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SOF NATIONAL CYBER OLYMPIAD

Total Questions : 50   Time : 1 hr.

	PATTERN & MARKING SCHEME		
Section	(1) Logical Reasoning	(2) Computers & IT	(3) Achievers Section
No. of Questions	10	35	5
Marks per Ques.	1	1	3

SYLLABUS

Section – 1 : Verbal and Non-Verbal Reasoning.

Section – 2 : Fundamentals of Computer, Operating System, Word Processing Tool, Networking, MS-PowerPoint, MS-Excel, HTML, Internet, Database Management System(Functions, Types, MS-Access) , Latest Developments in the field of IT.

Section – 3 : Higher Order Thinking Questions - Syllabus as per Section – 2.

Questions are based on Windows 7 and MS-Office 2010.

LOGICAL REASONING

1. In a group of five people, K, L and M are ambitious, M, N and R are honest, L, M and N are intelligent and K, M and R are industrious. Among these, neither industrious nor ambitious person(s) would include ____.
   (A) K alone
   (B) L and R
   (C) M and N
   (D) N alone

2. How many such pairs of digits are there in the number 95137248 each of which has as many digits between them in the number as when they are arranged in ascending order?
   (A) One
   (B) Two
   (C) Three
   (D) More than three

3. A, B, C, D, E, F and G are members of a family consisting of four adults and three children, two of whom, F and G are girls. A and D are brothers and A is a doctor. E is an engineer married to one of the brothers and has two children. B is married to D and G is their child. Who is C?
   (A) G's brother
   (B) F's father
   (C) E's daughter
   (D) A's son

4. How many such vowels are there in the given arrangement which are immediately preceded as well as immediately followed by a consonant?

   T H A J K R B T A E M D G S O J K U M B D L U H Y A C M
   (A) One
   (B) Two
   (C) Three
   (D) More than four

5. Five students participated in an examination and each scored different marks. Nidhi scored higher than Mamta. Kavita scored lower than Prashant but higher than Nidhi. Anil's score was between Mamta and Nidhi. Which of the following pairs represents the highest and the lowest scorers respectively?
   (A) Nidhi, Kavita
   (B) Kavita, Mamta
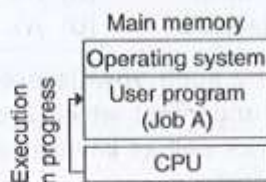   (C) Prashant, Mamta
   (D) Anil, Kavita

COMPUTERS AND INFORMATION TECHNOLOGY

6. Identify the following :
   - These printers use CIJ and Drop-on-demand printing method.
   - Its cartridges dry out if left unused for a long period of time.
   - It is a type of non-impact printer.
   (A) Inkjet Printer
   (B) Laser Printer
   (C) Dot-Matrix printer
   (D) Daisy Wheel Printer

7. Which of the following formulas in MS-Excel 2010 rounds a number to a specified number of decimals and returns the result as text with or without commas?
   (A) Find
   (B) Fixed
   (C) Round
   (D) Lower

8. A high end graphics card used for power gaming can be installed on the motherboard in ____.
   (A) PCI slots
   (B) AGP slots
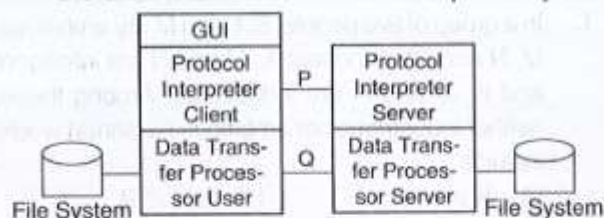   (C) DIMM slots
   (D) Both (A) and (B)

9. _____ attribute allows you to specify which portion of a table's border will display on a webpage in HTML.
(A) Frame (B) Height
(C) Width (D) None of these

10. The processing speed of a computer is measured in _____.
(A) Mega byte (B) 16 bit
(C) Mega hertz (D) Milli seconds

11. While working in MS-Excel 2010 cell address $A4 in a formula means it is a _____.
(A) Mixed cell reference
(B) Absolute cell reference

(C) Relative cell reference
(D) Initial cell reference

12. What is the function of an operating system?
(A) Manages computer's resources very efficiently.
(B) Takes care of scheduling jobs or execution.
(C) Manages the flow of data and instructions.
(D) All of these

13. Which of the following is NOT a hardware component?
(A) Mouse
(B) MS-Office
(C) Chip
(D) Semiconductor memory

ACHIEVERS SECTION

14. Which of the following process management technique has been illustrated in the given diagram?

Execution in progress → | Main memory |
| Operating system |
| User program (Job A) |
| CPU |

(A) Multiprogramming
(B) Uniprogramming
(C) Multithreading
(D) Double Threading

15. Given below is the FTP service diagram. Identify the area marked as P and Q respectively.

GUI		
Protocol Interpreter Client	P	Protocol Interpreter Server
Data Transfer Processor User	Q	Data Transfer Processor Server
File System — — — File System

(A) P-Control channel, Q-Data channel
(B) P-Data channel, Q-Control channel
(C) P-Response channel, Q-Data channel
(D) P-Command channel, Q-Response channel

N S O

SOF NATIONAL SCIENCE OLYMPIAD

Total Questions : 50   Time : 1 hr.

PATTERN & MARKING SCHEME			
Section	(1) Logical Reasoning	(2) Science	(3) Achievers Section
No. of Questions	10	35	5
Marks per Ques.	1	1	3

SYLLABUS

Section – 1 : Verbal and Non-Verbal Reasoning.

Section – 2 : Chemical Reactions and Equations, Acids, Bases and Salts, Metals and Non-metals, Carbon and its Compounds, Periodic Classification of Elements, Life Processes, Reproduction in Organisms, Heredity and Evolution, Light-Reflection and Refraction, Human Eye and Colourful World, Electricity, Magnetic Effects of Electric Current, Sources of Energy, Our Environment and its Management.

**Section – 3 :** Higher Order Thinking Questions - Syllabus as per Section – 2.

LOGICAL REASONING

1. Vinay starts walking towards East. After walking 35 km, he turns to his right and walks another 40 km. He then turns right and walks another 35 km. Finally, he turns right and walks 20 km. How far is he from the starting point and in which direction?
(A) 20 km, North (B) 35 km, South
(C) 20 km, South (D) 35 km, North

2. Eight friends P, Q, R, S, T, U, V and W are sitting around a circle facing the centre. V is third to the right of Q and is second to the left of R. Q is second to the left of T and on the immediate right of S. U is between Q and T. P is not on the left of R.

Which of the following is the correct position of W?

(A) On the immediate left of V
(B) On the immediate right of V
(C) Between U and V
(D) On the immediate right of R

3. Pointing to a photograph, a woman says, "He is the only son of the wife of my husband's father". How is the man related to the woman?
(A) Son
(B) Son-in-law
(C) Brother-in-law
(D) Husband

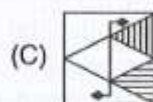4. Find the mirror image of Fig. (X) from amongst the options, if the mirror is placed to the right of Fig. (X).
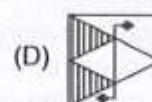

Fig.(X)
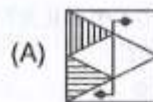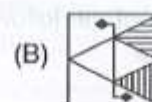
(A)   (B)

(C)   (D)

5. The given question is based on the 5 three-digit numbers given below:

517   394   823   976   465

If the position of the first and the second digits in each of the above numbers are interchanged, which of the following will be the third digit of the highest number?
(A) 7
(B) 4
(C) 3
(D) 6

SCIENCE

6. Read the given statements and select the correct option.

Statement 1 : A concave mirror and a convex lens both have the same focal length in air. When they are submerged in water, they will still have the same focal length.

Statement 2 : The refractive index of water is greater than the refractive index of air.

(A) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
(B) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
(C) Statement 1 is true but statement 2 is false.
(D) Statement 1 is false but statement 2 is true.

7. No heat loss occurs during flow of charge in superconductors because
(A) Speed of charge is slow in it
(B) It is a bad conductor of heat
(C) It offers zero resistance
(D) It generates very small voltage.

8. How do we know that fission isn't responsible for the sun's energy ?
(A) Fission doesn't produce enough energy per gram of fuel
(B) If fission were going on in the sun, the sun would explode
(C) If fission were going on in the sun, the sun's mass would increase

(D) There isn't very much fissionable material in the sun.

9. Which of the following statements is true with respect to diamond ?
(A) The carbon atoms are connected to each other by metallic bonds.
(B) In the diamond crystal, the carbon atoms are very loosely packed.
(C) Each carbon atom in the crystal is surrounded by four other carbon atoms forming a rigid 3-D structure.
(D) Diamond can be synthesised by subjecting pure carbon to very low pressure and temperature.

10. Which of the following statements regarding natural selection is true?
(A) It is a process in which members of a population inherit traits that enable them to better survive and produce offspring.
(B) It is based on the isolation of natural populations and selective breeding of organisms.
(C) It provides diversity without any adaptation.
(D) All of the above

11. Strips of metal X were dipped into two solutions as shown :
A greyish metallic deposit was found on both strips.

Metal X
Silver nitrate solution
Zinc nitrate solution
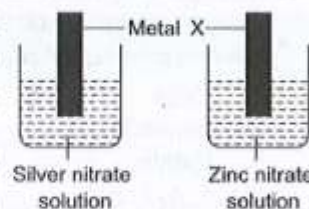
Which of the following could be metal X?

(A) Cu   (B) Mg

(C) Pb   (D) Fe

12. A constant current flows in a horizontal wire in the plane of the paper from west to east as shown in the given figure. The direction of magnetic field will be north to south, at a point _____ .

(A) Directly above the wire

(B) Directly below the wire

(C) Located in the plane of the paper, on the north side of the wire
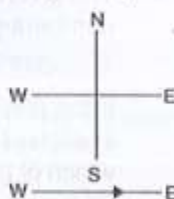
(D) Located in the plane of the paper, on the south side of the wire

13. In which labelled part of the given figure does the fertilization of an ovum by a sperm take place?
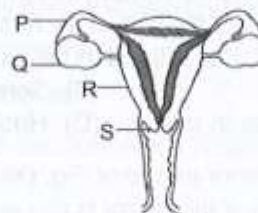
(A) P   (B) Q

(C) R   (D) S

ACHIEVERS SECTION

14. Which of the following statements about the given reaction are not correct?

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

I. Fe_2O_3 is getting oxidised to Fe.

II. Fe_2O_3 is acting as a reducing agent.

III. CO is acting as a reducing agent.

IV. CO is getting reduced to CO_2.

(A) III only   (B) I, II and IV

(C) II and IV   (D) I and III

15. Refer to the diagram of the human digestive system to answer the following question.
What would be the likely consequence of swapping S and T i.e., from the stomach, food will pass through T to S?

(A) The digestive enzymes would be denatured.

(B) The intestinal contents would be highly alkaline and would damage the wall of T.

(C) The intestinal contents would be too dry and unable to pass through S properly.

(D) Water absorption would be highly reduced.
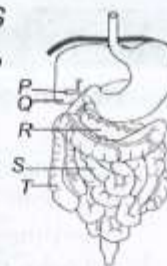
LOGICAL REASONING

1. Arrange the given word in the sequence in which they occur in the dictionary and then choose the correct sequence.

  1. Page   2. Pagan

  3. Palisade   4. Pageant

  5. Palate

(A) 1, 4, 2, 3, 5   (B) 2, 4, 1, 3, 5

(C) 2, 1, 4, 5, 3   (D) 1, 4, 2, 5, 3

2. What should come at the place of '?' so that every column or diagonal has the same sum?

(A) 19

(B) 12

(C) 13

(D) 15

Magic Hexagon

3. Mohit was looking for his father. He went 90 metres in the East before turning to his right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not there. From here he went 100 metres to the North before meeting his father in a street. How far did the son meet his father from the starting point?

(A) 80 metres   (B) 100 metres
(C) 140 metres   (D) 260 metres

4. If + stands for 'division', × stands for 'addition', − stands for 'multiplication' and ÷ stands for 'subtraction', then which of the following equations is correct?
(A) $36 \times 6 + 7 \div 2 - 6 = 20$
(B) $36 \div 6 + 3 \times 5 - 3 = 45$
(C) $36 + 6 - 3 \times 5 \div 3 = 24$
(D) $36 - 6 + 3 \times 5 \div 3 = 74$

MATHEMATICAL REASONING

5. Find the value of x in the given figure.
(A) 75°
(B) 40°
(C) 65°
(D) 90°

Class	0-20	20-40	40-60	60-80	80-100
Frequency	7	p	10	9	13

(A) 9   (B) 11
(C) 8   (D) 10
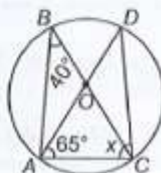
6. In the following system of equations, determine the value of k for which the given system of equations has a unique solution:
$$2x - 3y = 1$$
$$kx + 5y = 7$$
(A) $k \neq -\dfrac{5}{3}$ (B) $k \neq -\dfrac{10}{3}$
(C) $k \neq -\dfrac{3}{5}$ (D) $k \neq \dfrac{2}{3}$

7. If the mean of the following distribution is 54, find the value of p.

8. If the HCF of 210 and 55 is expressible in the form $210 \times 5 + 55y$, find y.
(A) 5   (B) −15
(C) 14   (D) −19

9. The sum of three numbers in A.P. is −3, and their product is 8. Find the numbers.
(A) 2, −1, −4   (B) −4, −1, 2
(C) 4, −1, −2   (D) Both (A) and (B)

10. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. Find the length of the wire.
(A) 240 m   (B) 242 m
(C) 243 m   (D) 245 m

EVERYDAY MATHEMATICS

11. Three ducks and two ducklings weigh 32 kg. Four ducks and three ducklings weigh 44 kg. All ducks weigh the same and all ducklings weigh the same. What is the weight of two ducks and one duckling?
(A) 20 kg   (B) 40 kg
(C) 60 kg   (D) 64 kg

12. What is the probability that a number selected from the numbers 1, 2, 3, ..., 25 is a prime number, when each of the given numbers is equally likely to be selected?

(A) 2/7   (B) 9/25
(C) 11/25   (D) 2/5

13. There is a circular path around a sports field. Priya takes 18 minutes to drive one round of the field, while Ravish takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?
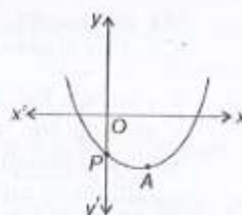(A) 54   (B) 24
(C) 36   (D) 72

ACHIEVERS SECTION

14. Fill in the blanks:

Every ___(a)___ number can be expressed (factorised) as the product of ___(b)___ factors and this factorisation is ___(c)___ except for the order in which the prime factor occur.

	(a)	(b)	(c)
(A)	Prime	Composite	Unique
(B)	Composite	Prime	Unique
(C)	Odd	Even	Universal
(D)	Even	Odd	Universal

15. The graph of $ax^2 + bx + c$ is shown here and $A\left(\dfrac{-b}{2a}, -\dfrac{D}{4a}\right)$.

Identify the signs of a, b and c.

	a	b	c
(A)	+ve	+ve	−ve
(B)	+ve	−ve	−ve
(C)	+ve	−ve	+ve
(D)	−ve	+ve	−ve

WORD AND STRUCTURE KNOWLEDGE

Direction (Q. No. 1 and 2) : Choose the most suitable word/phrase for each blank.

1. We have to let the law _____ and wait for the court verdict in this matter.
   - (A) Take it course
   - (B) Make its course
   - (C) Take a course
   - (D) Take its course

2. This colour has gone _____ fashion.
   - (A) Out from
   - (B) From
   - (C) Out of
   - (D) Off

3. Choose the correct spelling.
   - (A) Pseudonym
   - (B) Pseuodnym
   - (C) Pseudoname
   - (D) Seudonum

4. Select the correct phrase.
   - (A) Take it and leave it
   - (B) Take it or give it
   - (C) Take it or leave it
   - (D) Leave it or take it

Direction (Q. No. 5 and 6) : Fill in the blanks.

5. Mr. Prasanna is _____ and he works for a well-known computer firm.
   - (A) Dark tall man with an MBA from a Gujarat
   - (B) A tall dark man from Gujarat with an MBA
   - (C) An tall dark man from Gujarat with a MBA
   - (D) With an MBA from Gujarat a tall dark man

6. The Director was so _____ his team that he was at a loss for words.
   - (A) Angry with
   - (B) Angry by
   - (C) Angry about
   - (D) Angry on

7. Read the sentences given below and find the error.
   - (A) He said that he would not be able
   - (B) to come with all of us
   - (C) because of his uncle's visit.
   - (D) No error.

READING

Direction (Q. No. 8 to 10) : Read the passage given below and answer the questions that follow.

Once upon a time, everybody "did" science, for their own amusement and excitement. All of us, as children, are scientists too—testing substances on our tongues, discovering gravity, peering under rocks, seeing patterns in the stars, wondering what makes the night scary and the sky blue.

Partly because the educational system has taught science only in a reductionist, left-brain style and partly because of society's demands for practical applications of technology, the love of science fades quickly for most youngsters. Those who love nature but dislike dissecting small animals soon learn to avoid high-school biology. Students who enroll in psychology courses, hoping to learn something about how people think and feel, find themselves learning more about rats and statistics than they ever wanted to know.