OPENNET – VIII : Entrance Test for
B.Sc. (Nautical Science)
June, 2008

Total No. of Questions = 180   *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 6 tests :

Tests	No. of Questions	Marks
I – English	30	30
II – General Knowledge	30	30
III – Reasoning Aptitude	30	30
IV – Mathematics	30	30
V – Physics	30	30
VI – Chemistry	30	30

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 circle 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 circle 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 circle '0'.**

5. If you wish to change your answer, ERASE completely the already darkened circle by using a good quality eraser and then blacken the circle bearing your revised answer number. If incorrect answer is not erased completely, smudges will be left on the erased circle 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 OMR Answer Sheet to the Invigilator before leaving the examination hall.** However, any candidate leaving the examination hall before the completion of 3 hours must hand over the OMR Answer Sheet as well as the Test Booklet to the Invigilator. Any candidate who does not follow these instructions 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.

Directions for Questions No. 1 to 6 : *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.*

Her father, Edward Moulton Barrett, was, as Elizabeth later, wrote, a very peculiar person. "Heir to a fortune, educated at Harrow and Cambridge, he, was nevertheless a complete domestic tyrant." After bearing him twelve children, his gentle wife had little strength left for struggle against him, and the children never dared oppose his wishes.

Yet, Elizabeth's childhood was happy. She romped and studied with her eldest brother, learnt Greek and French, read widely, and wrote poetic tragedies. Her own tragedy began at fifteen with a cough and an injury to her back, which resulted in increasingly bad health. Then her mother died.

Four years later, her father decided to sell the country home. The large family moved from house to house until her father bought No. 50 Wimpole Street. There Elizabeth's health grew worse, and she became a creature of the shadows and silence.

As the years passed, the family grew used to her withdrawn life. She had a certain independence, for an uncle had left her a small income. But her brothers and sisters were all at the mercy of Mr. Barrett's harsh rules, which hung over the household like thunder in heavy weather. Chief among them was the absolute refusal to let his daughters marry. He prevented the marriage of Elizabeth's gay, dance-loving sister Henrietta, and the scenes that followed broke Elizabeth's heart. Yet she remained devoted to her father. It was a devotion that served to strengthen the walls of her prison.

1. Elizabeth's father was 'a complete domestic tyrant' implies

   (1) that he was fond of his children

   (2) that he helped his wife with the household duties

   (3) that he ruled like a cruel dictator

   (4) that he was a stern and disciplined head of the family

2. In spite of everything, Elizabeth's childhood was happy because

   (1) her father was kind to her

   (2) her mother was alive

   (3) she had some intellectual interests and was healthy

   (4) her illness had not yet crippled her

3. What broke Elizabeth's heart ?

 (1) Her father's refusal to let his daughters marry

 (2) Her father's refusal to let her sister Henrietta marry

 (3) Her illness which prevented her from getting married

 (4) The unpleasantness that followed her father's refusal to let her sister marry

4. Elizabeth's own tragedy began when

 (1) she became a creature of the shadows and silence

 (2) her father bought a new house at No. 50 Wimpole Street

 (3) she was fifteen and had an injury to her back

 (4) her health grew worse

5. Explain the idiomatic expression : 'to break one's heart'.

 (1) to become sorrowful

 (2) to feel weak and uneasy

 (3) to get angry

 (4) to crush with grief

6. Explain : 'a creature of the shadows and silence'.

 (1) a lonely person

 (2) a secluded existence, out-of-touch with the world around her

 (3) a ghost or a spirit

 (4) unable to communicate with others

*Directions for Questions No. 7 to 12 : 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.*

7. ABANDON

 (1) desert

 (2) restrain

 (3) amass

 (4) collect

8. WRATH

 (1) violence

 (2) anger

 (3) hatred

 (4) jealousy

HILARIOUS

(1) hilly

(2) remarkable

(3) gay

(4) sad

10. **ADEQUATE**

(1) less

(2) more

(3) exact

(4) sufficient

11. **REPROOF**

(1) rebuke

(2) warning

(3) ridicule

(4) threat

12. **STRINGENT**

(1) dry

(2) rigorous

(3) strained

(4) shrill

*Directions for Questions No. 13 to 18 : 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.*

13. **AMBIGUOUS**

(1) clear

(2) brilliant

(3) dazed

(4) ancient

14. **INFERNAL**

(1) fiery

(2) heavenly

(3) angelic

(4) earthly

15. **CREDULOUS**

(1) sceptical

(2) believer

(3) surprised

(4) likely

16. INDIGENT
    (1) lazy
    (2) poor
    (3) careless
    (4) rich

17. INCOHERENT
    (1) intelligible
    (2) disorganised
    (3) unequal
    (4) detached

18. PROLOGUE
    (1) dialogue
    (2) epilogue
    (3) preface
    (4) introduction

Directions for Questions No. 19 to 24 : 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.

19. During in the summer vacation I shall go to the hills where I propose
    _____(1)_____   ____(2)____   ___(3)___
    to spend a fortnight with my father.
    _____(4)_____

20. It is clear from the facts gathered so far that he had
    _____(1)_____   ____(2)____   ___(3)___
    in that murder.
    _____(4)_____

21. He explained why the manufacturing of the goods have stopped.
    (1)   (2)   (3)   (4)

22. Surely, it is not his book, it is somebody's else.
    (1)   (2)   (3)   (4)

23. The two brothers were quarrelling with one another.
    _____(1)_____   _____(2)_____   (3)   ___(4)___

24. Did you have the lunch ?
    (1) (2) (3)   (4)

Directions for Questions No. 25 to 30 : *Fill in the blanks with appropriate prepositions from the alternatives (1), (2), (3) and (4).*

25. He persecuted his subjects _____ their religious beliefs.
    (1) in
    (2) from
    (3) for
    (4) with

26. The taxes that were being unjustly levied were abolished _____ the government.
    (1) with
    (2) by
    (3) from
    (4) against

27. The two brothers wrangled _____ the distribution of the property.
    (1) over
    (2) with
    (3) for
    (4) of

28. At the sight of the huge creature, they were petrified _____ fear.
    (1) in
    (2) with
    (3) from
    (4) for

29. I would like to know _____ responsible for this loss.
    (1) whose
    (2) who is
    (3) which is
    (4) what's

30. If I had a choice I _____ stayed on.
    (1) had
    (2) could have
    (3) would have
    (4) had had

TEST II
GENERAL KNOWLEDGE

31. The coin called 'Rupiya' was issued for the first time by

    (1) Sher Shah Suri

    (2) Akbar

    (3) Alauddin Khilji

    (4) Mohammad Shah Tughlaq

32. The newspaper which was recently voted as the largest selling newspaper in the world is

    (1) The Los Angeles Times

    (2) The Times of India

    (3) The London Times

    (4) The Newspaper Times

33. Egg is a rich source of nutrients *except*

    (1) Vitamin C

    (2) Protein

    (3) Vitamin D

    (4) None of these

34. India Broadcasting Service was renamed in 1936 as

    (1) Akashvani

    (2) Nabhovani

    (3) Doorvani

    (4) All India Radio

35. Which of the following rivers does *not* flow through the northern plains ?

    (1) Gomti

    (2) Gaghra

    (3) Bhagirathi

    (4) Krishna

36. Who was the first Chairman of the Planning Commission ?

    (1) Gulzari Lal Nanda

    (2) J.L. Nehru

    (3) C.D. Deshmukh

    (4) K.C. Neogy

Which of the following is *not* a statutory body?

(1) Election Commission

(2) Finance Commission

(3) Planning Commission

(4) Union Public Service Commission

38. Entomology deals with

(1) ear and nose

(2) stones

(3) language

(4) insects

39. The acid that is generally stored in batteries is

(1) Sulphuric acid

(2) Nitric acid

(3) Hydrochloric acid

(4) Acetic acid

40. Which of the following is *not* a part of the public sector reform in India ?

(1) Restructuring

(2) Memorandum of Understanding (MOU)

(3) Association of Industrial Licensing

(4) Disinvestment

41. Weedicides are used to kill

(1) plant

(2) insects

(3) unwanted plants

(4) pests

42. Who were the first rulers in India to issue gold coins on a mass scale ?

(1) Indo-Greeks

(2) Kushanas

(3) Satavahanas

(4) Guptas

43. Which of the following compounds are responsible for acid rain ?

   a. Nitrogen dioxide
   b. Silicon dioxide
   c. Sulphur dioxide
   d. Carbon monoxide

   Select the answer from the codes given below :
   (1) a and b
   (2) a and c
   (3) b and d
   (4) c and d

44. Which of the following is *not* a viral disease ?
   (1) AIDS
   (2) Measles
   (3) Mumps
   (4) Leprosy

45. Raindrops are spherical due to
   (1) Viscosity of water
   (2) Surface tension
   (3) Continuous evaporation
   (4) Air friction

46. Consider the following animals of India :

   a. Crocodile
   b. Elephant

   Which of these is/are endangered species ?
   (1) Only a
   (2) Only b
   (3) Both a and b
   (4) Neither a nor b

47. Which of the following is an important layer for the transmission of Radio waves ?
   (1) Stratosphere
   (2) Troposphere
   (3) Ionosphere
   (4) Mesosphere

48. Who said that the King is a "Shadow of the God on Earth" ?
   (1) Abul Fazal
   (2) Faizi
   (3) Farishta
   (4) Babur

49. Which one of the following port cities in Venezuela was developed as an oil port ?
   (1) Caracas
   (2) Carupano
   (3) Maracay
   (4) Maracaibo

50. The sportsperson Yuvraj Singh is associated with
   (1) Archery
   (2) Cricket
   (3) Athletics
   (4) Golf

51. Who amongst the following was the first Sultan of Tughlaq dynasty ?
   (1) Firuz Shah Tughlaq
   (2) Muhammad-bin Tughlaq
   (3) Ghiyasuddin Tughlaq
   (4) Nasiruddin Muhammad Shah

52. Who amongst the following Mughal rulers reimposed 'Jaziya' ?
   (1) Akbar
   (2) Aurangzeb
   (3) Jahangir
   (4) Humayun

53. Dr. R.K. Pachauri is associated with
   (1) Music
   (2) Art
   (3) Medicine
   (4) Climate change

54. The best known example of the Hoysala style of temple is found at
   (1) Ajanta
   (2) Madurai
   (3) Karle
   (4) Halebid

55. Panini, a famous personality of ancient India, was a/an

    (1) astronomer

    (2) grammarian

    (3) mathematician

    (4) philosopher

56. Dr. M.S. Swaminathan is associated with

    (1) Agricultural research

    (2) Space research

    (3) Nuclear research

    (4) Music

57. Which of the following companies has started a rural marketing network called "e-chaupal" ?

    (1) ITC

    (2) Dabur

    (3) HLL

    (4) Procter and Gamble

58. The total geographical area of India is

    (1) 229 million hectares

    (2) 350 million hectares

    (3) 329 million hectares

    (4) 500 million hectares

59. Which of the following is the first surface-to-surface missile in India ?

    (1) Prithvi

    (2) Trishul

    (3) Agni

    (4) Nag

60. A program used to start the computer is

    (1) Compiler

    (2) System Software

    (3) Boot

    (4) Interpreter

TEST III
REASONING APTITUDE

61. If 'P + Q' means 'P' is the brother of 'Q'; 'P × Q' means 'P' is the father of 'Q', 'P ÷ Q' means 'P' is the mother of 'Q', which would mean 'R' is the son of 'M' ?

    (1) M × S × R

    (2) M + R × S

    (3) M ÷ R × S

    (4) M × S ÷ R

62. Reena is twice as old as Sunita. Three years ago, she was three times as old as Sunita. How old is Reena now ?

    (1) 12 years

    (2) 6 years

    (3) 8 years

    (4) 16 years

63. The clinic of a doctor faces the west. From the back side of his clinic, he walks straight 100 metres then turns to the left and walks 100 metres again. Finally, he turns towards right and stops after walking 50 metres. Now in which direction is the doctor from the starting point ?

    (1) South-west

    (2) North-east

    (3) South-east

    (4) North-west

Directions : In questions no. 64 to 67 one term is missing. Based on the relationship of the two given words find the missing term from the given options.

64. Baby : Human : : Lily : ?

    (1) Flower

    (2) Rose

    (3) Hand

    (4) Down

65. CART : ART : : FOUR : ?

    (1) RUN

    (2) TWO

    (3) QUE

    (4) OUR

66. EIGHTY : GIEYTH : : OUTPUT : ?

    (1)   UTOPTU

    (2)   UOTUPT

    (3)   TUOUTP

    (4)   TUOTUP

67. ABC : ZYX : : DEF : ?

    (1)   UVW

    (2)   WUV

    (3)   FED

    (4)   WVU

Directions : In questions no. 68 to 70, three out of four words are alike in some manner. Spot the odd one out.

68.   (1)   Cannon

    (2)   Gun

    (3)   Pistol

    (4)   Sword

69.   (1)   Chemistry

    (2)   Geography

    (3)   Subject

    (4)   Literature

70.   (1)   Club

    (2)   Heart

    (3)   Spade

    (4)   Ace

71. What is the proper order of the following ?

    a.   Accident

    b.   Hospital

    c.   Ambulance

    d.   Carelessness

    e.   Injury

    (1)   aedcb

    (2)   eadbc

    (3)   daecb

    (4)   cdaeb

    (5)   daceb

72. What is the proper order of the following ?

   a. Sleep

   b. Tranquilizer

   c. Illness

   d. Dream

   e. Sleeplessness

   (1) ecdab

   (2) cebad

   (3) badce

   (4) bcade

   (5) cedab

73. Find out the set of letters for the blanks to complete the series.

   aabc _ bbcab _ cabc _ abc _

   (1) acaa

   (2) cabb

   (3) aabb

   (4) caba

   (5) bbac

Directions : In questions no. 74 to 76 one term is missing. Based on the relationship of the first two given words find the missing term from the given options so that a similar relationship is formed between the third word and one of the options.

74. Sculpture : Statue : : Poet : ?

   (1) Poem   (2) Music

   (3) Painting   (4) Dance

75. Custom : Culture : : Ritual : ?

   (1) Religion   (2) Sect

   (3) Practice   (4) Function

76. Venus : Planet : : Rose : ?

   (1) Garden   (2) Flower

   (3) Red   (4) None of the above

77. WAB, XCD, YEF, __?__

    (1) CNN   (2) ZGH

    (3) BKL   (4) AIJ

78. 18, 30, 48, 72, __?__

    (1) 106   (2) 115

    (3) 120   (4) 102

79. If TABLE is written as GZYOV, how is 'JOICE' written ?

    (1) OZLEJ   (2) QLRXV

    (3) HOFAD   (4) QZHMT

80. In the following figures, four different views of a dice are given. Find the number of dots on the face opposite to the face with two dots [• •].
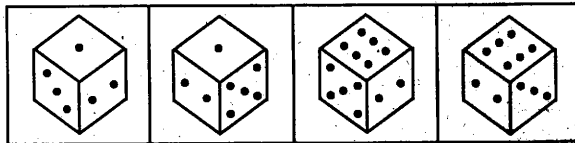
      (A)   (B)   (C)   (D)

    (1) 4   (2) 6

    (3) 5   (4) 3

81. A piece of paper is folded and punched as shown below. From the given responses, indicate how it will appear when opened.

    Question Figures :
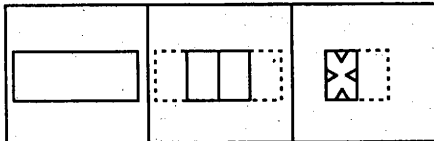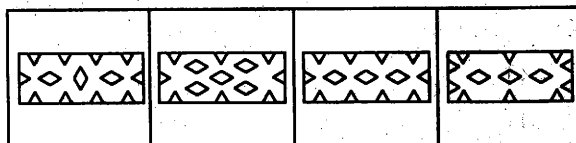
    Answer Figures :

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

82. Which of the following answer figures shall complete the question figure ?

Question Figure :
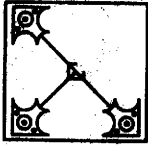
Answer Figures :
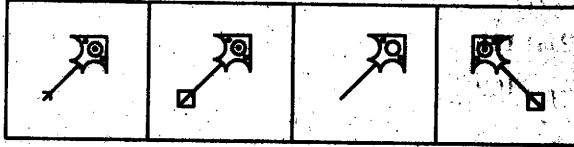
    (1)   (2)   (3)   (4)

83. In which of the following answer figures is the question figure embedded ?
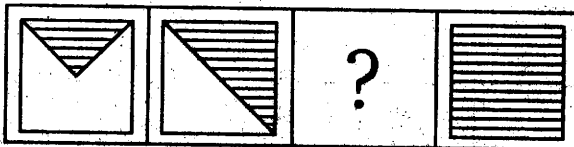
Question Figure :
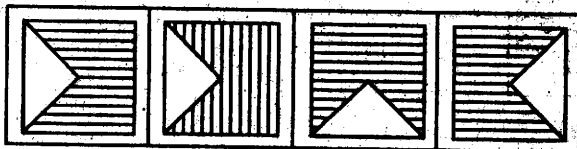

Answer Figures :
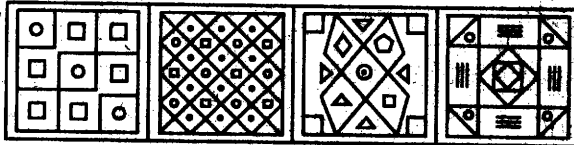
    (1)   (2)   (3)   (4)

Directions : In questions no. 84 to 89 one figure is missing. From the given answer figures find the figure which will complete the series given in the question figures.

84. Question Figures :

Answer Figures :

    (1)   (2)   (3)   (4)
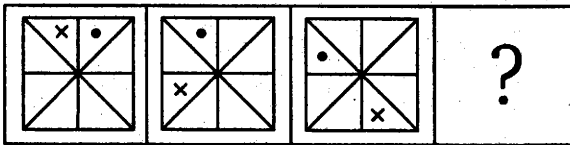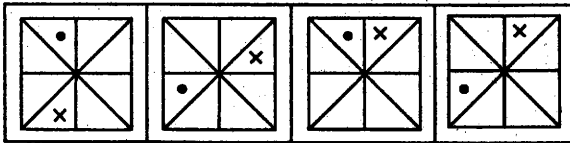
85. *Question Figures :*
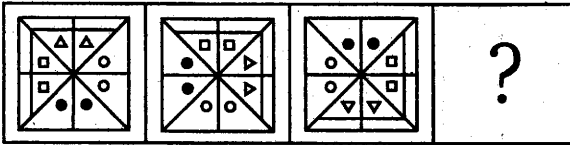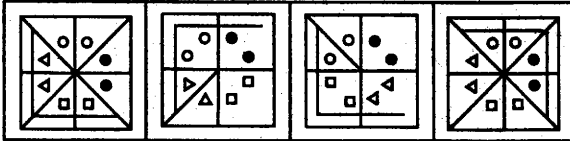
Answer Figures :

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

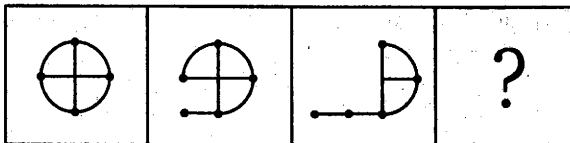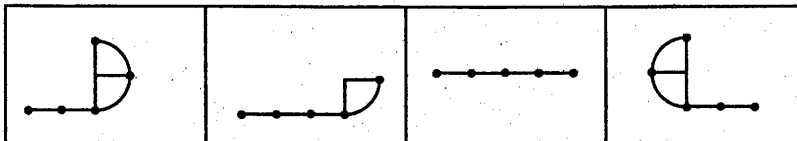**86.** *Question Figures :*

Answer Figures :

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

87. *Question Figures :*
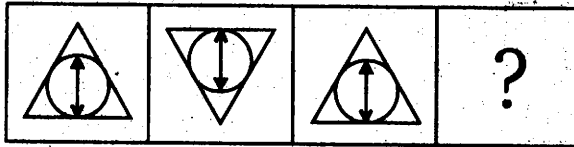

Answer Figures :

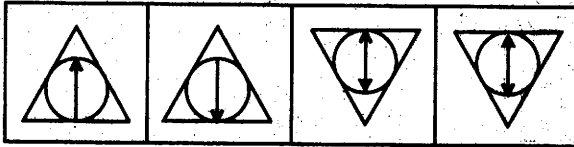   (1)   (2)   (3)   (4)

88. *Question Figures :*
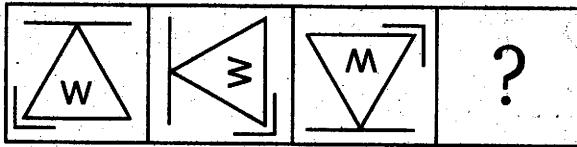

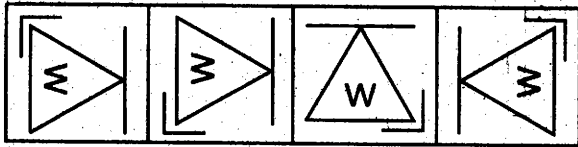*Answer Figures :*

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

89. *Question Figures :*

Answer Figures :

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

90. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete it ?

     D _ _ N _ _ N N D M _ N

(1) N D M N M

(2) M N D M N

(3) M D M N M

(4) D M N N M

TEST IV
MATHEMATICS

91. What will come in place of the question mark ?

    $\sqrt{\sqrt{625} + \sqrt{576}}$ = ?

    (1) 49   (2) 8

    (3) 54   (4) 7

92. The amount of simple interest accrued on a principal of Rs. 25,000 in 7 years is Rs. 21,000. What is the rate of interest per cent per annum ?

    (1) 15   (2) 10

    (3) 18   (4) None of these

93. The sum of ages of members (children and their parents) of a family is 360 years. If the sum of the ages of the children in the family is 240 years, what is the ratio of ages of the husband to the wife ?

    (1) 3 : 2

    (2) 2 : 3

    (3) 1 : 2

    (4) Cannot be determined

94. What is the circumference in centimetres of a circle whose area is 49 π square centimetres ?

    (1) 28 π   (2) 14 π

    (3) 7 π   (4) 21 π

95. What will be the cost of tiling the floor @ Rs. 35 per square metre, if the hall is of a square shape and has a perimeter of 400 metres ?

    (1) Rs. 19,000   (2) Rs. 57,000

    (3) Rs. 38,000   (4) None of these

96. The average of eight numbers taken together is 12. Two of these numbers are 0 and the remaining numbers are equal. What is the value of the non-zero numbers ?

    (1) 16   (2) 12

    (3) 6   (4) 18

97. A train running at a speed of 90 km per hour crosses a platform, double its length, in 36 seconds. What is the length of the platform in metres ?

    (1) 450   (2) 200

    (3) 300   (4) 600

98. The average age of 24 boys in a class is 11. When the teacher's age is included, the average increases by one. What is the age of the teacher ?

    (1) 34 years   (2) 42 years

    (3) 36 years   (4) 48 years

99. If the length and breadth of a rectangular field are increased, the area increases by 50%. If the increase in length was 20%, by what percentage was the breadth increased ?

    (1) 30%   (2) 25%

    (3) 20%   (4) None of these

100. A sum of money is divided among A, B and C, such that if A gets one rupee, B gets 65 paise and C gets 35 paise. If C's share is Rs. 28, the total money divided is

    (1) Rs. 120   (2) Rs. 140

    (3) Rs. 160   (4) Rs. 180

101. Find the missing number from the given sequence

    5, 9, 13, 17, ?, 25

    (1) 27   (2) 23

    (3) 21   (4) 19

102. The area of the greatest circle which can be inscribed in a square whose perimeter is 120 cm is

    (1) $\frac{22}{7} \times 15^2$ cm^2

    (2) $\frac{22}{7} \times \left(\frac{7}{2}\right)^2$ cm^2

    (3) $\frac{22}{7} \times \left(\frac{15}{2}\right)^2$ cm^2

    (4) $\frac{22}{7} \times \left(\frac{9}{2}\right)^2$ cm^2

103. Starting from his house one day, a student walks at a speed of $2\frac{1}{2}$ kmph and reaches his school 6 minutes late. Next day at the same time he increases his speed by 1 kmph and reaches the school 6 minutes early. How far is the school from his house ?

    (1) 2 km

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

    (3) 1 km

    (4) $1\frac{3}{4}$ km

104. Fresh fruits contain 68% water and dry fruits contain 20% water. How much dry fruits can be obtained from 100 kg of fresh fruits ?

(1) 32 kg

(2) 40 kg

(3) 52 kg

(4) 80 kg

105. The value of

$2 + \sqrt{0.09} + \sqrt[3]{0.008} - 75\%$ of 2.80 is

(1) 0·4

(2) 0·01

(3) −1

(4) 0·001

106. A man can row at 5 kmph in still water. If the velocity of the current is 1 kmph and it takes him 1 hour to row to a place and come back, how far is the place ?

(1) 2·5 km

(2) 3 km

(3) 2·4 km

(4) 3·6 km

107. The HCF of two numbers is 15 and their LCM is 300. If one of the numbers is 60, the other is

(1) 50

(2) 75

(3) 65

(4) 100

108. The average weight of A, B, C is 45 kg. If the average weight of A and B be 40 kg and that of B and C be 43 kg, then the weight of B is

(1) 17 kg

(2) 20 kg

(3) 26 kg

(4) 31 kg

109. The area of a regular hexagon of side $2\sqrt{3}$ cm is

(1) $18\sqrt{3}$ cm^2

(2) $12\sqrt{3}$ cm^2

(3) $36\sqrt{3}$ cm^2

(4) $27\sqrt{3}$ cm^2

110. The ratio of bases of two triangles is x : y and that of their areas is a : b. Then the ratio of their corresponding altitudes will be

(1) $\dfrac{a}{x} : \dfrac{b}{y}$

(2) ax : by

(3) $\dfrac{x}{a} : \dfrac{b}{y}$

(4) None of these

111. The maximum value of $\sin x + \cos x$ is equal to

(1) $-\sqrt{2}$ (2) $\sqrt{2}$

(3) 2 (4) $\sqrt{3}$

112. The value of $\sin^{-1}\left(\dfrac{3}{5}\right) + \tan^{-1}\left(\dfrac{1}{7}\right)$ is equal to

(1) π (2) $\dfrac{\pi}{2}$

(3) $\dfrac{\pi}{4}$ (4) $\dfrac{\pi}{8}$

113. The value of 'a' in

$$\frac{a}{84} = \frac{189}{a} \quad \text{is}$$

(1) 126 (2) 124

(3) 130 (4) 132

114. A person invests Rs. 5,000 at 5% per annum at simple interest for a certain period and earns Rs. 750. If he earns Rs. 720 on Rs. 6,000 in the same time period, what is the rate of interest ?

(1) 6%   (2) 4%

(3) 5%   (4) 3%

115. Which of the following expressions are equivalent ?

a. $\left(\dfrac{x}{4}\right)^3 - \left(\dfrac{y}{2}\right)^3$

b. $\left(\dfrac{x}{4} + \dfrac{y}{2}\right)^3 - \dfrac{3xy}{8}\left(\dfrac{x}{4} + \dfrac{y}{2}\right)$

c. $\left(\dfrac{x}{4} + \dfrac{y}{2}\right)\left(\dfrac{x^2}{16} - \dfrac{xy}{8} + \dfrac{y^2}{4}\right)$

d. $\dfrac{1}{8}\left(\dfrac{x}{2} + y\right)\left(\dfrac{x^2}{4} - \dfrac{xy}{2} + y^2\right)$

(1) a and d

(2) b and c

(3) b, c and d

(4) a, b and c

116. The sum of the ages of a husband and a wife is 70 years and the ratio of their ages is 3 : 2. The age of the wife is

    (1) 42 years

    (2) 25 years

    (3) 28 years

    (4) 27 years

117. Two equal glasses are respectively $\frac{1}{4}$ and $\frac{1}{3}$ full of milk. They are then filled up with water and the contents are mixed in a tumbler. The ratio of milk and water in the tumbler is

    (1) 3 : 11

    (2) 7 : 17

    (3) 9 : 23

    (4) 11 : 23

118. A train 700 m long is running at 72 kmph. If it crosses a tunnel in 1 minute, the length of the tunnel is

    (1) 700 m

    (2) 600 m

    (3) 550 m

    (4) 500 m

119. On the level ground the angle of elevation of the top of a tower is 30°. On moving 20 m nearer the tower, the angle of elevation is found to be 60°. The height of the tower is

    (1) $10\sqrt{3}$ m

    (2) 10 m

    (3) 15 m

    (4) 20 m

120. The least number to be added to 269 to make it a perfect square is

    (1) 31

    (2) 16

    (3) 7

    (4) 20

TEST V
PHYSICS

121. Ozone layer protects the earth from
    (1) Infra-red radiation
    (2) Ultraviolet rays
    (3) Cosmic rays
    (4) None of these

122. An exothermic reaction is one which
    (1) Absorbs heat
    (2) Releases heat
    (3) Decreases heat
    (4) None of these

123. The colour of a star is an indication of
    (1) Size
    (2) Age
    (3) Distance
    (4) Temperature

124. A drop of water is spherical due to
    (1) Surface tension
    (2) Cohesion
    (3) Adhesion
    (4) Viscosity

125. The instrument for measuring intensity of earthquakes is called
    (1) Eidograph
    (2) Pantagraph
    (3) Ergograph
    (4) Seismograph

126. Diamonds are glittering and attractive because light incident on them undergoes
    (1) highest refraction
    (2) multiple internal reflections
    (3) multiple surface reflections
    (4) hundred percent transmission

127. The inertia of an object depends only on its
    (1) Colour
    (2) Shape
    (3) Mass
    (4) Physical state

128. In the given circuits A (net resistance R_A) and B (net resistance R_B), the resistances R_A and R_B satisfy the condition

(A)

$$R/3 \quad\quad R/3 \quad\quad R/3$$

(B)

$$R/3$$
$$R/3$$
$$R/3$$
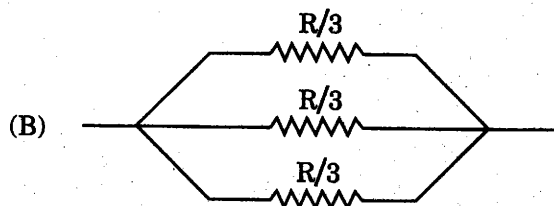
    (1) $R_A > R_B$
    (2) $R_A < R_B$
    (3) $R_A = R_B$
    (4) None of the above

129. Which of the following is used to split white light into different colours ?
    (1) Glass mirror
    (2) Convex lens
    (3) Concave lens
    (4) Prism

130. Fibre optics work on the principle of
    (1) Scattering of light
    (2) Total internal absorption
    (3) Total internal reflection
    (4) Optical rotation

131. A transformer
    (1) stores energy
    (2) regulates voltage
    (3) speeds up transmission of energy
    (4) changes electrical energy into mechanical energy

132. If μ_s, μ_k, μ_r represent the coefficient of static, kinetic, and rolling friction respectively, then,

    (1) $\mu_s = \mu_k = \mu_r$

    (2) $\mu_s < \mu_k < \mu_r$

    (3) $\mu_s > \mu_k > \mu_r$

    (4) $\mu_k > \mu_s > \mu_r$

133. The moment of momentum is named as

    (1)   Impulse

    (2)   Couple

    (3)   Torque

    (4)   Angular momentum

134. The velocity of sound is largest in

    (1)   Water

    (2)   Vacuum

    (3)   Air

    (4)   Steel

135. A transverse wave travels along the z-axis. The particles of the medium must move

    (1)   along the z-axis

    (2)   along the x-axis

    (3)   along the y-axis

    (4)   in the x-y plane

136. Decibel is the unit used for

    (1)   Speed of light

    (2)   Intensity of heat

    (3)   Intensity of sound

    (4)   Radio wave frequency

137. Conversion of chemical energy into electrical energy occurs in

    (1)   dynamos

    (2)   electric heaters

    (3)   batteries

    (4)   atom bombs

138. The temperature decreases with the mixing of sugar in hot milk, because

    (1)   sugar remains cool

    (2)   milk becomes cool with sugar by chemical process

    (3)   sugar takes the heat of milk to set into a liquid

    (4)   All of the above

139. The temperature at which the speed of sound in air becomes double of its value at 27° C is

    (1) 54° C

    (2) 327° C

    (3) 927° C

    (4) −123° C

140. When an object is transferred from the earth to the moon

    (1) its weight increases

    (2) its mass increases

    (3) its mass decreases

    (4) its weight decreases

141. Dimensional formula for impulse is

    (1) $[M L^2 T^{-2}]$

    (2) $[M L T^{-2}]$

    (3) $[M L T^{-1}]$

    (4) $[M L^{-2} T^{-2}]$

142. We find that if a body moves in a circle describing equal angles in equal intervals, the velocity vector

    (1) changes in magnitude

    (2) changes in direction

    (3) remains constant

    (4) changes both in magnitude and direction

143. A bomb of 12 kg explodes into two pieces of masses 4 kg and 8 kg. The velocity of 8 kg mass is 6 m/s. The kinetic energy of the other mass is

    (1) 24 J

    (2) 32 J

    (3) 48 J

    (4) 288 J

144. Electromagnetic induction involves

    (1) charging a body with a negative charge

    (2) charging a body with a positive charge

    (3) the production of current by relative motion between a magnet and a coil

    (4) None of these

145. When an object absorbs all the colours incident on it, it appears

    (1) white

    (2) blue

    (3) black

    (4) None of these

146. The frequency of BBC is 1500 kHz. What is its wavelength ?
(Given velocity of light c = 3×10^8 m/sec)

    (1) 210 m

    (2) 200 m

    (3) 400 m

    (4) 300 m

147. Candela is a unit of

    (1) Acoustic intensity

    (2) Electric intensity

    (3) Luminous intensity

    (4) Magnetic intensity

148. Which of the following laws validates the statement that matter can neither be created nor destroyed ?

    (1) Law of conservation of energy

    (2) Le Chatelier's principle

    (3) Law of conservation of mass

    (4) Law of osmosis

149. The mass and acceleration of an object are 100 kg and 10 m/sec^2 respectively. What amount of energy will be spent in travelling the distance of 10 m ?

    (1) 1000 joule

    (2) 10 kilo joule

    (3) 50 joule

    (4) 150 joule

150. Velocity of light in a medium is 2×10^8 ms^{-1}. Refractive index of the medium is

    (1) 1·4

    (2) 2·3

    (3) 1·0

    (4) 1·5

151. The correct order of atomic radii is

    (1) $N < Be < B$

    (2) $Na < Li < K$

    (3) $Fe^{3+} < Fe^{2+} < Fe^{4+}$

    (4) $F^- < O_2^- < N^{3-}$

152. The ratio of charge to mass would be greater for

    (1) Proton

    (2) Electron

    (3) Neutron

    (4) Alpha particle

153. Sulphur has the highest oxidation state in

    (1) H_2SO_4

    (2) $Na_2S_2O_3$

    (3) SO_2

    (4) $Na_2S_4O_6$

154. In the modern periodic table, the period indicates the value of

    (1) Atomic number

    (2) Atomic mass

    (3) Principal quantum number

    (4) Azimuthal quantum number

155. Temporary hardness in water is caused by

    (1) $MgCO_3$

    (2) $MgSO_4$

    (3) $Mg(HCO_3)_2$

    (4) $MgCl_2$

156. $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2\,NaCl$ is a

    (1) Replacement reaction

    (2) Decomposition reaction

    (3) Double decomposition reaction

    (4) Substitution reaction

157. Bond order of a molecule of oxygen is
    (1) One
    (2) Two
    (3) Three
    (4) Four

158. One litre of dioxygen gas at STP will weigh (in grams)
    (1) 1·43
    (2) 2·24
    (3) 22·4
    (4) 11·2

159. The enthalpy of all elements in their standard state is
    (1) 1
    (2) 0
    (3) ∞
    (4) −1

160. Change in Gibbs free energy is
    (1) $\Delta G = \Delta H + T \Delta S$
    (2) $\Delta G = \Delta H \times T \Delta S$
    (3) $\Delta G = \Delta H - T \Delta S$
    (4) None of these

161. Which of the following has greater entropy ?
    (1) Ice
    (2) Mixture of water and ice
    (3) Water vapour
    (4) Liquid water

162. 1 ml of 0·1 M HCl is added into 99 ml of water. The pH of the resulting solution is
    (1) 0·1
    (2) 1·0
    (3) 2·0
    (4) 3·0

163. Syngas is a mixture of
    (1) CO and H_2
    (2) CO_2 and H_2
    (3) H_2 and Cl_2
    (4) NH_3 and Cl_2

170. The IUPAC name of the compound with structural formula

$$CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2OH$$

is

(1) 2-dimethylpropan-1-ol

(2) 2,2-dimethylpropan-1-ol

(3) 2-methylbutan-1-ol

(4) None of the above

171. The most stable carbocation among the following is

(1) CH_3

(2) CH_3CH_2

(3) $(CH_3)_2CH$

(4) $(CH_3)_3C$

172. The amount of electricity required to deposit 1 mol of aluminium from a solution of $AlCl_3$ will be

(1) 0·33 Faraday

(2) 1 Faraday

(3) 3 Faraday

(4) 1 Ampere

173. Alums purify muddy water by

(1) dialysis

(2) adsorption

(3) coagulation

(4) filtering

174. Aluminium is *not* present in

(1) cryolite

(2) mica

(3) feldspar

(4) fluorspar

175. Which of the following halides is most acidic ?

(1) PCl_3

(2) $SbCl_3$

(3) $BiCl_3$

(4) CCl_4

164. Rate of reaction $A \rightarrow B$ is written as

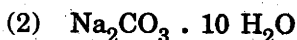   (1) $d[A] \times dt$

    (2) $+ \dfrac{d[A]}{dt}$

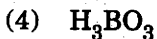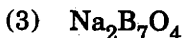   (3) $- \dfrac{d[A]}{dt}$

    (4) $- dA \times dt$
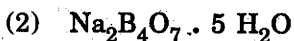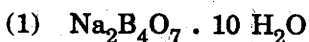
165. Which of the following is used in pollution control i.e. treatment of domestic and industrial effluents ?

    (1) $Ca(OH)_2$

    (2) D_2O

    (3)   Alum

    (4) NH_3
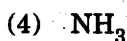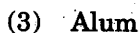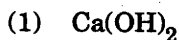
166. Chemical formulae of washing soda is

    (1)   NaOH

    (2) $Na_2CO_3 . 10 H_2O$

    (3) $CaCO_3$

    (4) $NaHCO_3$
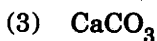
167. Borax is expressed as

    (1) $Na_2B_4O_7 . 10 H_2O$

    (2) $Na_2B_4O_7 . 5 H_2O$

    (3) $Na_2B_7O_4$

    (4) H_3BO_3

168. High melting point of diamond, despite being a covalent compound is attributed to

    (1)   strong crystal structure

    (2)   toughness

    (3)   strong $C - C$ bond

    (4)   organic nature

169. Two important man-made silicates are

    (1)   glass and cement

    (2)   glass and felspar

    (3)   cement and felspar
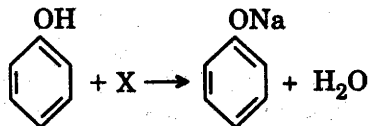
    (4)   felspar and zeolite

176. When formaldehyde and KOH are heated we get

    (1)   acetylene

    (2)   methane

    (3)   methyl alcohol

    (4)   ethene

177. The general molecular formula which represents the homologous series of alkanols is

    (1) $C_nH_{2n+2}O$

    (2) $C_nH_{2n}O_2$

    (3) $C_nH_{2n}O$
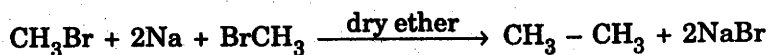
    (4) $C_nH_{2n+1}O$

178. For the reaction

    X is

    (1)   NaOH

    (2)   Na

    (3)   NaH

    (4) NaH_2

179. Transition metal halides have the highest oxidation number of metal

    (1)   chlorides

    (2)   fluorides

    (3)   iodides

    (4)   bromides

180. The reaction

$$CH_3Br + 2Na + BrCH_3 \xrightarrow{\text{dry ether}} CH_3 - CH_3 + 2NaBr$$
    is called

    (1)   Wurtz reaction

    (2)   Decarboxylation

    (3)   Kolbe's reaction

    (4)   Halogenation

SPACE FOR ROUGH WORK