

**OPENNET – V : Entrance Test for
Diploma in Nautical Science leading to B.Sc. (Nautical Science)
2006**

Total No. of Questions = 100

Time : 3 Hours

- All questions are compulsory.
- Use of calculator is *not* allowed. Rough work may be done in the space provided at the back of the Test booklet.
- The Test booklet has the following 5 tests :

Tests	No. of Questions	Marks
I – Reasoning Aptitude	20	20
II – General Knowledge	20	20
III – Mathematics	20	20
IV – English	20	20
V – General Science	20	20

Read the instructions given on the OMR Answer Sheet carefully before you start.

HOW TO FILL UP THE INFORMATION ON THE ENTRANCE TEST OMR ANSWER SHEET

While filling up the OMR Answer Sheet, you should follow the following guidelines :

1. Write your complete Roll Number. This should correspond to the roll number already supplied to you. Also write your correct name, address with pin code in the space provided, in ink. Put your signatures on the Answer Sheet with date, in ink. Ensure that the Invigilator in your examination hall also puts his signatures with date on the OMR Answer Sheet at the space provided. You should use HB pencil to mark the answers of the questions on the OMR Answer Sheet.
2. Do not make any stray marks on the OMR Answer Sheet.
3. Write correct information in numerical digits in Roll No., Programme Code, Date and Month and Examination Centre Code Columns. **The column of Course Code should be left blank.** The corresponding rectangle should be dark enough and should be filled in completely.
4. Each question is followed by four probable answers which are numbered 1, 2, 3 and 4. You should select and show only one answer to each question considered by you as the most appropriate or the correct answer. Select the most appropriate answer. Then by using HB pencil, blacken the rectangle bearing the correct answer number against the serial number of the question. **If you find that answer to any question is none of the four alternatives given under the question you should darken the rectangle '0'.**
5. If you wish to change your answer, ERASE completely the already darkened rectangle by using a good quality eraser and then blacken the rectangle bearing your revised answer number. If incorrect answer is not erased completely, smudges will be left on the erased rectangle and the question will be read as having two answers by the Optical Mark Reader (OMR) and will be ignored for giving any credit.
6. No credit will be given if more than one answer is given for one question. Therefore, you should select the most appropriate answer.
7. You should not spend too much time on any one question. If you find any particular question difficult, leave it and go to the next. If you have time left after answering all the questions, you may go back to the unanswered ones.
8. There is no negative marking for wrong answers.

GENERAL INSTRUCTIONS

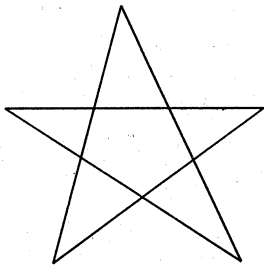
1. Mobile Phones, calculators, books, slide-rules, foot rulers, note-books or written notes, etc. are not allowed inside the examination hall.
2. You should follow the instructions given by the Centre Superintendent, observers and by the Invigilators at the examination venue. If you violate the instructions you will be disqualified.
3. Any candidate found copying or receiving or giving assistance in the examination will be disqualified.
4. The Test Booklet and the OMR Answer Sheet would be supplied to you by the Invigilators. **After the exam is over, you should hand over the Test Booklet and the OMR Answer Sheet to the Invigilator before leaving the examination hall.** Any candidate who does not return the Question Booklet and the OMR Answer Sheet will be disqualified.
5. Candidates arriving late will not be permitted to enter the examination hall. The reporting time is 9.15 A.M. The examination will start at 10.00 A.M. and will be over at 1.00 P.M.
6. All rough work is to be done on the test booklet itself and not on any other paper. Scrap paper is not permitted. For arriving at answers you may work in the margins, make some markings or underline in the test booklet itself.
7. The University reserves the right to cancel scores of any candidate who impersonates or uses malpractices. The examination is conducted under uniform conditions. The University would also follow a procedure to verify the validity of scores of all examinees uniformly. If there is substantial indication that your performance is not genuine, the University may cancel your score.

TEST I
REASONING APTITUDE

1. What is the sum upto 105 terms of the following series ?

$$2 + 3 + 4 - 9 + 2 + 3 + 4 - 9 + \dots$$

- (1) 0 (2) 1
(3) 2 (4) 5
2. If $5.4 = 2515$
 $4.5 = 1624$
 $3.2 = 93$
then the value of 2.1 is
- (1) 40 (2) 1600
(3) 14 (4) 24
3. The afternoon classes in a school begin at 1 : 00 P.M. and end at 3 : 52 P.M. There are 4 afternoon class periods with 4 minutes allowed between periods as break. The number of minutes in each class period is
- (1) 39 (2) 40
(3) 43 (4) 59
4. Introducing a man, a woman said, "His father-in-law's father is my father-in-law". How is the man related to her ?
- (1) Husband (2) Son-in-law
(3) Son (4) Father
5. Rita ranks sixteenth from the top in the class of forty two. What is her rank from the bottom ?
- (1) 28 (2) 26
(3) 16 (4) 27
6. How many triangles are there in the figure below ?



- (1) 5 (2) 7
(3) 9 (4) 10

7. If 'South-East' is called 'East', 'North-West' is called 'West', 'South-West' is called 'South' and so on, what will 'North' be called ?
- (1) East
 - (2) North-East
 - (3) North-West
 - (4) South-West

Directions for Questions 8 – 9 : Fill in the blanks to complete the series.

8. $11\frac{1}{9}$, $12\frac{1}{2}$, $14\frac{2}{7}$, $16\frac{2}{3}$, _____
- (1) $8\frac{1}{3}$
 - (2) 20
 - (3) 10
 - (4) $9\frac{1}{11}$
9. 9, 11, 20, 31, _____, 82
- (1) 51
 - (2) 41
 - (3) 60
 - (4) 71

Directions for Questions 10 – 11 : Read the following information and answer the questions.

The sum of incomes of A and B is more than that of C and D taken together. The sum of the incomes of A and C is the same as that of B and D taken together. A earns half as much as the sum of incomes of B and D.

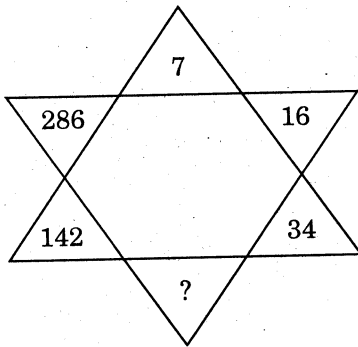
10. Whose income is the highest ?
- (1) A
 - (2) B
 - (3) C
 - (4) D
11. If A's income is Rs. 80,000 per annum and the difference between the income of B and D be the same as A's income, B's income is
- (1) Rs. 40,000
 - (2) Rs. 1,00,000
 - (3) Rs. 1,20,000
 - (4) Rs. 1,50,000

Directions for Questions 12 – 13 : Choose the odd numeral pair.

12. (1) 70 – 80
(2) 54 – 62
(3) 28 – 32
(4) 21 – 24
13. (1) 2 – 4
(2) 4 – 8
(3) 6 – 18
(4) 8 – 32

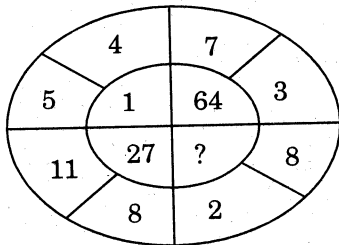
Directions for Questions 14 – 15 : Find the missing number.

14.



- (1) 72
(2) 68
(3) 66
(4) 70

15.



- (1) 216
(2) 125
(3) 128
(4) 81

Directions for Questions 16 – 20 : Read the following information and answer the questions that follow.

- (i) P, Q, R, S, T and U are six members of a family, each of them engaged in a different profession — Doctor, Lawyer, Teacher, Engineer, Nurse, and Manager, not necessarily in that order.
- (ii) Each of them remains at home on a different day of the week from Monday to Saturday.
- (iii) The Lawyer remains at home on Thursdays.
- (iv) R remains at home on Tuesdays.
- (v) P, the Doctor, does not remain at home either on Saturdays or on Wednesdays.
- (vi) S is neither the Doctor nor the Teacher, and remains at home on Fridays.
- (vii) Q is the Engineer and T is the Manager.

16. Which of the following combinations is correct ?

- (1) R – Teacher
- (2) Q – Engineer
- (3) T – Manager
- (4) All are correct

17. Which of the following combinations is correct regarding staying at home ?

- (1) Lawyer – Tuesday
- (2) Nurse – Friday
- (3) Teacher – Wednesday
- (4) Manager – Friday

18. Who is the nurse ?

- (1) S
- (2) R
- (3) U
- (4) Data inadequate

19. Who among them remains at home on the following day on which the nurse stays at home ?

- (1) Q
- (2) Q or T
- (3) R
- (4) S

20. Who remains at home on Tuesdays ?

- (1) S
- (2) T
- (3) R
- (4) Q

TEST II
GENERAL KNOWLEDGE

21. Niagara falls are in
(1) Africa (2) Australia
(3) North America (4) Asia
22. Who among the following is known as 'Fuhrer' ?
(1) Stalin (2) Hitler
(3) Lenin (4) Bismarck
23. Freud is associated with
(1) detective work (2) medicine
(3) psychology (4) leprosy control
24. Which of the following is *not* a primary colour ?
(1) Green (2) Red
(3) Yellow (4) Blue
25. The Taj Mahal was built during
(1) 15th century (2) 14th century
(3) 16th century (4) 17th century
26. Which is the largest lake in the world ?
(1) Lake Baikal (2) Caspian Sea
(3) Dead Sea (4) Chilka Lake
27. The famous Italian explorer Marco Polo explored
(1) China (2) India
(3) America (4) Japan
28. The line of latitude a quarter of the way from the Equator to the South Pole is called
(1) Tropic of Cancer (2) Arctic Circle
(3) Tropic of Capricorn (4) Antarctic Circle
29. The fear (phobia) of heights is called
(1) Aviophobia (2) Acrophobia
(3) Xylophobia (4) Agoraphobia
30. In the Roman numbering system one hundred is written as
(1) M (2) D
(3) L (4) C

31. World War II took place during
- (1) 1939 – 1945 (2) 1914 – 1918
(3) 1950 – 1953 (4) 1861 – 1865
32. Who holds the record of winning maximum gold medals (7) in a single Olympics ?
- (1) Michael Phelps (2) Mark Spitz
(3) A. Dityatin (4) Olga Korbut
33. Who is the first woman to become Germany's Chancellor ?
- (1) C. Rice (2) Margaret Thatcher
(3) Angela Merkel (4) Linda Buck
34. A geometrical figure with seven sides is called
- (1) tetragon (2) heptagon
(3) decagon (4) hexagon
35. The word 'bon jour', meaning hello, is from which language ?
- (1) Spanish (2) Italian
(3) Dutch (4) French
36. The first navigator to sail round the world was
- (1) Marco Polo (2) Columbus
(3) Amundsen (4) Magellan
37. The 2010 World Cup Football Tournament will be held in
- (1) South Africa (2) Australia
(3) England (4) Brazil
38. If you want to visit the cities in the Golden Triangle, which city, apart from Delhi and Jaipur, would you visit ?
- (1) Jodhpur (2) Ajmer
(3) Agra (4) Chandigarh
39. Where is the Indian Institute of Science located ?
- (1) Delhi (2) Mumbai
(3) Hyderabad (4) Bangalore
40. Who is the only speaker of the Lok Sabha to have later become the President of India ?
- (1) V.V. Giri
(2) Neelam Sanjiva Reddy
(3) Zakir Hussain
(4) R. Venkataraman

TEST III
MATHEMATICS

41. If the base of a triangle is doubled and height is halved, its area will be

- (1) doubled (2) halved
(3) one-fourth (4) same

42. Find the value of k for which $x = 2$ is a solution of the equation

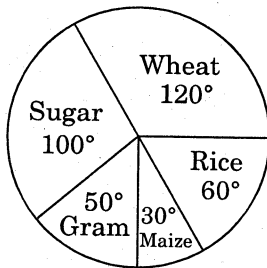
$$kx^2 + 2x - 3 = 0.$$

- (1) 0.25 (2) -0.25
(3) 0.5 (4) 1.0

43. The vectors $\vec{A} = 2\hat{i} + x\hat{j} + \hat{k}$ and $\vec{B} = 3\hat{i} + \hat{j} + \hat{k}$ are perpendicular to each other for

- (1) $x = -6$ (2) $x = 6$
(3) $x = 7$ (4) $x = -7$

44. The following pie-chart shows the annual agricultural production of an Indian state. If the total production of all the given commodities is 96000 tonnes, then the production (in tonnes) of rice is



- (1) 18000 (2) 16000
(3) 12000 (4) 1600

45. The mean weight of a group of seven boys is 56 kg. The individual weights (in kg) of six of them are 52, 57, 55, 60, 59 and 55. The weight of the seventh boy is

- (1) 45 kg (2) 55 kg
(3) 54 kg (4) None of these

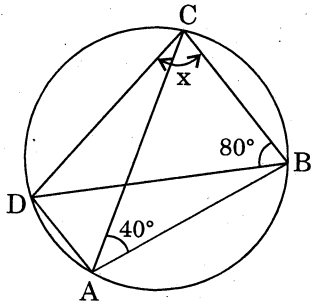
46. A tower is $100\sqrt{3}$ metres high. The angle of elevation of its top from a point 100 metres away from its foot is

- (1) 30° (2) 45°
(3) 60° (4) 75°

47. The value of $\frac{1}{(1 + \tan^2 \theta)} + \frac{1}{(1 + \cot^2 \theta)}$ is

- (1) $\sin 30^\circ$ (2) $\sin 45^\circ$
 (3) $\sin 60^\circ$ (4) $\sin 90^\circ$

48. The value of x in the following figure is



- (1) 65° (2) 80°
 (3) 60° (4) 70°

49. A man goes 15 metres due west and then 8 metres due north. How far is he from the starting point ?

- (1) 23 m (2) 16 m
 (3) 17 m (4) 20 m

50. A two-digit number is 4 times the sum of its digits and twice the product of its digits. Find the number.

- (1) 63 (2) 36
 (3) 24 (4) 12

51. The length of a tangent from a point 13 cm away from the centre of a circle whose radius is 5 cm will be

- (1) 65 cm (2) 60 cm
 (3) $\sqrt{144}$ cm (4) $\sqrt{194}$ cm

52. The product of two numbers is 168 and their difference is 2. Their sum is

- (1) 39 (2) 36
 (3) 26 (4) 29

53. When 60% of a number is added to 60, the result is number itself. The number is

- (1) 80 (2) 120
 (3) 140 (4) 150

54. If 1 is added to both numerator and denominator of a fraction, it becomes $\frac{4}{5}$ and if 5 is subtracted from both numerator and denominator, it becomes $\frac{1}{2}$. The fraction is

(1) $\frac{6}{7}$

(2) $\frac{7}{9}$

(3) $\frac{3}{4}$

(4) $\frac{5}{6}$

55. The areas of three mutually adjacent faces of a rectangular box are known. The product of these areas is equal to

(1) the volume of the box

(2) twice the volume of the box

(3) the square of the volume of the box

(4) cube root of its volume

56. If $x + \frac{1}{x} = 3$, then $\frac{x}{x^2 + 1}$ is

(1) 9

(2) $\frac{1}{3}$

(3) 13

(4) $\frac{1}{13}$

57. How many 3-digit numbers can be formed by using the digits 0, 2, 3 without repetition ?

(1) 4

(2) 3

(3) 5

(4) 6

58. The function $f(x) = \frac{x^4}{4} - x$ has a minimum at

(1) $x = 4$

(2) $x = -1$

(3) $x = 1$

(4) $x = -4$

59. If $25 \times (\sqrt{5})^a \times (\sqrt{5})^3 = 5\sqrt{5}$, then the value of a is

(1) -4

(2) 3

(3) 4

(4) 5

60. If A is a 2×3 matrix, B is a 4×2 matrix and C is a 3×3 matrix, then

(1) $AB + C$ is defined

(2) $CB + A$ is defined

(3) CA is defined

(4) $BA + C$ is defined

TEST IV

ENGLISH

Directions for questions 61 to 65. Read the passage given below and answer the questions given at the end of the passage on the basis of the contents of the passage.

The best way to learn is to teach. This is the message emerging from experiments in several schools in which teenage pupils who have problems at school themselves are tutoring younger children — with remarkable results for both sides.

According to American research, pupil-tutoring wins 'hands down' over computerised instruction and American teachers say that no other recent innovation has proved so consistently successful.

Now the idea is spreading in Britain. Throughout this term, a group of 14-year-olds at Trinity School have been spending an hour a week helping children at a nearby primary school with their reading. The younger children read aloud to their tutors (who are supervised by university students of education) and then play word games with them.

All the 14-year-olds have some of their own lessons in a special unit for children who have difficulties at school. Though their intelligence is around average, most of them have fallen behind on reading, writing and maths and in some cases, this has led to truancy or bad behaviour in class.

Jean Bond, who is running the special unit says that the main benefit of tutoring is that it improves the adolescents' self-esteem. "The younger children come rushing up every time and welcome them. It makes the tutors feel important whereas, in normal school lessons, they often feel inadequate. Everyone benefits. The older children need practice in reading but, if they had to do it in their own classes, they would say it was kids' stuff and be worried about losing face. The younger children get individual attention from very patient people. The tutors are struggling at school themselves so, when the younger ones can't learn, they know exactly why."

The younger children speak warmly of their new teachers. "He doesn't shout like other teachers," says eight-year-old Jenny of her tutor, Cliff McFarlane who, among his own teachers, has a reputation for being a handful. Yet Cliff sees himself as a tough teacher. "If they get a word wrong," he says, "I keep them at it until they get it right."

Jean Bond, who describes pupil tutoring as an 'educational conjuring trick', has run two previous experiments. In one, six persistent truants, aged 15 upwards, tutored 12 slow-learning infants in reading and maths. None of the six played truant from any of the tutoring sessions. "The degree of concentration they showed while working with their tutees was remarkable for pupils who had previously shown little ability to concentrate on anything related to school work for any period of time," says Bond. The tutors became 'reliable, conscientious, caring individuals'.

Their own reading, previously mechanical and monotonous, became far more expressive as a result of reading stories aloud to infants. Their view of education, which they had previously dismissed as 'crap' and 'a waste of time', was transformed. They became firmly resolved to teach their own children to read before starting school because, as one of them put it, "if they go for a job and they can't write, they're not going to employ you, are they?" The tutors also became more sympathetic to their own teachers' difficulties, because they were frustrated themselves when the infants 'mucked about'.

In the seven weeks of the experiment, concludes Bond, "these pupils received more recognition, reward and feelings of worth than they had previously experienced in many years of formal schooling." And the infants, according to their own teachers, showed measurable gains in reading skills by the end of the scheme.

61. All the tutors in the Trinity experiment are pupils who
- (1) cause discipline problems for their teachers
 - (2) frequently stay away from school
 - (3) are below standard in the basic literacy and mathematical skills
 - (4) are unable to read and write
62. According to the writer, the tutors wouldn't normally practise reading in their class because
- (1) they would find it humiliating
 - (2) they wouldn't be able to concentrate
 - (3) their teachers wouldn't consider it necessary
 - (4) their teachers would get impatient with them
63. The main reason that the tutors make such successful teachers seems to be that
- (1) they enjoy being the centre of attention
 - (2) they can relate to their pupils' problems
 - (3) they are never strict with their pupils
 - (4) their pupils enjoy playing games with them

64. What was observed about the tutors ?
- (1) They became good readers.
 - (2) They enjoyed the sessions with their pupils.
 - (3) They wanted to be teachers when they grew up.
 - (4) They became caring individuals who could be relied upon.
65. The most significant result of the experiments so far carried out seems to have been that the tutors
- (1) learnt to overcome their fear of reading aloud
 - (2) improved their pupils' ability to concentrate
 - (3) benefited from an increase in their self-respect
 - (4) came to see the importance of the writing skill

Directions for questions 66 to 70 : Each of these questions consists of a word in capital letters followed by four alternatives. Select the alternative that is most similar in meaning to the word in capital letters in each case.

66. **INGENIOUS**

- | | |
|--------------|--------------|
| (1) innocent | (2) clever |
| (3) ignorant | (4) trusting |

67. **FANATICAL**

- | | |
|---------------|----------------|
| (1) extreme | (2) fanciful |
| (3) fantastic | (4) dream-like |

68. **GRUELLING**

- | | |
|--------------|----------------|
| (1) horrible | (2) humbling |
| (3) growing | (4) exhausting |

69. **REVERE**

- | | |
|------------|---------------|
| (1) honour | (2) revenge |
| (3) enjoy | (4) pull back |

70. **OPPORTUNE**

- | | |
|-----------------|------------------|
| (1) opportunity | (2) inconvenient |
| (3) timely | (4) miraculous |

Directions for questions 71 to 75 : Each of these questions consists of a word in capital letters, followed by four alternatives. Select the alternative that is **opposite** in meaning to the word in capital letters in each case.

71. AMIABLE

- | | |
|---------------|----------------|
| (1) agreeable | (2) immoral |
| (3) amoral | (4) unfriendly |

72. CEASE

- | | |
|-----------|---------------|
| (1) stop | (2) break off |
| (3) begin | (4) honour |

73. HAMPER

- | | |
|------------|--------------|
| (1) help | (2) curb |
| (3) hinder | (4) remember |

74. DEXTEROUS

- | | |
|-------------|------------|
| (1) devoted | (2) clumsy |
| (3) wicked | (4) happy |

75. HARMONIOUS

- | | |
|-----------------|---------------|
| (1) cooperative | (2) bitter |
| (3) discordant | (4) difficult |

Directions for questions 76 to 80 : Each of these statements consists of four underlined sections one of which is incorrect as per usage of Standard English. You have to identify the segment which is incorrect, in each case.

76. The government does not provide enough food to the population.

- | | | | |
|-----|-----|-----|-----|
| (1) | (2) | (3) | (4) |
|-----|-----|-----|-----|

77. She spoke very shortly about how they had lived during the war.

- | | | | |
|-----|-----|-----|-----|
| (1) | (2) | (3) | (4) |
|-----|-----|-----|-----|

78. In these days many children have their own computer.

- | | | | |
|-----|-----|-----|-----|
| (1) | (2) | (3) | (4) |
|-----|-----|-----|-----|

79. She told me do not trust such a person at all.

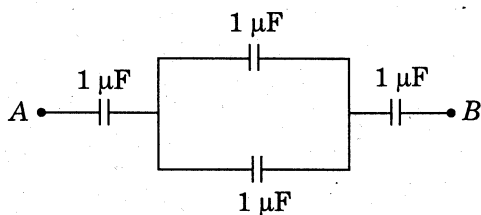
- | | | | |
|-----|-----|-----|-----|
| (1) | (2) | (3) | (4) |
|-----|-----|-----|-----|

80. I will give a reward to anyone who found my purse.

- | | | | |
|-----|-----|-----|-----|
| (1) | (2) | (3) | (4) |
|-----|-----|-----|-----|

88. A person weighing 65 kg climbs a flight of stairs 4 m high. The work done by the person against the gravitational force is
- (1) 2548 J (2) 160 J
 (3) 2468 J (4) 29.3 J
89. A moving body P of mass 5 kg collides with another stationary body Q . After collision, both the bodies move together with a speed one-third of the speed of body P . The mass of body Q is
- (1) 5 kg (2) 10 kg
 (3) 15 kg (4) 20 kg

90. In the figure given below, the equivalent capacitance between points A and B is



- (1) $0.1 \mu\text{F}$ (2) $0.2 \mu\text{F}$
 (3) $0.3 \mu\text{F}$ (4) $0.4 \mu\text{F}$
91. The number of orbitals corresponding to $n = 3$ and $l = 2$ is
- (1) 1 (2) 2
 (3) 3 (4) 5

92. Which of the following are present in aqua regia ?

- (1) $\text{HNO}_3 + \text{HCl}$
 (2) $\text{HNO}_3 + \text{H}_2\text{SO}_4$
 (3) $\text{H}_2\text{SO}_4 + \text{HCl}$
 (4) $\text{H}_2\text{SO}_4 + \text{SO}_3$

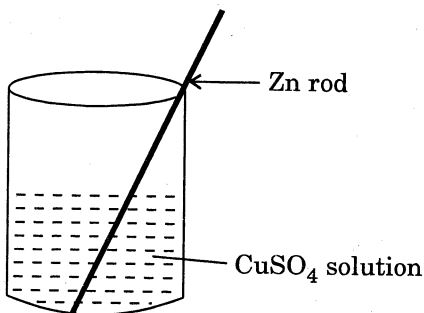
93. Which one of the following is **not** an ore of aluminium ?

- (1) Bauxite (2) Mica
 (3) Corundum (4) Proustite

94. A saturated hydrocarbon having molecular mass 30 would contain C and H in the respective percentages as

- (1) 30 : 70 (2) 20 : 80
 (3) 80 : 20 (4) 50 : 50

95. Which of the following would have the largest radius ?
- (1) F^- (2) O^{2-}
(3) Na^+ (4) Mg^{2+}
96. ClF_3 molecule is
- (1) Seesaw shaped
(2) T-shaped
(3) Square planar
(4) Tetrahedral
97. Which of the following is an intensive property ?
- (1) Mass (2) Volume
(3) Density (4) Heat capacity
98. Which one of the following would have the highest value of pH ?
- (1) Lemon juice (2) Tomato juice
(3) Human blood (4) Lime water
99. Glyptal is a polymer of
- (1) acrylonitrile
(2) *o*-phthalic acid and ethylene glycol
(3) formaldehyde and ethylene glycol
(4) formaldehyde and styrene
100. In the following set-up of the reaction :



- (1) Zn gets oxidised to Zn^{2+}
(2) Cu gets reduced to Cu^{2+}
(3) Cu gets oxidised to Cu^{2+}
(4) Zn^{2+} reduces to Zn

SPACE FOR ROUGH WORK