet Code as given in the Test Booklet / Answer Sheet in the Attendance Sheet.

## PART - I (MATHEMATICS)

### Straight Objective Type
### (MaximumMarks:60)

This section contains **FIFTEEN** single choice questions. Each question has four choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

1. If $\alpha$ and $\beta$ are the zeroes of the quadratic polynomial $f(x) = x^2 - 2x + 1$. Then a quadratic polynomial whose zeroes are $\frac{2\alpha}{\beta}$ and $\frac{2\beta}{\alpha}$ would be

   (1) $x^2 - 4x + 4$ (2) $x^2 + 4x - 4$
   (3) $x^2 - 6x - 4$ (4) $x^2 - 6x - 4$

2. In a right-angled triangle ABC right angled at A, perpendicular D is drawn from A to the hypotenuse BC, then which of the following is true

   (I) $\Delta ABD \sim \Delta CAD$ (II) $\Delta ABD \cong \Delta CAD$ (III) $\Delta ADB \sim \Delta CAB$

   Of these statements the correct ones are combination of

   (1) I and II (2) I and III
   (3) II and III (4) I, II and III

3. The number nearest to 10000, which is exactly divisible by each of 3, 4, 5, 6, 7 and 8 is

   (1) 9240 (2) 10080 (3) 9996 (4) 10000

4. If in a circle, a chord of length $5\sqrt{2}$ cm makes a right angle at the centre, then the length of the radius of the circle is (in cm)

   (1) 10 (2) 4 (3) 6 (4) 5

5. For any real values of $\theta$, $\sqrt{\frac{\sec\theta - 1}{\sec\theta + 1}} = ?$

   (1) $\cot\theta - \operatorname{cosec}\theta$ (2) $\sec\theta - \tan\theta$ (3) $\operatorname{cosec}\theta - \cot\theta$ (4) $\tan\theta - \sec\theta$

6. The sum of the third and seventh term of an A.P. is 8. Then the sum of the first nine terms of this progression is

   (1) 24 (2) 32 (3) 36 (4) Cannot be determined

7. $a$ and $b$ are the two sides adjacent to the right angle of a right-angled triangle and $p$ is the perpendicular drawn to the hypotenuse from the opposite vertex. Then $p^2$ is equal to

   (1) $a^2 + b^2$ (2) $\frac{1}{a^2} + \frac{1}{b^2}$ (3) $\frac{a^2 b^2}{a^2 + b^2}$ (4) $a^2 - b^2$

8. Two poles are erected on either bank of a river just opposite to each other. One pole is 40 m high. From the top and foot of this pole, the angles of elevation of top of the other pole are 30° and 60° respectively. Find the height of the other pole (in m)

   (1) $60\sqrt{3}$ (2) 60 (3) 50 (4) $50\sqrt{3}$

9. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downs tream to the same spot. Then the speed of the stream is
(1) 5 (2) 6 (3) 7 (4) 8

10. The ratio in which the y-axis divides the line segment joining the points (5, –6) and (–1, –4)
(1) 5 : 1 (2) 1 : 5 (3) 2 : 3 (4) 1 : 1

11. If the diameter of a metallic sphere is 6 cm, it is melted and a wire of diameter 0.2 cm is drawn, then the length of the wire made shall be
(1) 24 m (2) 28 m (3) 32 m (4) 36 m

12. Area of the triangle formed by the graph of the straight lines $x - y = 0$, $x + y = 2$ and x-axis is
(1) 1 sq. unit (2) 2 sq. unit (3) 4 sq. unit (4) None of these

13. The diameter of wheel is 70 cm, then the number of revolution it will make to cover 165 m is
(1) 25 (2) 50 (3) 75 (4) 100

14. From the letters of word 'STUPID' a letter is selected the probability that the letter is a vowel is
(1) $\frac{1}{3}$ (2) $\frac{2}{3}$ (3) $\frac{5}{3}$ (4) None of these

15. The average monthly expenditure of the family for the first four months is Rs. 2570, for the next three months Rs. 2490 and for the last five months Rs. 3030. If the family saves Rs. 5320 during the whole year, the average monthly income of the family during the year is
(1) Rs. 3000 (2) Rs. 3185 (3) Rs. 3200 (4) Rs. 3580

## PART - II (PHYSICS)

### Straight Objective Type
### (MaximumMarks:40)

This section contains **TEN** single choice questions. Each question has four choices (1),(2),(3)and(4), out of which **ONLY ONE** is correct.

16. A body of mass 4 kg moving on a horizontal surface with an initial velocity of 6 $ms^{-1}$ comes to rest after 3 seconds. If one wants to keep the body moving on the same surface with the velocity of 6 $ms^{-1}$, the force required is:
(1) Zero (2) 4 N (3) 8 N (4) 16 N

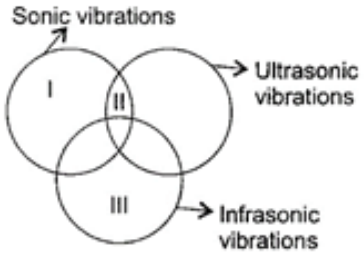
17. Select from the following the correct variation between the velocity of sound (v) and the density (p) of the medium?
(1) $V \propto \frac{1}{\sqrt{\rho}}$ (2) $V \propto \sqrt{\rho}$ (3) $V \propto \frac{1}{\sqrt{\rho}}$ (4) $V^2 \propto \frac{1}{\sqrt{\rho}}$

18. Determine the correct conversion of -40ºF to Kelvin (ºK) from the following.
(1) – 40ºK (2) 313ºK (3) 233ºK (4) 203ºK

19. 10-unit electricity = _____joules

(1) $3.6 \times 10^7$ (2) $3.6 \times 10^6$ (3) $36 \times 10^7$ (4) $36 \times 10^5$

20. Observe the given Venn diagram and select the correct option.




(1) I- Human, II- Bat, III- Rhinoceros (2) I- Rhinoceros, II- Human, III- Bat

(3) I- Bat, II- Rhinoceros, III- Human (4) I- Elephant, II- Bat, III- Human

21. Select true statement/statements from the following about irregular (diffused) reflection.

(A) Rules of reflection are obey in irregular reflection.

(B) Incident rays are parallel to each other in irregular reflection.

(C) In irregular reflection the angle of incidence is of difference measure at every point of incidence.

(D) In irregular reflection, the angle ofincidence and angle of reflection are different at the same point of incidence.

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

22. Select the correct group of non-magnetic substances from the following.

1 - Magnesium, 2 - Nickel,

3 - Titanium, 4 - Cobalt.

(1) 1,2,3 (2) 1,3 (3) 2,3,4 (4) 2,4

23. Find the heat required to increase the temperature by 10ºC of iron bob of mass S10gm? (Specific heat of iron is 0.11 cal/gmºC)

(1) 0.11 cal (2) 1.10 cal (3) 11 cal S(4) 110 cal

24. Which of the following forces help horse to pull horsecart?

P- The Force applied by cart on horse.

Q- The force applied by land on horse.

R- The Force applied by land on cart.

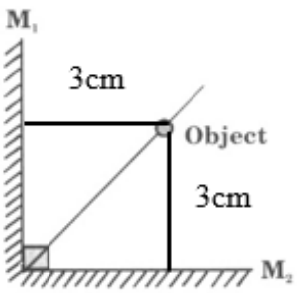
S- The force applied by horse on land.

(1) P,Q,R (2) P,R,S (3) P,Q,S (4) Q,R,S

25. $M_1$ and $M_2$ are two plane mirrors fixed in right angle as shown in diagram. A point object P is 3 cm. away from both mirrors. What will be area of triangle formed by a point object P and its images in both mirrors?

(1) 72 $cm^2$ (2) 27 $cm^2$

(3) 36 $cm^2$ (4) 18 $cm^2$



## PART - III (CHEMISTRY)

### Straight Objective Type
### (Maximum Marks:40)

This section contains **TEN** single choice questions. Each question has four choices (1),(2),(3)and(4), out of which **ONLY ONE** is Scorrect.

26. Magnesium fluoride present in toothpaste is used to -
    I) Remove the direct particular on teeth.
    II) Resist decay of teeth.
    III) Polish the teeth.
    IV) Strengthen bones and enamels.
    (1) I,II (2) I,II,IV (3) II,III,IV (4) II,IV

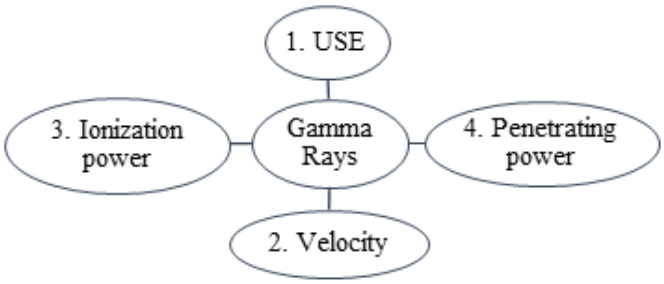
27. What is the basicity of $H_3PO_3$?
    (1) 1 (2) 2 (3) 3 (4) None of these

28. Which of the following isotope is used in treatment of polycythaemia?
    (1) P-32 (2) Co-60 (3) Sr-90 (4) I-123

29. Identify P,Q,R in the following balanced chemical Equations?
    a) $Ca(OH)_2 + Cl_2 \rightarrow [P] + H_2O$
    b) $[Q] + H_2SO_4 \rightarrow Na_2SO_4 + H_2CO_3$
    c) $CaOCl_2 + [R] \rightarrow CaSO_4 + H_2O + Cl_2$
    (1) P-CaOCl Q-NaOH R-HCl (2) P-$CaOCl_2$ Q-$Na_2CO_3$ R-$H_2SO_4$
    (3) P-$CaOCl_2$ Q-$Na_2CO_3$ R-$Na_2SO_4$ (4) P-$CaOCl_2$, Q-$NaHCO_3$, R-$H_2SO_4$

30. Which is the wrong option regarding the following chemical equation.
    $FeSO_4.7H_2O \xrightarrow{Heat} FeSO_4 + 7H_2O$
    (blue) (colourless)
    (1) Molecular formula of reactant (2) Colour of reactant
    (3) Number of water molecules (4) None of these

31. Choose correct option related to gamma rays with respect to alpha and beta activities.




    P) Very high Q) Low
    R) Very Low S) Radio therapy
    T) Same as light U) 1/5 to of light
    V) Smoke detector
    (1) 1 – V, 2 – T, 3 – R, 4 – P (2) 1 – V, 2 – U, 3 – Q, 4 – R
    (3) 1 – S, 2 – T, 3 – R, 4 – P (4) 1 – S, 2 – U, 3 – Q, 4 – R

32. Which of the following statement is most suitable for 'graphite' which is used to make lubricant?
(1) It has high melting point and slippery layer.
(2) Graphite doesn't dissolve in most of the solvents.
(3) It is good conductor of electricity.
(4) The density of graphite is 1.9 to 2.3 $g/cm^3$

33. If atomic numbers of A, B and C elements are Z+4, Z, Z – 8 respectively.
If Z= 12 then what is the number of valence electrons in the atom of elements A, B and C respectively?
(1) 2,6,2 (2) 2,6,4 (3) 2,2,2 (4) 6,2,2

34. The molecular formula of chloride of element Y is $YCl_3$.
Then what will be the molecular formula of its oxide?
(1) $YO_2$ (2) $YO_3$ (3) $Y_2O_3$ (4) $Y_3O_2$

35. What is the mass of $6.022 \times 10^{25}$ molecules of water?
(1) 18gm (2) 180gm (3) 1800gm (4) 900gm

## PART - IV (BIOLOGY)

**Straight Objective Type**
**(MaximumMarks:40)**

This section contains **TEN** single choice questions. Each question has four choices (1),(2),(3)and(4), out of which **ONLY ONE** is correct.

36. A plant root bending towards earth is said to show
(1) Hydrotropism (2) Phototropism (3) Geotropism (4) Chemotropism

37. Which is the source of variations in populations of organisms?
(1) Errors in DNA copying mechanism (2) Wave length of light
(3) Temperature and pH (4) Asexual reproduction

38. What is the phenotypic ratio in $F_2$ generation in Mendelian monohybrid cross?
(1) 1:2:1 (2) 2 : 1 (3) 1 : 2 (4) 3 : 1

39. If the transfer of pollen occurs in the same flower from stamen to stigma, it is known as
(1) Cross pollination (2) Self-pollination (3) Self fertilisation (4) Cross fertilization

40. Which statement is correct?
(1) In man, all cells carry 46 chromosomes (2) Man contain 46 set of chromosomes
(3) In flowering plants, pollen grain germinate in ovary (4) All of these

41. Which plant movement is due to growth?
(1) Sensitive plant movement (2) Geotropism
(3) Stomatal movement (4) Shrinkage of plant cell

42. Match the following :

| | |
|---|---|
| A. Unisexual flower | (i) Watermelon |
| B. Bisexual flower | (ii) *Hibiscus* |
| C. Bengal gram | (iii) *Channa* |
| D. Buds | (iv) *Bryophyllum* |

(1) A-iv, B-iii, C-ii, D-i
(2) A-iii, B-i, C-ii, D-iv
(3) A-i, B-ii, C-iii, D-iv
(4) A-iv, B-i, C-iii, D-ii

43. Common feature between Syphilis and AIDS is/are
(1) Both caused by virus
(2) Both are case of Sexually Transmitted Disease (STD)
(3) Both caused by bacteria
(4) Both (1) and (2)

44. Which structure represent future plant in seed?
(1) Plumule (2) Tissue (3) Epicotyl (4) Embryo

45. Which part of plant contain germ cells?
(1) Stamen (2) Ovary (3) Fruit (4) Both (1) and (2)

## PART - V (MENTAL ABILITY)

**Straight Objective Type**
**(MaximumMarks:60)**

This section contains **FIFTEEN** single choice questions. Each question has four choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

46. According to a certain code, '=' means '>', '-' means '+' and '+' means '-'. If a, b and c are positive integers and $a = b = c$, then which of the following is true?
(1) $b = a + c$ (2) $ac = b^2$ (3) $a - c = 2b$ (4) $ac = c^2$

47. One term in the following number series is wrong. Find out the wrong term. 2, 6, 18, 82, 650
(1) 2 (2) 18 (3) 82 (4) 650

48. Six students A, B, C, D, E and F are in a class. A and B are from Town and C, D, E and F are from village. D and F are studious while others are casual. A, C, D are girls and B, E, F are boys. Who is the studious girl from village?
(1) C (2) D (3) E (4) F

49. Five persons are standing in a line. One of two persons at the extreme ends is a professor and the other is businessman. An advocate is standing to the right of a student. An author is to the left of the businessman. The student is standing between the professor and the advocate. Counting from the left, the advocate is at which place.
(1) $1^{st}$ (2) $2^{nd}$ (3) $3^{rd}$ (4) $5^{th}$

50. Read the following information carefully and answer the questions given below it.
(a) Gopal is shorter than Ashok but taller than Kunal
(b) Navin is shorter than Kunal
(c) Jayesh is taller than Navin
(d) Ashok is taller than Jayesh
Who among them is the tallest?
(1) Gopal (2) Ashok (3) Kunal (4) Navin

51. Find the missing term (?) in the following series 2, 6, 30, 260, ?
(1) 470 (2) 510 (3) 630 (4) 3130

52. A boat travels in a stream from A to B and then from B to A. What is the speed of the boat in still water?
**Statements:**
I. The speed of the boat in still water is 2 km/h more than the speed of the current.
II. The speed of the current is 1 km/h more than the speed of the boat.
III. Boat covers the distance by y kilometers between A and B both downstream and upstream in x hours.
(1) All of I, II and III are required
(2) Both II and III are required
(3) I and III taken together are sufficient
(4) Either I and II together or II and III together are sufficient

53. Select the correct number that is missing in the number series given below: 214, 265, 367, ?, 724
(1) 520 (2) 501 (3) 525 (4) 571

54. P + Q means P is the father of Q; P – Q means P is the wife of Q; $P \times Q$ means P is the brother of Q. which of the following means A is the maternal uncle of D?
(1) A × B − C + D (2) D × C – B × A
(3) A × C + B − C (4) A – C × B + D

55. Select from the alternatives two signs which need to be interchanged to make the following equation correct. $36 \div 12 \times 6 + 9 - 6 = 38$
(1) − *and* × (2) ÷ *and* × (3) – and + (4) ÷ *and* +

56. If Fast is coded as 798 and LAST is coded as 906 then BUSY is coded as
(1) 1759 (2) 1431 (3) 952 (4) 948

57. There are two statements given below as premise, which support the conclusion suggested in the answer options. You may select the conclusion that makes the whole argument valid:
**Statements:**
I. No film actors are Cricketers.
II. Some Cricketers are poets.
(1) Therefore, some poets are film actors.
(2) Therefore, some poets are not film actors.
(3) Therefore, all poets are film actors.
(4) Therefore, all film actors are poets.

58. What is the next number in the series 7, 23, 31, 55, 109, ____
(1) 199 (2) 189 (3) 191 (4) 209

59. What is P's profession?
(1) Pharmacist (2) Lawyer (3) Teacher (4) None of the above

60. Consider the question and two statements that follow: What is the total cost of one pen, and one pencil and 1 note book?

**Statements:**

I. The total cost of 5 pens, 6 pencils and 7 note books is Rs. 178

II. The total cost of 6 pens, 4 pencils and 2 note books, is Rs. 124

Which one of the following is correct?

(1) Statements I alone is sufficient to answer the question

(2) Statement II alone is sufficient to answer the question

(3) Statement I and II together are sufficient to answer the question

(4) Both statements are not sufficient to answer the question

❖ ❖ ❖ ❖ ❖ ❖ ❖ ❖

## ANSWER KEY (E4)

| **Q. No.** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Answer** | 1 | 4 | 2 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 4 | 1 | 3 | 1 | 2 |
| **Q. No.** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** |
| **Answer** | 3 | 1 | 3 | 1 | 1 | 1 | 2 | 3 | 4 | 4 | 4 | 2 | 1 | 2 | 2 |
| **Q. No.** | **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** | **41** | **42** | **43** | **44** | **45** |
| **Answer** | 3 | 1 | 4 | 3 | 3 | 3 | 1 | 4 | 2 | 1 | 2 | 3 | 2 | 4 | 4 |
| **Q. No.** | **46** | **47** | **48** | **49** | **50** | **51** | **52** | **53** | **54** | **55** | **56** | **57** | **58** | **59** | **60** |
| **Answer** | 1 | 3 | 2 | 3 | 2 | 4 | 3 | 1 | 1 | 4 | 2 | 2 | 3 | 1 | 4 |