

Model Questions
Test for Student-Profiling
I Analytical Skills

Directions for Questions 1-4: Based on the Scenario below, answer the questions that follow.

Four engineering students E_1 , E_2 , E_3 and E_4 attempted their semester exams and their relative scores in *Electronics*, *Computer Science*, *Mathematics* and *Communication* is as follows:

Electronics $\Rightarrow E_1 > E_2 > E_3 > E_4$

Computer Science $\Rightarrow E_2 > E_4 > E_3 > E_1$

Mathematics $\Rightarrow E_3 > E_1 > E_4 > E_2$

Communication $\Rightarrow E_4 > E_2 > E_1 > E_3$

The total marks for each of the tests was 100 . It was also found that all students' scores were whole numbers and *none scored marks less than 40*. In addition, *nobody scored the same marks in two subjects*. The average marks scored by the four students were 70 , 80 , 60 and 80 respectively.

1. The total marks scored (all subjects inclusive) by E_1 was ____?

- a) 200
- b) 280
- c) 320
- d) 360

2. The total marks scored (all subjects inclusive) by E_2 was ____?

- a) 290
- b) 300
- c) 310
- d) 350

3. Who scored the highest marks (all subjects inclusive)?

- a) E1
- b) E2
- c) E3
- d) E4

4. Who are the following two students whose total marks (all subjects inclusive) were same?

- a) E1 and E2
- b) E2 and E3
- c) E3 and E4
- d) E1 and E4

Directions for Questions 5-7: Study the scenario given below and answer the questions that follow.

Consider four people **A, B, C,** and **D.** By profession, one is a Doctor, the other is a Lawyer, the third a Painter and the fourth is a Wrestler (not necessarily in that order). The income of Wrestler is half the sum of C and D; the income of Doctor is half the sum of A and B and the income of Painter is half that of D.

5. The ratio of incomes of A and B cannot be equal to _____?

- a) 1 : 2
- b) 1 : 3
- c) 3 : 5
- d) 5 : 3

6. If the income of A is thrice that of B, then A, B, C and D are respectively?

- a) Painter, Wrestler, Doctor and Lawyer
- b) Wrestler, Painter, Lawyer and Doctor
- c) Wrestler, Lawyer, Painter and Doctor
- d) Painter, Wrestler, Lawyer and Doctor

7. In which one of the following cases, the ratio of incomes of A and C will be 3 : 2 ?

Doctor, Wrestler, Painter, Lawyer are respectively ____, ____, ____, ____

- a) C, B, A, D
- b) D, A, B, C
- c) D, A, C, B
- d) D, B, C, A

Directions for Questions 8-9: Study the scenario given below and answer the questions that follow.

A, B, C, D, E, F are six distinct single digit positive integers such that _____

$$ABC + DEF = 1056$$

$$BCA + EFD = 1569$$

$$CAB + FDE = n05$$

Where n is a single digit integer.

8. Given the above equations, $n =$ _____ ?

- a) 6
- b) 7
- c) 8
- d) 9

9. Which of the following is not an admissible value of (A, D) ?

Note: The order is not to be considered as is.

- a) (5, 4)
- b) (6, 3)
- c) (7, 2)
- d) (8, 1)

Directions for Questions 10-11: Study the scenario given below and answer the questions that follow.

A dice has six distinct numbers (positive integers) inscribed on its face, the sum of numbers on opposite faces being 11, 12 and 13. Another identical dice (with identical numbering) is brought and tossed together thrice. The sum of numbers thrown up was found to be 10, 11 and 15 while the sum of hidden numbers was 13, 14 and 9 respectively.

10. The number not inscribed on the disc is _____

- a) 4
- b) 5
- c) 6
- d) 7

11. The number on the opposite faces whose sum is 12 are _____, _____

- a) 3, 9
- b) 4, 8
- c) 5, 7
- d) Cannot be determined

II English Language

Questions 12 and 13 are based on the following passage.

The Rosetta Stone! What a providential find that was. And what a remarkable set of circumstances it took for people to be able to read Egyptian hieroglyphics after a hiatus of some 1400 years. It even took a military campaign. In 1798, Napoleon Bonaparte's army attacked British-held Egypt, seeking to cut off England from the riches of the Middle East. Rebuilding a fortress, a French soldier uncovered a block of basalt inscribed with writing in three distinct scripts; Greek, demotic script (an everyday cursive form of Egyptian), and Egyptian hieroglyphs. At that moment, modern Egyptology began.

12. The primary purpose of lines 1-5 is to

- (A) describe the physical attributes of an artifact
- (B) underscore the difficulty of translating ancient texts
- (C) indicate a new direction for linguistic research
- (D) qualify an excessively sweeping generalization
- (E) emphasize the unusual background of a discovery

13. The author's tone in writing of the discovery of the Rosetta Stone can best be characterized as

- (A) ironic
- (B) enthusiastic
- (C) condescending
- (D) nostalgic
- (E) objective

Questions 14, 15 and 16 are based on the following passage.

But man is not destined to vanish. He can be killed, but he cannot be destroyed, because his soul is deathless and his spirit is irrepressible. Therefore, though the situation seems dark in the context of the confrontation between the superpowers, the silver lining is provided by the amazing phenomenon that the very nations which have spent incalculable resources and energy for the production of deadly weapons are desperately trying to find out how they might never be used. They threaten each other, intimidate each other and go to the brink, but before the total hour arrives they withdraw from the brink.

14. **In the author's opinion**

- A. Huge stockpiles of destructive weapons have so far saved mankind from a catastrophe.
- B. Superpowers have at last realized the need for abandoning the production of lethal weapons.
- C. Mankind is heading towards complete destruction.
- D. Nations in possession of huge stockpiles of lethal weapons are trying hard to avoid actual conflict.
- E. There is a silver lining over the production of deadly weapons.

15. **'Irrepressible' in the second line means**

- A. incompatible
- B. strong
- C. oppressive
- D. unrestrainable
- E. unspirited

16. **A suitable title for the above passage is**
- A. Destruction of mankind is inevitable.
 - B. Man's desire to survive inhibits use of deadly weapons.
 - C. Mounting cost of modern weapons.
 - D. Threats and intimidation between super powers.
 - E. Cowardly retreat by man

Read the instructions given below and answer the questions that follow:-

Fill in the blanks

17. He was _____ of all valuable possessions.
- A) robbed
 - B) stolen
 - C) pinched
 - D) established
18. The presence of armed guards _____ us from doing anything disruptive.
- A) defeated
 - B) excited
 - C) irritated
 - D) prevented
19. I am _____ forward to our picnic scheduled in next month
- A) looking
 - B) planning
 - C) seeing
 - D) going

Choose the correct option for the underlined words.

20. To no ones surprise, Joe didn't have his homework ready.
- A. no ones surprise
 - B. noones surprise
 - C. no-ones surprise
 - D. no ones' surprise
 - E. no one's surprise

III Mathematics

21. If the three digit numbers $A28$, $3B9$ and $62C$, where A , B and C are integers between 0 and 9, are divisible by a fixed integer k , then the determinant is divisible by _____.

22. The solutions of the equations $x+2y+3z=6$, $2x+4y+z=17$, $3x+2y+9z=2$ is _____.

23. The determinant $\begin{vmatrix} xp+y & x & y \\ yp+z & y & z \\ 0 & xp+y & yp+z \end{vmatrix} = 0$, if x, y and z are _____.

24. If it is known that $(\vec{a}-\vec{b})^2 + (\vec{a}+2\vec{b})^2 = 20$, $|\vec{a}|=1$ and $|\vec{b}|=2$, then the angle between the vectors \vec{a} and \vec{b} is _____.

25. If $\begin{vmatrix} a & a^2 & a^3 \\ b & b^2 & b^3 \\ c & c^2 & c^3 \end{vmatrix} = 0$ and the vectors $\vec{A} = i + aj + a^2k$, $\vec{B} = i + bj + b^2k$, and $\vec{C} = i + cj + c^2k$ are non-coplanar, then the product $abc =$ _____.

26. If θ is the angle between the vectors \vec{a} and \vec{b} , then $\frac{|\vec{a} \times \vec{b}|}{|\vec{a}\vec{b}|} =$ _____.

27. If $\left| \frac{z-2}{z-3} \right| = 2$ represents a circle, then its radius is equal to _____.

28. $|z_1| + |z_2| = |z_1 + z_2|$ is possible, is _____.

29. If $a = \cos 2\alpha + i \sin 2\alpha$, $b = \cos 2\beta + i \sin 2\beta$, $c = \cos 2\gamma + i \sin 2\gamma$, $d = \cos 2\delta + i \sin 2\delta$,
then $\sqrt{abcd} + \frac{1}{\sqrt{abcd}} =$ _____.

30. The orbit of the earth is an ellipse with eccentricity $\frac{1}{60}$ with the sun at one focus, the major axis being approximately 186×10^6 miles in length. The shortest and longest distances of the earth from the sun is _____, _____.

31. The area of a triangle formed by the asymptotes and any tangent to the hyperbola $x^2 - y^2 = a^2$ is _____.

32. The variable chord of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is a tangent to the circle $x^2 + y^2 = c^2$.
The locus of its midpoint is _____.

33. The relative maximum of $f(x) = 1 - x^6$ is _____.

34. The bending moment at a distance x from one end of a beam of length l uniformly loaded is given by $M = \frac{1}{2} \omega x(l-x)$, where ω is the load per unit length. Then the maximum bending moment is at $x =$ _____.

35. The time T of a complete oscillation of a simple pendulum of length l is given by $T = 2\pi \sqrt{\frac{l}{g}}$ where g is a constant. If an error of 2% is encountered in the measure of l , then the error in the calculated value of T is _____.

36. In any group the number of improper subgroups is _____.

37. In a group G , if $a^2 = e \forall a \in G$, then _____.

38. Let G denote the set of all $n \times n$ non-singular matrices with rational numbers as entries. Then under multiplication G is _____.

39. A fair coin is tossed repeatedly. If the tail appears on first four tosses, then the probability of head appearing on the fifth toss equals _____.

40. If 20% of the bolts produced by a machine are defective, then the probability that out of 4 bolts chosen at random 1 bolt will be defective is _____.