APPENDIX – I

Non-Verbal Group Intelligence Test (NVGIT)

Directions and Examples:

Read the Directions and Examples silently.

1. There are 78 questions in order from the easiest to the hardest. After each question, there are four alternatives answers.

2. There is only one right answer. When you find out the right answer, just put a tick mark on the answer sheet against the appropriate number provided.

3. Now practice the solved examples given as how to solve and mark your responses (Practice 1 to 9 one by one).

4. You may clarify your doubts, if there be any.

5. Try every problem one by one, starting from the first to the last.
PRACTICE EXAMPLES

Practice these solved examples and learn how to solve and put your responses in your answer sheet.

1. Solve and find out the correct answer:
   \[ \text{=50 liter: } \text{ + + } = \text{ liter?} \]
   1. 300
   2. 350
   3. 400
   4. 250

2. Which of the four drawings fits in the incomplete pattern?
   1. 2. 3. 4.

3. Select the one which does not belong to the others:
   1. 2. 3. 4.

4. Select the correct analogous pictures as the first one:
   1. 2. 3. 4.

5. Which star has the number of dots equal to the parts in the circle?
   1. 2. 3. 4.

6. Select the best synonym with the first one:
   \[ \text{9: } 1. 6. 2. \circ 3. \text{IX} 4. \]

7. Select the right one which is opposite to the first one:
   1. 2. 3. 4.

8. Select one pair which is most similar in nature:
   1. 2. 3. 4.

9. Complete the picture with the most appropriate part:
   1. 2. 3. 4.

Answers: 1 2 3 4 5 6 7 8 9
Questions: 1 2 3 4 5 6 7 8 9

DO NOT OPEN THE NEXT PAGE UNTIL YOU ARE TOLD TO DO SO.
Test Sheet

1. Solve and find out the correct answer:

\[ \text{90 liter} : \text{ liter} ? \]

1. 35
2. 40
3. 45
4. 50

2. Which one of the four drawings correctly fits in the incomplete pattern?


3. Select the one which does not belong to the others:

1. 2. 3. 4.

4. Select the correct analogous pictures as the first one:

\[ \text{Umbrella} \rightarrow \text{Clouds} \rightarrow \text{Boot} \rightarrow 1. \text{ } 2. \text{ } 3. \text{ } 4. \]

5. Which flower has corolla equal to the points in the circle?

1. 2. 3. 4.

6. Select the best synonym with the first one:

\[ \text{1. } \text{2. } \text{3. } \text{4. } \]
7. Select the right one which is opposite to the first one:

8. Select the one pair which is most similar in nature:

9. Complete the picture with the most appropriate part:

10. Solve the question and find out the correct answer:

   \[ Y = 15 \]
   \[ F = 20 \]
   \[ G = 10 \]

   \[ H = Y + G \]

   \[ H = \boxed{\quad} ? \]

11. Which of the four drawings correctly fits in the incomplete pattern?

12. Select the one which does not belong to the others:
13. Select the correct analogous (parallel) picture as the first one:

14. Which basket has the number of arrows less than the parts in the circle:

15. Select the best synonym with the first one:

16. Select the one which is opposite to the first one:

17. Select one pair which is most similar in nature:

8. Complete the picture with the most appropriate part:
19. Solve the question and find out the correct answer:

\[
\begin{array}{c}
\text{= 50} \\
\text{= 50} \\
\text{= 50} \\
\text{= 50} \\
\text{= 50} \\
\end{array}
\]

1. 150  
2. 140  
3. 160  
4. 155

20. Which one of the four drawings correctly fits in the incomplete pattern?

1.  
2.  
3.  
4.  

21. Select the one which does not belong to the others:

1.  
2.  
3.  
4.  

22. Select the correct analogous picture as the first one:

1.  
2.  
3.  
4.  

23. Which wall has the number of parts equal to the parts in the circle?

1.  
2.  
3.  
4.  

24. Select the best synonym with the first one:

1.  
2.  
3.  
4.  

25. Select the right one which is opposite to the first one:

1.  
2.  
3.  
4.  

26. Select one pair which is most similar in nature:

1.  
2.  
3.  
4.  

27. Complete the picture with the most appropriate part:

1.  
2.  
3.  
4.  

28. Solve the question and find out the correct answer:

\[ \frac{1}{2} = \text{Rs. 81} \] : \[ \frac{2}{3} = ? \]

1. 243  
2. 240  
3. 241  
4. 242  

29. Which one of the four drawings fits in the incomplete pattern?

:  
1.  
2.  
3.  
4.  

30. Select the one which does not belong to the others:

1.  
2.  
3.  
4.  

304
31. Select the correct analogous picture as the first one:

32. Solve the question and find out the correct answer:

33. Which one of the four drawings fits in the incomplete pattern correctly?

34. Select the one which does not belong to the others:

35. Select the correct analogous picture as the first one:

36. Which wheel has number of spokes equal to the points in the circle?
37. Select the best synonym with the first one:

38. Select the right one which is opposite to the first one:

39. Select one pair which is most similar in nature:

40. Complete the picture with the most appropriate part:

41. Solve the question and find out the correct answer:

\[ P = 12 \]
\[ M = P - N \]
\[ N = 10 \]

\[ M = \underline{\quad} \]

1. 4
2. 2
3. 3
4. 6

42. Which of the four drawings correctly fits in the incomplete pattern?
3. Select the one which does not belong to the others:
   1. Ant
   2. Fly
   3. Frog
   4. Beetle

4. Select the correct analogous picture as the first one:
   1. Telephone
d   2. Computer
   3. Tower
   4. Horn

5. Which bundle has the number of sticks equal to the parts in the circle?
   1. Bundle
   2. Bundle
   3. Bundle
   4. Bundle

6. Select the best synonym to the first one:
   1. Cathedral
   2. Mosque
   3. Hut
   4. House

7. Select the right one which is opposite to the first one:
   1. Sad
   2. Happy
   3. Smiling
   4. Angry

8. Select one pair which is the most similar in nature:
   1. Indian flag
   2. Lion
   3. Cat
   4. Axe
49. Complete the picture with the most appropriate part:

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<td>C</td>
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\[ A + B + C + D = 240, \quad B = 60 \]

50. Solve the question and find out the correct answer:

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51. Which one of the four drawings correctly fits in the incomplete pattern?

```
1.  
2.  
3.  
4.  
```

52. Select the one which does not belong to others:

```
1.  
2.  
3.  
4.  
```

53. Select the correct analogous picture as the first one:

```
Sun \rightarrow \text{moon} \rightarrow \text{palm tree} \rightarrow \text{banana} \rightarrow \text{fruit} \rightarrow \text{vegetable}
```

54. Which land has the number of trees more than the dots in the circle?

```
1.  
2.  
3.  
4.  
```
5. Select the best synonym with the first one:

\[ \text{fire} \rightarrow \text{1. stove} \quad \text{2. tank} \quad \text{3. drum} \quad \text{4. box} \]

6. Solve the problem and find out the correct answer:

\[ \text{25 kgs} \times \text{? kgs} = \] options 1. 235 2. 230 3. 255 4. 225

7. Which of the four drawings correctly fits in the incomplete pattern?

\[ \text{Pattern: } \text{1. } \text{2. } \text{3. } \text{4. } \]

8. Select the one which does not belong to the others:

\[ \text{1. deer} \quad \text{2. tiger} \quad \text{3. snake} \quad \text{4. elephant} \]

9. Select the correct analogous picture as the first one:

\[ \text{INK} \rightarrow \text{1. pen} \quad \text{2. brush} \quad \text{3. knife} \quad \text{4. clock} \]

10. Which plate has the number of sweets equal to the dots in the circle?

\[ \text{1. } \text{2. } \text{3. } \text{4. } \]
61. Select the best synonym with the first one:

62. Select the right one which is opposite to the first one:

63. Select the pair which is most similar in nature:

64. Solve the question and find out the correct answer:

65. Which of the four drawings fits in the incomplete pattern correctly?

66. Select the one which does not belong to the others:
1. Select the correct analogous picture as the first one:
   - [ Images of items like an umbrella, bow and arrow, sun, and knife ]

2. Which shirt has the number of lines equal to the lines in the circle?
   - [ Images of shirts with varying line patterns ]

3. Select the best synonym with the first one:
   - [ Images of ax, shovel, pickaxe, and sickle ]

4. Select the right one which is opposite to the first one:
   - [ Images of leaves with varying shapes ]

5. Select the pair which is most similar in nature:
   - [ Images of a cup, pipe, pot, and watch ]

6. Complete the picture with the most appropriate part:
   - [ Images of parts of a bird ]
73. Solve the problem and find out the correct answer:

\[
\begin{array}{c}
\text{\textbullet} \quad = \quad 4 \text{ dcts} \quad : \quad \begin{array}{c}
\text{\textbullet} \quad \text{\textbullet} \quad \text{\textbullet} \\
\text{\textbullet} \quad \text{\textbullet} \quad \text{\textbullet} \\
\text{\textbullet} \quad \text{\textbullet} \quad \text{\textbullet}
\end{array}
\end{array}
\]

\[\quad = \quad \text{?} \]

1. 30  
2. 32  
3. 34  
4. 36

74. Which of the four drawings correctly fits in the incomplete pattern?

\[
\begin{array}{c}
\begin{array}{c}
\text{\textbullet} \\
\text{\textbullet} \\
\text{\textbullet}
\end{array}
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\]

:  
1.  
2.  
3.  
4.  

75. Select one which does not belong to the others:

\[
\begin{array}{c}
1. \quad \text{stool} \\
2. \quad \text{chair} \\
3. \quad \text{couch} \\
4. \quad \text{rocket}
\end{array}
\]

76. Select the correct analogous picture as the first one:

\[
\text{Teapot} \quad \rightarrow \quad \text{Mug} \quad \rightarrow \quad \text{Table} \quad \rightarrow \quad \text{Chair} \quad \rightarrow \quad \text{Box} \quad \rightarrow \quad \text{Ball} \quad \rightarrow \quad \text{Cube} \quad \rightarrow \quad \text{Egg} \quad \rightarrow \quad \text{Computer}
\]

77. Which ball has the number of parts equal to the parts in the circle?

\[
\begin{array}{c}
\begin{array}{c}
\text{\textbullet} \\
\text{\textbullet} \\
\text{\textbullet}
\end{array}
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\]

:  
1.  
2.  
3.  
4.  

78. Select the best synonym with the first one:

\[
\begin{array}{c}
\begin{array}{c}
\text{\textbullet} \\
\text{\textbullet} \\
\text{\textbullet}
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:  
1.  
2.  
3.  
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# Non-Verbal Group Intelligence Test (NVGIT)

## Answer Sheet

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**APPENDIX-I (A)**

Non-Verbal Group Intelligence Test (NVGIT)

(Scoring Key)

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APPENDIX – II

Language Aptitude Test (English)

Name of the Student: 
Gender: Boy / Girl

Class: 
Age: 

Name of the School: 

Instruction:

There are XVIII categories of questions given in this test. Each category has questions. Totally there are 90 questions. Write your answers clearly in this question booklet itself. Write your name, gender, class and other necessary information on the question booklet. Write quickly, but try not to make mistakes. You will be given 25 minutes for this test. You have to complete this test within the given time. At any cost, you will not be allowed to take extra time to complete this test.

I. Add ONE letter and make name of the Vehicle:

1. __an
2. __us
3. __rain
4. __lane
5. __hip

II. Rearrange the letters and get the words:

6. stmpa - 
7. rsot - 
8. adssred - 
9. cotelc - 
10. dleievr - 
III. Circle the Correct spelling:

11. camp  camb  kamp
12. creaper  creepar  creeper
13. summar  sommer  summer
14. termite  termight  termit
15. fight  feight  fite

IV. Here are some words. Fill in the missing letters:

16. W__nd
17. Bu__t__r__ly
18. S__f__
19. Ha__p__ned
20. S__r__ng

V. What are they called? Write the Group Names:

21. Train, boat, bus, bicycle, aero plane -
22. Lemon, apple, orange, banana, guava -
23. Elephant, monkey, bear, cat, giraffe -
24. Ducks, parrots, crow, peacock, cock, hen -
25. Carrot, radish, yam, potato, onion -

VI. Write Past tense for the following words:

26. Buy - _____________
27. Catch - _____________
28. Meet - _____________
29. Slip - _____________
30. Pick - _____________
VII. Fill in the blanks choosing the right words given in the brackets.

31. There is ______________milk in the tumbler. (little / few)
32. There is ______________rice in the bag. (many / a lot of)
33. People make __________noise in the stadium (a lot of / many)
34. There is ____________water in the sea. (a lot of / a little)
35. There are___________ girls working in the farm (a few / little)

VIII. In the following words, one is different from others, circle it.

36. bite  might  bet  kite
37. arm  come  farm  calm
38. rat  meet  sheet  sit
39. us  house  blouse  mouse
40. tiny  honey  money  funny

IX. Underline the Phrase that indicates time:

41. I built a new house last week.
42. The news reached the ant the next morning.
43. It brought a cat the same evening.
44. The next moment, the termite covered the rat’s eyes.
45. It brought a dog the next day.

X. Rearrange the letters and write down the words in the space

46. blaolon  ________________
47. sehll  ________________
48. toba  ________________
49. spih  ________________
50. weva  ________________
XI. Tick the correct word:

51. The catamarans are (about / on) the seashore.
52. The plane flies (beside / above) the sea.
53. Ravi will return (within / without) a week.
54. The men are swimming (on / in) the sea.
55. Mrs. Ramu is the Headmistress (of / in) our school.

XII. Give the plural form of the following words

56. Monkey ________________
57. Butterfly ________________
58. Baby ________________
59. Calf ________________
60. City ________________

XIII. Match the following:

61. The day before - regularly
62. The next day - yesterday
63. This day - soon
64. In a short time - today
65. Everytime - tomorrow

XIV. Which is correct?

67. Number ‘3’ is ________________ (among / between) two and four.
68. The sky is ________________ (beyond / near) our reach.
69. This train runs from Madurai ________________ (by / to) Coimbatore.
70. Ananth is the principal ________________ (of / in) our college.
XV. Write the Opposite gender for the following words:

71. Uncle -  
72. Son -  
73. King -  
74. Tiger -  
75. Lion -  

XVI. Choose the correct Phrase and fill in the blanks:

76. Our teacher is _____________________ (happy about/afraid of) the arrangements for the excursion.
77. Ganesh feels _____________________ (sorry for / happy about) breaking the toy.
78. Sara is ________________ (afraid of / late for) snakes.
79. Sam came ________________ (late for, sorry for) the function.
80. Aruna is ________________ (afraid of / sorry for) showing her rank card to her father.

XVII. Match the following:

81. Money order forms -  bank
82. Pay-in-slips -  school
83. Admission forms -  railway station
84. Reservation forms -  office
85. Files -  post office

XVIII. Fill in the blanks with correct words taken from the list below:
(packet, signs, intelligent, reservation, entrance)

86. Suchi did that sum quickly. She is very ________________ .
87. The watchman is standing at the ________________ of the building.
88. There is no ________________ in town buses.
89. I bought a ________________ of biscuits from a shop.
90. My mother usually ________________ my mark sheet.
APPENDIX-II (A)

Language Aptitude Test
(Scoring key)

I. Add ONE letter and make name of the Vehicle:
1. Van
2. Bus
3. Train
4. Plane
5. Ship

II. Rearrange the letters and get the words:
6. Stamp
7. Roast
8. Address
9. Collect
10. Deliver

III. Circle the Correct spelling:
11. Camp
12. Creeper
13. Summer
14. Termite
15. Fight

IV. Here are some words. Fill in the missing letters:
16. Wind
17. Butterfly
18. Safe
19. Happened
20. Strong

V. What are they called? Write the Group Names:
21. Vehicles
22. Fruits
23. Animals
24. Birds
25. Vegetables

VI. Write Past tense for the following words:
26. Bought
27. Caught
28. Met
29. Slipped
30. Picked
VII. Fill in the blanks choosing the right words given in the brackets.
31. little
32. a lot of
33. a lot of
34. little
35. a few

VIII. In the following words, one is different from others, circle it.
36. Bet
37. Come
38. Rat
39. us
40. funny

IX. Underline the Phrase that indicates time:
41. last week
42. next morning
43. same evening
44. next movement
45. next day

X. Rearrange the letters and write down the words in the space
46. balloon
47. shell
48. boat
49. ship
50. wave

XI. Tick the correct word:
51. on
52. above
53. within
54. in
55. of

XII. Give the plural form of the following words
56. monkeys
57. butterflies
58. babies
59. calves
60. cities
XIII. Match the following:
61. yesterday
62. tomorrow
63. today
64. soon
65. regularly

XIV. Which is correct?
66. before
67. between
68. beyond
69. to
70. of

XV. Write the Opposite gender for the following words:
71. aunty
72. daughter
73. queen
74. tiger
75. lioness

XVI. Choose the correct Phrase and fill in the blanks:
76. afraid of
77. sorry for
78. afraid of
79. late for
80. afraid of

XVII. Match the following:
81. post office
82. bank
83. school
84. railway station
85. office

XVIII. Fill in the blanks with correct words taken from the list below:
86. intelligent
87. entrance
88. reservation
89. packet
90. signs
APPENDIX-III
Science Attitude Scale (SAS)

Please fill in the following information:-

Name..............................................................................................................
Age.............................................Sex.................................................................
School..............................................................................................................

INSTRUCTIONS

Given below are some statements about science. Some of these statements describe how you might feel about science. We are interested in working your valuable opinion about science as a subject of study. You may agree with some of these statements and you may disagree with others. After you have read a statement carefully, decide whether you agree or not with it.

If you agree strongly with a statement put a circle around the category (Strongly Agree) (SA), if you agree put a circle around (Agree)(A), if you are undecided put a circle around (Undecided) (U), if you disagree put a circle around (Disagree) (D) and if you strongly disagree put a circle around (Strongly Disagree) (SD).

You are requested to give your free and frank opinion.
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Scientists are persons without human considerations.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>2.</td>
<td>Scientific careers are more useful to the society than other careers</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>3.</td>
<td>Study of science subjects is rather a dull affair.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>4.</td>
<td>Other subjects cannot be properly understood without the knowledge of science.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>5.</td>
<td>Science subjects are very difficult to study.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>6.</td>
<td>Science subjects are more exact than others.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>7.</td>
<td>Science is bound to lead our society into godlessness.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>8.</td>
<td>Science subjects provide more relation than other subjects.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>9.</td>
<td>Scientific knowledge alone cannot improve a man’s life.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>10.</td>
<td>Science sharpens our reasoning power and logical thinking.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>11.</td>
<td>Science fails to solve all of our problems.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>12.</td>
<td>Science subjects are useful for getting a success in the competitive examinations.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>13.</td>
<td>Too much emphasis on science would bring down our moral standards.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>14.</td>
<td>Science alone is responsible for our technical and industrial progress.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>15.</td>
<td>A student gets discouraged when he fails to answer certain questions in science.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>16.</td>
<td>Working in a scientific field brings more fame.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>17.</td>
<td>Science can be studied by males only.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>18.</td>
<td>Science subjects open up many avenues of employment.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>19.</td>
<td>Science has made us to depend entirely on machines.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>20.</td>
<td>Science has turned the impossibilities into possibilities.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
<td>D</td>
<td>SD</td>
</tr>
</tbody>
</table>
APPENDIX – IV
Criterion Referenced Test (CRT)
Biological Science Test

Name of the Student: 9th standard

Instructions

- There are 74 multiple choice questions. Each question carries one mark.
- Time given to answer the questions is 30 minutes.
- Answer all the questions.
- Write the answer in the space provided.
- Choose only one option for each question.
- Write the answer as shown in the example.

Example:

There are ___ kidneys in human excretory system.

a) One b) Two c) Three d) Four

Ans: b) Two

1. Ureter and ________ exits from kidney
   a) renal vein b) renal artery
   c) urethra d) urinary bladder

Ans: ________________________________

2. Ascending limb of Henle’s loop helps in ______________
   a) Secretion of K⁺ HH₂⁺, H⁺ uricacid b) Reabsorption of water
   c) Reabsorption of Na⁺ Cl⁺ and Urea d) Glomerular filtration

Ans: ________________________________
3. Urine collected in urinary bladder is passed out by _________ of excretory system.
   a) kidney   b) ureter
   c) renal vein  d) urethra
Ans: ________________________________________________________________

4. Loop of Henle is concerned with _________
   a) excretory system   b) reproductive system
   c) nervous system    d) muscular system
Ans. : _______________________________________________________________

5. In the structure of excretory system in man given below, identify the part indicated by alphabet A.

   a) kidney   b) urethra
   c) urinary bladder  d) renal artery
Ans: ________________________________________________________________

6. Blood is passed out by _________ from kidney.
   a) urethra    b) renal artery
   c) renal vein  d) urinary bladder
Ans: ________________________________________________________________
7. Right kidney is lower than left kidney due to presence of

_________

a) thoracic cavity  b) abdominal Cavity

c) small intestine  d) liver

Ans: ___________________________________________________________________

8. A child named Nidhi is suffering from skin and throat inflammation. It results to __________

a) kidney failure  b) nephritis

c) uranemia  d) leukemia

Ans: ___________________________________________________________________

9. Urine is brought to Ureter from kidney through _________

a) urethra  b) cortex

c) renal pelvis  d) urinary bladder

Ans: ___________________________________________________________________

10. In the section of kidney given below identify the part indicated by alphabet A.

a) Medulla  b) Renal pelvis

c) Cortex  d) Renal pyramid

Ans: ___________________________________________________________________
11. Primary urine is obtained from __________
   a) Henle’s loop  b) distal convoluted tubule
   c) proximal convoluted tubule  d) glomerulus

Ans: 

12. Malpighian corpuscle helps in ________
   a) Secretion of K⁺, HH₂⁺, H⁺ uricacid  b) Re-absorption of water
   c) Reabsorption of Na⁺ Cl⁺ and Urea  d) Glomerular filtration

Ans: 

13. Inner region of kidney is known as ________
   a) Hilus  b) Renal pelvis
   c) Cortex  d) Medulla

Ans: 

14. Each kidney is ________ cm long and ______ cm broad.
   a) 6cm long, 8cm broad  b) 12cm long, 6cm broad
   c) 8cm long, 6cm broad  d) 12cm long, 8cm broad

Ans: 

15. In the structure of Nephron given below identify the part indicated by alphabet A

   a) collecting duct  b) henle’s loop
   c) bowman’s capsule  d) distal convoluted tubule

Ans: 

328
16. Distal Convoluted tubule helps in ____________
a) Secretion of K⁺ NH₂⁺, H⁺ uric acid   b) Re-absorption of water
c) Reabsorption of Na⁺ Cl⁻ and Urea   d) Glomerular filtration
Ans: ____________________________________________

17.Glucose is mainly absorbed in the kidney by _________
a) Bowman’s capsule           b) distal convoluted tubule
c) proximal convoluted tubule  d) henle’s loop
Ans: ____________________________________________

18. A severe fall in the blood pressure disturbs the function of kidneys and reduces ________
a) renal filtration           b) glomerular filtration
c) reabsorption              d) secretion of nitrogenous waste
Ans: ____________________________________________

19. In nephron ________is followed by collecting duct
a) proximal convoluted tubule b) bowman’s capsule
c) distal convoluted tubule   d) henle’s loop
Ans: ____________________________________________

20. Stones accumulated in kidney of a person named Praveen are broken down into smaller pieces by _______method .
a) dialysis                     b) laser technique
c) Kidney transplantation      d) chemotherapy
Ans: ____________________________________________

21. A network around the Henle’s loop is called as ________
a) renal artery                b) peritubular capillaries
c) vasarecta                   d) tubular capillaries
Ans: ____________________________________________
22. In the section of kidney given below identify the part indicated by alphabet A.

![Kidney Diagram]

a) Medulla  b) Renal pelvis  
c) Cortex  d) Renal pyramid

Ans: ________________________________

23. Essential substances is absorbed by ______ from convoluted tubule.
   a) renal artery  b) peritubular capillaries
   c) vasarecta  d) tubular capillaries

Ans: ________________________________

24. What happens if one kidney of a person is removed?
   a) he will survive and remain normal  b) he will die
   c) urea will be accumulating in the blood  d) urination will stop

Ans: ________________________________

25. In the Malpighian structure given below identify the part indicated by alphabet A.

![Malpighian Structure Diagram]

a) afferent arteriole  b) proximal convoluted tubule
   c) glomerulus  d) efferent arteriole

Ans: ________________________________
26. Collecting tubule helps in ____________
   a) Secretion of K⁺, H⁺, uric acid  b) Re-absorption of water
   c) Re-absorption of Na⁺ Cl⁺ and Urea  d) Glomerular filtration

   Ans: __________________________________________

27. A tuft of capillaries within the cavity of Bowman’s capsule is called as ________
   a) glomerulus  b) peritubular capillaries  c) bowman  d) vasarecta

   Ans: __________________________________________

28. In the structure of Nephron given below identify the part indicated by alphabet A
   a) collecting duct  b) henle’s loop  c) bowman’s capsule  d) distal convoluted tubule

   Ans: __________________________________________

29. A space between two walls of Bowman’s capsule is called as_______
   a) bowman’s space  b) capsular space  c) pericardial space  d) glomerular space

   Ans: __________________________________________

30. A person named Aishya is suffering from Uranmeia. She is treated by ________
   a) laser technique  b) dialysis  c) kidney transplantation  d) bypass surgery

   Ans: __________________________________________
31. Descending limb of Henle’s loop helps in ________________
   a) Secretion of $K^+ \text{HH}_2^+$, $H^+$ uric acid  b) Re-absorption of water
   c) Reabsorption of $Na^+, \text{Cl}^+$ and Urea  d) Glomerular filtration

Ans: _____________________________________________________________

32. A depression in each kidney is called ____________
   a) renal pelvis  b) ureter
   c) hilum  d) renal pyramid

Ans: _____________________________________________________________

33. Renal artery enters into the kidney at ____________
   a) ureter  b) renal pyramid
   c) renal pelvis  d) cortex

Ans: _____________________________________________________________

34. Urine from collecting duct flows into ____________
   a) urinary bladder  b) ureter
   c) renal pelvis  d) renal vein

Ans: _____________________________________________________________

35. Excretory system of man consists of a sac like structure called
   a) ureter  b) kidney
   c) urethra  d) urinary bladder

Ans: _____________________________________________________________

36. In the structure of Nephron given below identify the part indicated
   by alphabet A

   a) collecting duct  b) henle’s loop
   c) bowman’s capsule  d) distal convoluted tubule

Ans: _____________________________________________________________
37. Bowman’s capsule of nephron is found in __________ region of kidney
   a) cortex  b) medulla
   c) both cortex and medulla d) none of the above
Ans: ________________________________________________

38. A system which helps in removal of metabolic wastes from the body is called ____________
   a) respiratory system  b) circulatory system
c) excretory system  d) digestive system
Ans: ________________________________________________

39. Kidneys are located at the back of ____________ one on either side of the backbone.
   a) thoracic cavity  b) heart
   c) liver  d) abdominal cavity
Ans: ________________________________________________

40. Urine is brought from kidney by ____________ to urinary bladder.
   a) urethra  b) renal artery
   c) renal vein  d) ureter
Ans: ________________________________________________

41. Blood is brought by ____________ into kidney.
   a) urethra  b) renal artery
   c) renal vein  d) urinary bladder
Ans: ________________________________________________

42. Kidney is protected by ____________
   a) pyramid  b) renal papillae
   c) renal capsule  d) nephron
Ans: ________________________________________________
43. In the section of kidney given below identify the part indicated by alphabet A.

![Kidney Image](image)

a) Medulla    b) Renal pelvis

c) Cortex    d) Renal pyramid

Ans: ________________________________

44. Bean shaped structure in excretory system of man is called

a) Henle’s loop    b) ureter

c) urinary bladder    d) kidney

Ans: ________________________________

45. Bowman’s capsule is named after ___________

a) William bowman    b) Thomas bowman

c) Henle bowman    d) Robert bowman

Ans: ________________________________

46. U-shaped structure in nephron is called as _________

a) distal convoluted tubule    b) proximal convoluted tubule

c) henle’s loop    d) collecting duct.

Ans: ________________________________

47. Opening of a pyramid is called ____________

a) Renal papillae    b) cortex

c) medulla    d) nephron

Ans: ________________________________

48. Malphigian corpuscle helps in ________________

a) passive reabsorption of water    b) NH₄⁺ H⁺, uric acid

c) selective ion of aminoacids, glucose, vitamins    d) prime urine

Ans: ________________________________
49. Outer region of kidney is known as __________
a) medulla   b) hilum
   c) cortex   d) renal pyramid

Ans: ____________________________

50. Human being have ____ nephrons.
   a) 10      b) 100
   c) 1 million  d) 1 lakh

Ans: ____________________________

51. In the structure of excretory system in man given below identify
    the part indicated by alphabet A

   a) kidney   b) urethra
   c) urinary bladder   d) renal artery

Ans: ____________________________

52. Bowman’s capsule and __________ are together called as malpian corpuscle.
   a) distal convoluted tubule   b) henle’s loop
   c) proximal convoluted tubule   d) glomerulus

Ans: ____________________________

53. In a nephron __________ follows proximal convoluted tubule
   a) collecting duct   b) henle’s loop
   c) bowman’s capsule   d) distal convoluted tubule

Ans: ____________________________
54. A capillary called __________ helps in absorbing water from henle’s loop.
   a) renal artery                      b) peritubular capillaries
   c) vasarecta                         d) tubular capillaries
Ans: ___________________________________

55. In kidney ______________ helps in bringing urine to ureter.
   a) urinary bladder           b) urethra
   c) renal pyramid              d) renal pelvis
Ans: ___________________________________

56. A person named Vikas donates one of his kidney to his brother Vikram. This is called __________
   a) kidney transplantation   b) dialysis
   c) lithotrpsy               d) laser technique
Ans: ___________________________________

57. A network of capillaries around proximal convoluted tubule is called as ______
   a) renal artery                      b) peritubular capillaries
   c) vasarecta                         d) tubular capillaries
Ans: ___________________________________

58. Urine consists ____% of water and ____% of dissolved solid.
   a) 95% water, 5% dissolved salts   b) 98% water, 2% dissolved salts
   c) 90% water, 10% dissolved salts d) 99% water, 1% dissolved salts
Ans: ___________________________________

59. Nephrologist says to John that he has stones in his kidney. He is treated by ______
   a) kidney transplantation   b) laser technique
   c) lithotrpsy               d) dialysis
Ans: ___________________________________
60. In the Malpighian structure given below identify the part indicated by alphabet A.

![Malpighian structure]

a) afferent arteriole  b) proximal convoluted tubule  
c) glomerulus  d) effenter arteriole

Ans: ________________________________________________________________

61. Henle’s loop of nephron is found in ___________ region of kidney

a) cortex  b) medulla  
c) both cortex and medulla  d) none of the above

Ans: ________________________________________________________________

62. Blood is carried away from kidney through ______

a) renal vein  b) ureter  
c) renal artery  d) both renal artery and ureter

Ans: ________________________________________________________________

63. Infection of glomerulus results in accumulation of ______ in blood.

a) ammonia  b) urea  
c) hydrogen ions  d) potassium ions

Ans: ________________________________________________________________

64. Sukruth’s kidney is damaged and irreversible. It can be corrected by ___________

a) dialysis  b) laser technique  
c) lithotripsy  d) kidney transplantation

Ans: ________________________________________________________________

65. Instrument used for breaking the stones in kidney is called ______

a) lithotripter  b) dialyser  
c) pace maker  e) inertia meter

Ans: ________________________________________________________________
66. In the structure of excretory system in man given below identify the part indicated by alphabet A.

- a) renal vein
- b) urethra
- c) ureter
- d) renal artery

Ans: ________________________________

67. Nephrons are connected to _____________
- a) pyramid
- b) renal papillae
- c) renal pelvis
- d) collecting duct

Ans: ________________________________

68. Proximal convoluted tubule is present in ____________ region of kidney.
- a) medulla
- b) cortex
- c) both medulla and cortex
- d) renal papillae

Ans: ________________________________

69. Distal convoluted tubule is present in ____________ region of kidney.
- a) medulla
- b) cortex
- c) both medulla and cortex
- d) renal papillae

Ans: ________________________________

70. In the section of kidney given below identify the part indicated by alphabet A.

- a) Medulla
- b) Renal pelvis
- c) Renal capsule
- d) Renal pyramid

Ans: ________________________________
71. Blood from the renal artery is passed through a semipermeable membrane in ____________
   a) dialysis                     b) kidney transplant
   c) laser technique       d) bypass surgery

Ans: _______________________________________________________________________

72. Infection of glomerulus leads to _______
   a) kidney failure       b) nephritis
   c) uranemia               d) leukemia

Ans: _______________________________________________________________________

73. Neeta was ready to donate her kidney to her step brother Nikith, but doctor rejected because _______
   a) gender difference     b) she was married
   c) unmatched tissue type d) she was step sister

Ans: _______________________________________________________________________

74. In the structure of Nephron given below identify the part indicated by alphabet A

   a) Distal convoluted tubule   b) Proximal convoluted tubule
   b) Henle’s loop               d) Bowman’s capsule

Ans: _______________________________________________________________________
# APPENDIX-IV A

## CRITERION REFERENCED TEST

### Scoring Key

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APPENDIX – V

Personal Information Proforma

1. Name of the Student : 
2. Name of the School : 
3. Sex : Boy / Girl
4. Age :

Computer Test

Tick the correct answer for the following questions:

1. _______ is an input device used with windows in which you point and click to make a selection.
   a) Keyboard c) Scanner
   b) Remote control d) Mouse
2. _______ command is used to paste the copied text.
   a) ctrl+V c) ctrl+P
   b) ctrl+X d) ctrl+I
3. DOS stands for _______
   a) Disk Operating System c) Do not Operate System
   b) Disk Operation Sequence d) Disconnect Operating System
4. _______ command used to cut the text in a word document.
   a) ctrl+C c) ctrl+V
   b) ctrl+X d) ctrl+I
5. A code used to gain access to a locked system.
   a) Password   c) Boot record
   b) Key   d) Re-boot
6. A combination of hardware and software that separates a LAN into two or more parts for security purposes is __________
   a) Server   c) interface
   b) firewall   d) Google
7. ______ command is given to reduce the font size.
   a) ctrl+shift+=   c) ctrl+V
   b) ctrl+<   d) ctrl+Shift++
8. ______ command is given to create superscript
   a) ctrl+shift+=   c) ctrl+V
   d) ctrl+<   d) ctrl+Shift++
9. ______ button is used to refresh the current window in the computer.
   a) F1   c) F3
   b) F5   d) F7
10. By default how do numeric values appear when entered in a spreadsheet?
   (a) left aligned   (c) centred
   (b) right aligned   (d) unaligned
11. ______ command is given Excel spreadsheet to display the value of the cell in percentage.
   a) ctrl+>>+%   c) ctrl+shift+%
   b) ctrl+<>+%   d) ctrl+alt+%
APPENDIX-V A

COMPUTER KNOWLEDGE TEST

(Scoring Key)

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Dear students! In your class the teacher always teaches you the lessons, but now you are going to learn a lesson by your self. Yes! With this computer package you can learn about Excretory System in man without the help of your Biology teacher.

Click for Instructions
Instructions

• Read each passage carefully then try to answer the questions that follow.
• To answer the question; click any one of the options given.
• If your answer is correct, you can go to the next page.
• If your answer is not correct, no problem you can read the passage once again and try to give correct answer.

Ok! Now let us begin our lesson

Click

Excretory System in Man

Click for details
Excretory System

Do you know which are the different parts of the excretory system in man, it includes a pair of kidneys, renal artery entering the kidney from aorta. Renal artery brings oxygenated blood along with the nitrogenous waste from aorta to kidney (Pic-1.a).

Renal vein from inferior vena cava exits from kidney it takes the purified deoxygenated blood from kidney to inferior vena cava (Pic-1.a).

There is a pair of tubular ureters exiting from kidneys and opens into a sac like structure called urinary bladder (Pic-1.b). It is made up of thin transparent muscle. The size of the urinary bladder varies according to the amount of urine stored in it. It stores urine. The urine is excreted through urethra (Pic-1.b) which is at the lower end of urinary bladder.

Question

Which brings the oxygenated blood from aorta to kidney

- Renal artery
- Renal vein
- Ureter
Position and appearance of Kidney

Now let us study the Position & appearance of Kidney.

**Position:**
Kidneys are located at the back of abdominal cavity attached to the dorsal wall one on either side of the back bone (Pic-2.a).

Do you know that kidneys are not in the same line, right kidney is slightly lower in position (Pic-2.a) when compared to the left kidney as liver occupies larger area above it.

**Color & Shape:**
Each kidney is reddish brown bean shaped and usually 12cm long and 6cm broad (Pic-2.b).

Each kidney weighs around 160gms. The outer surface of kidney is convex while the inner surface is concave. There is a concave depression called hilus / Hilum (Pic-2.c). Each kidney is covered by tough connective tissue capsule called renal capsule (Pic-2.d).

---

Structure of kidney

Click for details
Structure of kidney

When we take the longitudinal section of kidney, it reveals two main regions. The outer cortex and inner medulla. The place where the ureter leaves the kidney is renal pelvis (Pic-3.a).

Medulla:
The inner region consists of 5-8 pyramid like structure called pyramids (Pic-3.a). All the end of each pyramid there are minute openings called renal papillae. These pyramids project into renal pelvis through renal papillae (Pic-3.b).

Each kidney consists of about 1 million nephron, blood capillaries and connective tissues.

Question

Which are the two main regions of kidney?

- Cortex and medulla
- Pyramids and Renal Papillae
- Blood capillaries and Nephron
Structure of Nephron

Nephrons are called as Structural and functional unit of kidney (Pic-4a,4b). Each Nephron is about 30-38 mm in length. A portion of Nephron is located in cortex and another portion in medulla (Pic-4c).

Each Nephron consists of Malpighian corpuscle, proximal convoluted tubule, Henle’s loop, distal convoluted tubule connected to collecting duct (Pic-4d).

Each Nephron is surrounded by a network of capillaries (Pic-4e).

Question
Which is the structural and functional unit of kidney?

- Pyramids
- Blood capillaries
- Nephrons

**Malphigian corpuscle**

It consists of 2 parts the first part is cup shaped sac called Glomerular capsule. It is also known as Bowman's capsule (Pic-5a) (named after his discoverer William Bowman 1842).

It is the starting point. The capsule is double walled. The space between two walls is called capsular space (Pic-5a). It is connected below with the cavity of Proximal convoluted tubule (Pic-5a).

The second part is a tuft of 20-40 loops of capillaries called the Glomerulus, within the cavity of the Bowman's capsule. The glomerulus receives the blood supply from a minute branch of renal artery called the afferent renal artery (Pic-5a). The blood is drained from the glomerulus by an efferent renal artery (Pic-5a).

The Bowman's capsule and glomerulus are together called Malphigian corpuscle. It lies in the cortex (Pic-5b) and represents the filtering unit of kidney.

**Question**
What does the Malphigian Corpuscle consists of?

- Glomerulus and Proximal convoluted tubule
- Bowman’s capsule and Glomerulus
- Bowman’s capsule and Proximal convoluted tubule

Proximal convoluted tubule

Now let us continue with the other parts of Nephron.

It is a twisted tube which measures with diameter of 60 micron. It follows the malphagian corpuscle (Pic-6a). It lies in the cortex and may extend to medulla(Pic-6b)

Henle’s loop

It is relatively straight U-shaped portion of Nephron(Pic-6c). It lies in the medulla(Pic-6b). Its two limbs are described as descending and ascending limb (Pic-6c). The permeability of the descending and ascending limbs are different and hence the loop of Henle is important in concentrating urine.

Question
Which region of kidney consists Henle’s loop?

- Cortex
- Medulla
- Both cortex and medulla

**Distal convoluted tubule**

It is the continuation of the ascending limb of Henle’s loop. It is mostly in the cortex and is called like the proximal convoluted tubule (Pic-7a).

**Collecting Tubules**

The collecting duct forms a branched system receiving the ends of hundred Nephrons (Pic-7b). They extend from the cortex into medulla and open into renal pelvis through renal papillae of renal pyramid. Infact the renal pyramids visible in longitudinal section are all composed of collecting ducts (Pic-7c).
Where does the Nephron connect?

- Collecting duct
- Renal pyramid
- Renal papillae

Blood Capillaries

The efferent arteriole that leaves the glomerulus does not join a vein. Instead it divides into a set of capillaries called peritubular capillaries and Vasarecta (Pic-8a).

Peritubular capillaries form a network around the proximal convoluted tubule and Distal convoluted tubule (Pic-8b).

The second capillary bed of efferent arteriole lies around the Henle’s loop forming the vasarecta (Pic-8b). From there they lead to vein that lead away from kidney.
What do we call the capillaries around Henle’s loop?

- Peritubular capillaries
- Tubular capillaries
- Vasarecta

Function of Kidney

Click for details
Urine Formation

Now let us study the function of kidney

Formation of urine is the main function of kidney, urine is formed in three steps i.e. 1. Glomerular filtration 2. Reabsorption 3. Tubular secretion (Pic-9b).

First step Glomerular filtration /Ultrafiltration

It is the process of filtration of substances from the blood of the glomerulus into the Bowman’s capsule (Pic-9b) of the nephron through ultrafine membrane under pressure. It is also called nonelective process.

The filtrate contains essential substance such as water glucose, vitamins, amino acids and nonessential substance such as nitrogenous waste, sodium potassium bicarbonates (Pic-9b). This filtrate is called Primary Urine/Glomerular filtrate.

Which of these is an essential substance in Primary Urine?

- Sodium bicarbonates
- Potassium bicarbonates
- Amino acids
Reabsorption takes place mainly in Proximal convoluted tubule and Henle’s loop (Pic-10a).

**Reabsorption in Proximal Convoluted Tubule**

When the filtrate passes down the Proximal Convoluted Tubule the peritubular capillaries absorb glucose, amino acids, vitamins ions into the blood (Pic-10b).

**Reabsorption in Henle’s loop:**

When the filtrate passes down the walls of descending limb of Henle’s loop which is permeable only to water, hence water passes out of the descending limb (Pic-10c) by osmosis leaving a more concentrated filtrate in this part of loop. Water is absorbed by Vasarecta (Pic-10d).

The filtrate moves to the ascending limb and Distal Convoluted Tubule (Pic-10e) here the walls are less permeable to water hence Na+ Cl- passes out and absorbed by peritubular capillaries.

---

What happens to the essential substance passed out from Proximal convoluted tubule?

- Reabsorbed by peritubular capillaries
- Remain in the fluid
- Reabsorbed by Vasarecta
Tubular Secretion

When the remaining filtrate reaches the Distal Convoluted Tubule (Pic-11.a), cells of the tubule secrete potassium, ammonium salts, hydrogen ions and uric acid from the peritubular capillaries (Pic-11.b).

The filtrate passes on to the collecting duct (Pic-11.c) and it flows into the pelvis through the papillae. Later it drains through ureter (Pic-11.d). This urine is stored in the urinary bladder and excreted through urethra (Pic-11.e).

About 1.5lts of urine is formed per day.
Urine is straw yellow coloured with 95% H₂O and 5% dissolved solids.

Question

Where does Potassium, ammonium salts and hydrogen salts get secreted?

- In Collecting duct
- In Distal convoluted tubule
- In Proximal convoluted tubule
Kidney Disorder and Their Treatment

Click for details

Disorders of kidney and their treatment

Kidney Stones
Stones are formed by the accumulation of calcium oxalate, calcium phosphate, magnesium phosphate(Pic-12.a). Some stones are formed by hardening of uric acid. Now a days the stones are broken into smaller pieces by a process called lithotripsy or laser technique(Pic-12.b). The phenomenon of breaking the kidney stones using a lithotripter(Pic-12.d) is called lithotripsy.
The process of breaking the stones into smaller pieces in the kidney is called?

- Dialysis
- Lithotripsy
- Peritoneal dialysis

Nephritis

Nephritis is one of the kidney disorders (Pic-13.a) found commonly in children. It is the inflammation of throat and skin infection (Pic-13.b). If it is not treated it leads to chronic (permanent) renal failure in the later life.

Question
Name the type of kidney disorder when kidney is inflamed due to throat & skin infection?

- Kidney failure
- Kidney stone
- Nephritis

Dialysis

The patient who is suffering from the disorders of kidney can be treated by a technique called dialysis. The instrument used for this is called dialyzer (Pic-14.a).

Dialyzer acts as an artificial kidney. Blood from the artery of the patient is pumped into the tubes bounded by semi-permeable Membrane. The dialyzing solution is made to flow on the outside of the tube. The wastes from the blood of artery are filtered (Pic-14.b). Thus the whole process required 4 to 12 hrs. A patient should undergo dialysis at least 2 to 3 times in a week. This treatment is expensive.
Which technique is used to treat kidney failure?

- Lithotripsy
- Laser technique
- Dialysis

Kidney failure

Kidney failure is also one of the disorders of kidney.

If the kidney is unable to perform its filtration, reabsorption and secretion (Pic-15.a), the condition is called kidney failure. It may be the result of the infection of glomerulus. It results in accumulation of urea in blood (Pic-15.b), which is called, qì Uraemia. It is fatal if not treated in the early stages.
What is Uraemia?
- Accumulation of Ammonia in the blood
- Accumulation of Urea in the blood.
- Accumulation of Sodium in the blood.

Kidney transplant
Nephrologists recommend kidney transplant when the damage to the kidney is irreversible (Pic-16.a). Kidney donors can be blood relatives or others with closely matching tissue type. With a successful kidney transplant (Pic-16.b), a patient can live a normal life, with less expenses for several years.
When does a person require kidney transplantation?

- Damage to kidney is reversible
- Damage to kidney is irreversible
- Stones formed in kidney.
Sorry try again!

Read carefully and try again!

Good! Correct Answer

Now you can move to the next Lesson