



RECRUITMENT TEST

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Name: _____ Branch: _____
Phone: _____ Email: _____

- 1st SEM
 3rd SEM
 3rd SEM (Diploma)

SET: 1
Start time:
End time:

INSTRUCTIONS

- This selection test consists of a total of 20 questions. Questions 1-15 are purely aptitude-based and questions 15-20 are technical.
- Question 20 is an option question where either of the choices may be attempted.
- The duration of the test is 45 minutes. Calculators are permitted.
- The results of the Selection Test will be announced by 7 September on www.teamantariksh.in.
- **MAY THE FORCE BE WITH YOU, AND THE ODDS BE EVER IN YOUR FAVOUR!**

APTITUDE QUESTIONS

1. The wrong number in the given sequence is:

153, 370, 371, 407, 1634, and 1729

Ans. 1729

2. Ram prefers Economics to Maths, English to Social Studies and Politics to History. If he prefers Maths to History and Social Studies to Maths, which is Ram's least preferred subject?

Ans. History

3. Direction (Questions 3.1 to 3.3): There are eight people A, B, C, D, E, F, G and H sitting around a circular table facing centre. B is sitting second to the left of G who is sitting third to the right of F. Only E is sitting between A and C. C is sitting third to the left of B. Only one person is sitting between E and H. (mark the right answer).

1. Which of the following is correct?

- a) D is sitting third to the left of H
- b) F is sitting third to the left of G
- c) C is sitting third to the left of D
- d) H is sitting second to the right of C

2. Based on the given information, which of the following is the correct position?

- a) A and C are sitting next to each other
- b) F and G are sitting next to each other
- c) H and F are sitting next to each other
- d) D is sitting next to H

3. Which of the following is the correct order of sitting of persons right of A?

- a) ECHDGBF
- b) ECHFBDG
- c) EBHDCFG
- d) CHBEDGF

Ans. 1) b 2) c 3) b

4. What is the angle made by the minute hand and the hour hand of the clock, if it reads 4:25 pm?

Ans. 17.5°

5. Which is the highest power of 2 which can divide $(257!)/(100!)$?

Ans. 158

6. In two decks of cards, what is the least number of cards you must take to be "guaranteed" at least one four-of-a-kind?

Ans. 40

7. If $72^x \cdot 48^y = 6^{xy}$, where x and y are real numbers, what is $x+y$?

Ans. $-\frac{10}{3}$

8. There are 4 big houses standing in a row. They are made from these materials: red marbles, green marbles, white marbles and blue marbles.

- a) Mrs Jennifer's house is somewhere to the left of the green marbles one and the third one along is white marbles.
- b) Mrs Sharon owns a red marbles house and Mr Cruz does not live at either end, but lives somewhere to the right of the blue marbles house.
- c) Mr Danny lives in the fourth house, while the first house is not made from red marbles.

Who lives where, and what is their house made from?

Ans. #1 - Mrs. Jennifer - Blue Marbles

#2- Mrs. Sharon - Red Marbles

#3 - Mr. Cruz - White Marbles

#4 - Mr. Danny- Green Marbles

9. In a group of 4 boys and 6 girls, four children are to be selected. The number of ways in which they can be selected such that at least 1 girl is present in the group is _____.

Ans. 209

10. A family pays \$800 per year for an insurance plan that pays 80 percent of the first \$1,000 in expenses and 100 percent of all medical expenses thereafter. In any given year, the total amount paid by the family will equal the amount paid by the plan when the family's medical expenses total. What is the claim?

Ans. \$1200

11. In a certain game, each player scores either 2 points or 5 points. If 'n' players score 2 points and 'm' players score 5 points, and the total number of points scored is 50, the least difference between 'n' and 'm' is _____

Ans. 3

12. What is the largest number that can be made using the digits 7, 8 and 9?

Ans. $7!^{9!}$

13. Read the information carefully and answer the following question:

- a) $M + N$ means M is the mother of N
- b) M / N means M is the father of N
- c) $M \$ N$ means M is the wife of N
- d) $M \% N$ means M is the sister of N
- e) $M : N$ means M is the son of N
- f) $M \# N$ means M is the husband of N

What should come in place of question mark to establish that D is the son-in-law of B in the expression?

"A % B / C ? D / E"

Ans. \$

14. Analyse the statements below and find out who did it.

- a) Mr. Reese: 'Mr. Bilbo did it.'
- b) Mr. Bilbo: 'Mr. Reese did it.'
- c) Mr. Gerry: 'Mr. Bilbo's telling the truth.'
- d) Mr. Yang: 'Mr. Gerry's not lying.'

Please note that three of the statements below are false.

Ans. Mr. Bilbo

15. In a game, you have six empty glasses in a row numbered from 1 to 6. You roll a die and whatever number you get, you are going to fill that glass with water. If you get a number in the die, for which the water already exists in the glass, we will drink that water and make it empty, this process continues till all the glasses are filled. How many times would the die have rolled?

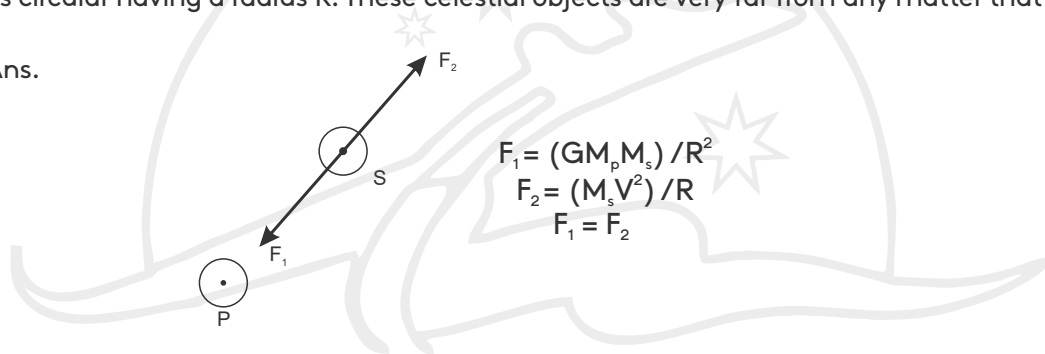
Ans. 83

TECHNICAL QUESTIONS

16. If a satellite is orbiting the Earth, or any celestial body for that matter, a gravitational force acts on the body. Then why doesn't the body fall eventually on Earth (or celestial body). Justify with a free-body diagram, with the following information in mind.

A satellite (S), having a mass M_s and is moving with a velocity V ; orbiting a planet (P) having mass M_p , in free space. Consider the planet and the satellite to be point masses where $M_p \gg M_s$. The orbit of the satellite is circular having a radius R . These celestial objects are very far from any matter that has mass.

Ans.



17. The path of a celestial body around another celestial body is known as the orbit of the former. Considering the central celestial body to be Earth and a satellite as the orbiter, answer the following questions:

- a) With respect to Earth, what is the farthest point (X) and the nearest point (Y) of the orbit called?
- b) If the speeds of the satellite at the respective points are V_x and V_y , which of the following is true?
(i) $V_x > V_y$ (ii) $V_x = V_y$ (iii) $V_x < V_y$

Ans.

- a) X: apogee, Y: perigee
- b) (iii) $V_x < V_y$

18. Expand the acronym GSLV. What is it capable of? What are the number of stages in a GSLV? There is a certain piece of technology on-board the GSLV, that makes it very special and the ROSCOSMOS (Russian Space Agency) had helped India to fabricate it. Identify the “certain piece of technology”.

Ans.

GSLV- Geosynchronous Satellite Launch Vehicle, capable of launching satellites to geosynchronous orbits, geotransfer orbits, and some heavier satellites to polar orbits.

There are 3 stages

Cryogenic engine composed of LOX and LH₂ is special.

19. Low Earth Orbits (or LEOs) are a class of orbits that have altitude varying between 200km to 2000 km. The ISS is an orbiting station above the Earth, established by a joint venture of 15 countries. The official NASA blog associates the ISS with the following quote: “Off the Earth, For the Earth”.

- What does ISS stand for?
- What is altitude of the ISS from mean sea level?
- What is the speed of the ISS with respect to the Earth (in kms^{-1})?
- Briefly describe its function. Why is there a need for an orbiting station in the first place?

Ans.

a) International Space Station

b) 400 km (330km to 435 km is fine)

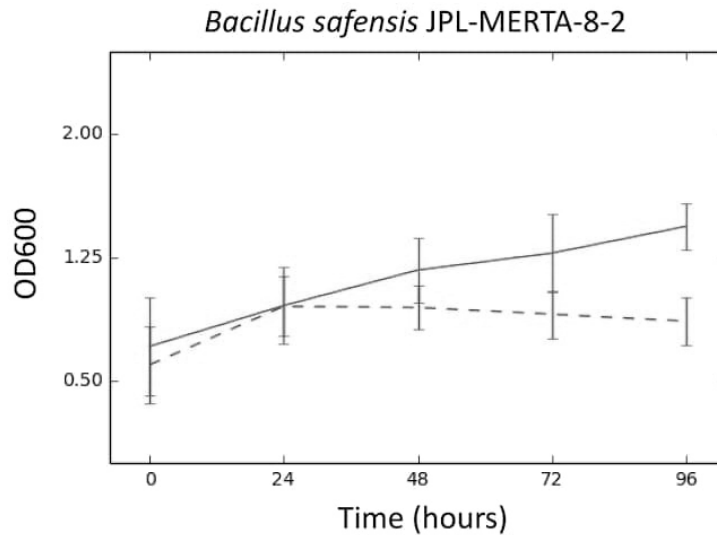
c) 7.66 km/s (7.6 to 7.9 km/s is fine)

d) It is a lab, just at a high altitude. Experiments are carried out onboard the lab such as microgravity related experiment, plant growth, analysis of bacteria, behavior of fluids in space, experiments in humans etc. Since the lab provides a way to analyse stuff in microgravity conditions, it is right place to do so

20(A). A satellite is orbiting the Earth at an altitude of $h=30,000$ km. Given that mass and radius of the Earth is 5.9722×10^{24} kg and 6400 km, calculate the time period of the satellite. Write the final answer in hours.

OR

20(B). The plot shows the variation of Optical Density with time, of *Bacillus safensis*, a gram positive bacteria. One of the two curves denotes the growth observed in space. Label the two curves and give a suitable justification as to why the growth rate is different in space.



Ans.

20(A) 3.056 hours

20(B) The dark line is the curve obtained from the bacteria grown in space.

Reasons: microgravity, radiation

RECHECK YOUR ANSWERS, YOU MUST

If you were unable to answer any questions, it is absolutely fine.

The need of the hour is that you Google search all your unresolved doubts, or simply mail your doubts to publicrelations@teamantariksh.in