Manav Rachna International School

SESSION: 2021-22
SCHOLARSHIP TEST PAPER
FOR GRADE XI

Duration: 2 Hours **M.M: 100**

KINDLY FILL THE GIVEN DETAILS

Name: _____

Father's Name: _____

Mother's Name: _____

Current Class: _____

Examination Centre: Manav Rachna International School _____

GENERAL INSTRUCTIONS:

- This paper is divided into 4 sections
  SECTION – A: Logical Reasoning: 20 marks (All questions carry 2 marks each)
  SECTION – B: English: 20 marks (All MCQs carry 1 mark each, Short Answer Type Questions carry 2 marks each, Long Answer Type Question carries 10 marks)
  SECTION – C: Math: 30 marks (All Objective Questions carry 1 mark each. All Subjective Questions carry 2.5 marks each)
  SECTION – D: Science: 30 marks (All Objective Questions carry 1 mark each. All Subjective Questions carry 2 marks each)
- All sections are compulsory.
- Read each question carefully before answering.
- Objective Questions need to be **tick marked** in the question paper itself and submitted.
- Subjective Questions need to be attempted in the answer sheets provided and submitted.

SECTION A
LOGICAL REASONING

1. A clock is started at noon. By 10 minutes past 5, the hour hand has turned through:
   a) 145°
   b) 150°
   c) 155°
   d) 160°

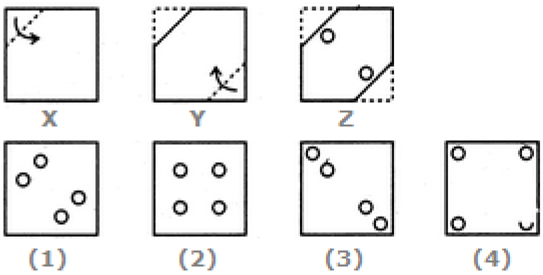
2. Which word does not go along with the others:
   a) freeway
   b) street
   c) interstate
   d) expressway

3. Yard is to inch as quart is to
   a) gallon
   b) ounce
   c) milk
   d) liquid

4. Siamese : Cat
   a) type : breed
   b) dog : puppy
   c) mark : spot
   d) collar : leash

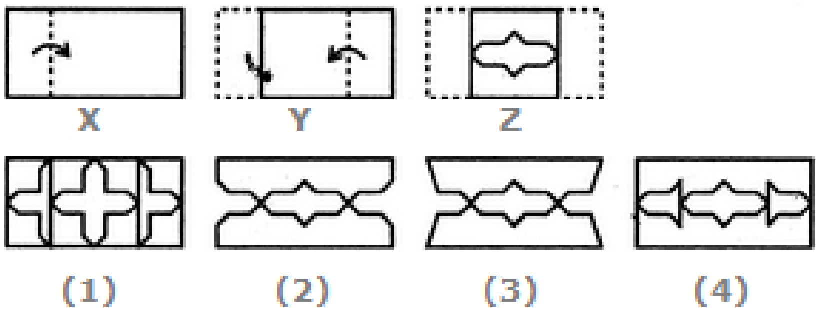
5. slapstick : laughter
   a) horror : fear
   b) mimicry : tears
   c) satire : anger
   d) genre : mystrey

6. Choose a figure which would most closely resemble the unfolded form of Figure Z



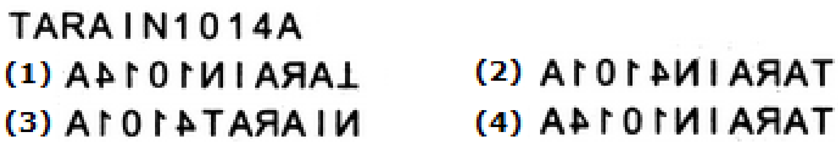
   a) 1
   b) 2
   c) 3
   d) 4

7. Choose a figure which would most closely resemble the unfolded form of Figure Z



   a) 1
   b) 2
   c) 3
   d) 4

8. Choose the alternate which closely resembles the mirror image of the given combination;

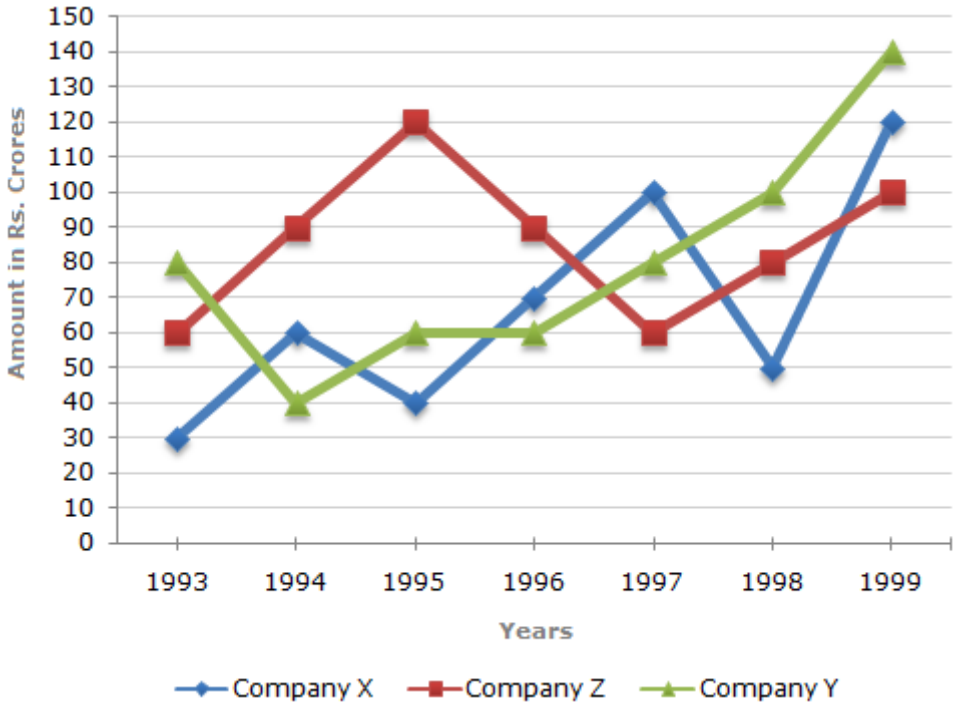


   a) 1
   b) 2
   c) 3
   d) 4

9. Elated is to despondent as enlightened is to
   a) aware
   b) ignorant
   c) miserable
   d) tolerant

10. Study the following line graph and answer the questions that follow-

Exports From Three Companies Over The Years



In which year was the difference between the exports from Companies X and Y the minimum?
   a) 1994
   b) 1995
   c) 1996
   d) 1997

SECTION B
ENGLISH

1. Read the given passage carefully and answer the questions that follow:

I have often thought it would be a blessing if each human being was stricken blind and deaf for a few days at some time during his adult life. Darkness would make him more appreciative of sight, silence would teach him the joy of sound. Now and then I have tested my seeing friends to discover what they see. Recently I asked a friend, who had just returned from a long walk in the woods, what she has observed. "Nothing in particular," she replied.

How was it possible, I asked myself, to walk for an hour through the woods and see nothing worthy of note. I, who cannot see find hundreds of things to interest me through mere touch. I feel the delicate symmetry of leaf. I pass my hands lovingly about the smooth skin of a silver birch or the rough, shaggy bark of a pine. In spring I touch the branches of trees hopefully in search of a bud, the first sign of awakening nature after her winter's sleep. Occasionally if I am fortunate & place my hand gently on a small tree and feel the happy quiver of a bird in full song.

At times my heart cries out with longing to see all these things. If I can get so much pleasure from mere touch, how much more beauty must be revealed by sight. And I have imagined what I must like to see if I were given the use of my eyes, say, just for three days.

I should divide the period into three parts. On the first day, I should want to see the people whose kindness and gentleness and companionship have made my life worth living. First I would like to gaze upon the face of my dear teacher, Mr. Anne Sullivan Macy. She came to see me when I was a child. She opened the other world for me.

Answer the given questions:

i. What would make one's blindness more appreciative of sight?

a) blackness
b) darkness
c) whiteness
d) joyfulness

ii. What would silence teach one's deafness?

a) joy of music
b) joy of voice
c) joy of sound
d) joy of speaking

iii. Where did her friend go for a walk to?

a) to a village
b) to a city
c) to a town
d) to a wood

iv. How could Helen Keller find hundreds of thing?

a) by mere touch
b) by voice
c) by sound
d) by listening

v. The plural form of 'leaf' is?

a) leafs
b) leaves
c) leaften
d) leafen

vi. The verb form of 'thought' is?

a) think
b) thinked
c) thinks
d) to think

vii. "It would be a blessing if each human being was stricken blind and deaf for a few days at some time during his adult life." says Helen. What makes her think so?

viii. Mention the things of interest that Helen found through the sense of touch?

2i. You are an avid reader and disappointed with the absence of a public library in your city. Write a letter to the District Administrator requesting the government to start a well stocked public library which will not only cater to readers like you but will also help develop a reading culture in the community. **(Word limit – 200 words)**

OR

2ii. The Supreme Court recently said the value of a woman's work at home must be placed at par with that of her office-going husband. The debate was reignited last month when actor-turned-politician Kamal Haasan said that the state should recognise this officially and pay homemakers a salary. Write a debate on either for or against the motion. **(Word limit – 200 words)**

SECTION C
MATH

OBJECTIVE

1. The product of x and y is 36. If both x and y are integers, then what is the least possible value of (x-y)?
   a) -37 b) -36 c) -35 d) -9

2. The points A(2,3) and B(m,11) are 10 units apart. Which of the following equations could describe the line that contains points A and B?
   a) 8x+6y=11 b) 8x-6y=-2 c) 6x+8y=36 d) 6x-8y=-12

3. On the real number line, a number, b is more than twice as far from -3 as it is from 3. Which of following equations can be solved to find all possible value of b ?
   a) $|b-3|>2|b+3|$ b) $|b+3|>2|b-3|$ c) $2|b-3|>|b+3|$ d) $2|b+3|>|b-3|$

4. A set of four integers has a mode of 7 and a median of 4. What is the greatest possible average of this set?
   a) 3.50 b) 3.75 c) 4.00 d) 4.25

5. Let the function h be defined by the equation h(x)=f(g(x)) where $f(x)=x^2-1$ and g(x)=x+5. What is the value of h(2)?

   a) 24 b) 32 c) 40 d) 48

6. If the graph of the quadratic function y=a(x–b)(x–4) has a vertex at (5,–3), what is the value of ab ?

   a) 18 b)21 c) 24 d) 27

7. If the variables x and y in the table above have a linear relationship, what is the value of b ?

x:	2	5	10
y:	10	b	34

   a) 19 b) 20 c) 21 d) 22

8. Kritika can select one or more of the following 3 toppings for her cake: nuts, whipped cream, cherries. If she selects one or more, how many different combinations of toppings are possible?

   a) 7 b) 8 c) 9 d) 10

9. If $\sin(\alpha+\beta-\gamma)=\frac{1}{2}$, $\cos(\beta+\gamma-\alpha)=\frac{1}{2}$, $\tan(\gamma+\alpha-\beta)=1$, find the values of α, β, γ.

a) $\alpha = 22.5, \beta = 57.5, \gamma = 45$
b) $\alpha = 37.5, \beta = 45, \gamma = 52.5$
c) $\alpha = 22.5, \beta = 45, \gamma = 57.5$
d) $\alpha = 45, \beta = 22.5, \gamma = 52.5$

10. If $\frac{\left(p+\frac{1}{q}\right)^p\left(p-\frac{1}{q}\right)^q}{\left(q+\frac{1}{p}\right)^p\left(q-\frac{1}{p}\right)^q} = \left(\frac{p}{x}\right)^x$ *then* $x =$ _____.

a) $p-q$ b) $p+q$ c) $q-p$ d) pq

11. $\sqrt{\sqrt{3}-\sqrt{4+\sqrt{5}+\sqrt{17-4\sqrt{15}}}}$ = _____

a) 1 b) $\sqrt{-1}$ c) -1 d) $\sqrt{5}$

12. The string of length n is wound on the exterior four walls of a cube of side 'a' cm starting at point C and ending at point D exactly above C, making 4 turns equally spaced. The side of the cube is _____.

a) $a=\frac{2n}{\sqrt{255}}$ b) $a=\frac{(n)^2}{16}$ c) $a=\frac{8n}{\sqrt{257}}$ d) $a=\sqrt{15}n$

13. 80 percent of the people in a party drink coffee; 10 percent of these also drink tea. 10 percent of these also drink tea . 10 percent drink neither of these two drinks. What percent of the people in the party drink?

a) Only coffee b) only tea c) tea d) person does not prefer any of the drink.

14. If one root of the equation $px^2+qx+r=0$ is m times the other , then $\frac{(m+1)^2}{m}$ = ?

a) $\frac{a}{pr}$ b) $\frac{q^2}{pr}$ c) $\frac{p^2r^2}{q^2}$ d) *none of these*

15. If 9x-3y+z=0 , then the value of $\frac{y}{2x}+\sqrt{\frac{y^2-4xz}{4x^2}}$ (where x,y,z are constants).

a) 1 b) 2 c)3 d) 4

16.A three –digit number was chosen at random . Find the probability that it's hundred's digit, ten's digit and unit's digit are consecutive integers in descending order.

a) 2/225 b) 1/225 c) 4/225 d) 11/225

17. If two rectangular sheets with dimensions (x, 2) and (y, 2) form the curved surfaces of two different cylinders with 2 units as the height of the cylinder, then find the ratio of volumes i.e $\frac{V_1}{V_2}$ =

a) $\frac{x^2}{y^2}$ b) $\frac{2x^2}{y^2}$ c) $\frac{6x^2}{7}$ d) $\frac{1}{y^2}$

18. The value of $(a+1)^{-1}+(b+1)^{-1}$ at a = $\left(2+\sqrt{3}\right)^{-1}$ and b = $\left(2-\sqrt{3}\right)^{-1}$ will be :

a) 1 b) 0 c) -1 d) none of these

19. Carlos delivered n packages on Monday, 4 times as many packages on Tuesday as on Monday, and 3 more packages on Wednesday than on Monday. What is the average number of packages he delivered per day over the three days?

a) $2n-3$ b) $2n-1$ c)$2n+1$ d) $2n+3$

20. The value of $\sqrt{a+\sqrt{a+\sqrt{a+\cdots\infty}}}$ is

a) $\frac{1+\sqrt{1+4a}}{2a}$ b) $\frac{1+\sqrt{1-4a}}{2a}$ c) $\frac{1+\sqrt{1+a}}{2a}$ d) none of these

SUBJECTIVE

1. A barrel of diameter 2m rests with its curved surface in contact with the ground and a wall. A 6.5m long ladder lies in contact with the barrel, the wall and the ground. What is the maximum distance between the ground end of the ladder and the wall?

2. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be 1/27 of the volume of the given cone, at what height above the base is the section made?

3. Find the integral roots of the equation : $(x+2)(x+4)(x+6)(x+8)=105$.

4. If $(a^2-b^2)\sin\theta+2ab\cos\theta=a^2+b^2$, then find the value of $\tan\theta$.

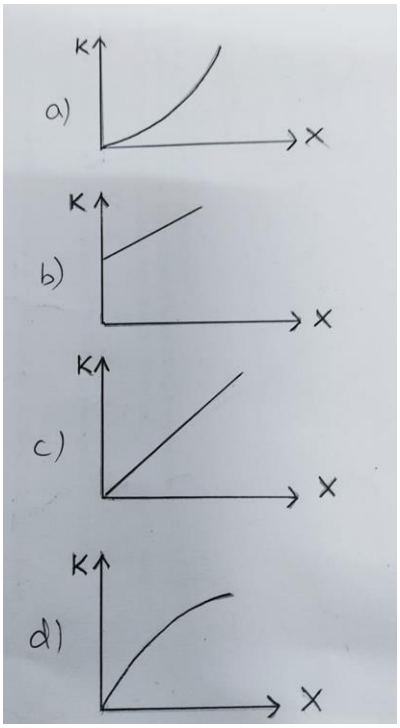
SECTION D
SCIENCE

OBJECTIVE

1. Shaurya exerts a force of 100 N when he is riding his bicycle along a level road and this causes him to accelerate at 0.5 m/s^2. Shaurya and the bike have the total mass of 120,000 g. the magnitude of the frictional force acting on Shaurya and his bike is:

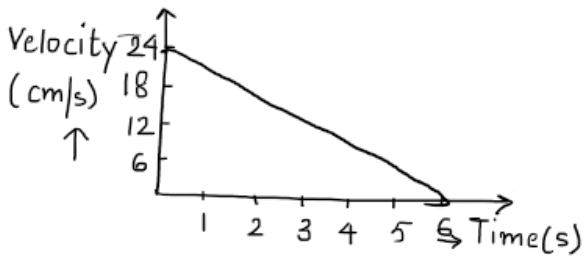
a) 40 N
b) 60 N
c) 80 N
d) Zero

2. A body starts from rest with constant acceleration. Which of the following graphs represent the variation of the kinetic energy 'K' with the distance 'x'?



3. A man pulls a bucket of water from a well of depth 'H'. If the mass of rope and the bucket of water are 'm' and 'M' respectively, then the work done by the man is:
   a) $(\frac{m}{2}$ +M)gH
   b) $(\frac{M}{2}$ + m)gH
   c) $\frac{(m+M)}{2}$gH
   d) (m+M)gH

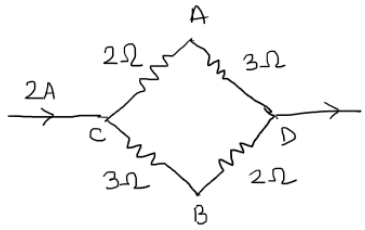
4. The velocity time graph of a body moving on a table is shown. If the mass of the body is 100 g, then the force which the table will exert to bring the body to rest is:



   a) -2 x 10^{-3} N
   b) Zero
   c) - 4 x 10^{-3} N
   d) - 400 N

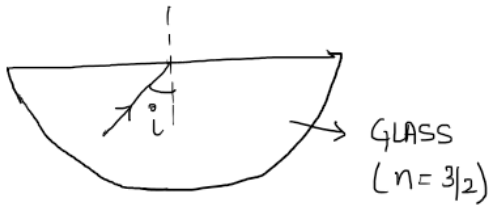
5. A key of a mechanical piano struck gently and then struck again but much harder this time. In the second case:
   a) Sound will be louder but pitch will be same
   b) Sound will be louder and pitch will also be higher
   c) Sound will be louder but pitch will be lower
   d) Both loudness and the pitch will remain unaffected.

6. A current of 2A flows in a system in the figure. The potential difference $V_A - V_B$ will be:



a) 0V
b) 1 V
c) 2 V
d) 3 V

7. The angle of incidence that cause the refracted ray to have an angle of refraction of 90° is: (refractive index of glass 'n' is 3/2)



a) Sin i = 3/2
b) Sin i = 2/3
c) Sin i = ¾
d) Sin i = 4/3

8. 3.42 g of sucrose are dissolved in 18 g of water in a beaker. The number of oxygen atoms in the solution are:
   a) 6.68×10^{23}
   b) 6.09×10^{22}
   c) 6.022×10^{23}
   d) 6.022×10^{23}

9. How many times an atom of sulphur is heavier than an atom of carbon?
   a) 32 times
   b) 12 times
   c) 8/3 times
   d) 12/32 times

10. If 10^{21} molecules are removed from 200mg of CO_2 , then the number of moles of CO_2 left are ?
   a) 2.88×10^{-3}
   b) 1.66×10^{-3}
   c) 4.54×10^{-3}
   d) 1.66×10^{-3}

11. Which of the following pair of gases will diffuse at the same rate through a porous plug?
    a) CO, NO_2
    b) NO, C_2H_6
    c) NO_2 , CO_2
    d) NH_3, PH_3

12. The pH of a solution prepared by mixing 2.0ml of HCl solution of pH 3.0 and 3.0 ml of NaOH solution of pH 10.0 is
    a) 2.5
    b) 3.5
    c) 5.5
    d) 6.5

13. Elements X, Y and Z have valencies 1,3,4 respectively . Formula unit mass of their oxides are 62, 102 and 64 respectively. If atomic mass of Z is divided by the difference in atomic mass of X and Y , then the value obtained is the atomic number of which of the following elements.
    a) Carbon
    b) Nitrogen
    c) Oxygen
    d) Fluorine

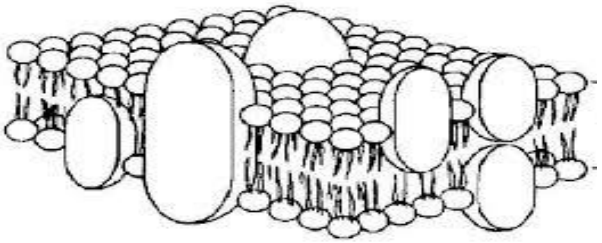
14. Insulin contains 3.4% sulphur. The minimum molecular weight of insulin is
    a) 350
    b) 470
    c) 560
    d) 940

15. A student was asked to focus a permanent slide under the high power of microscope. This involved the following steps which have not been written in correct sequence:
    i) Place the slide on the stage.
    ii) Clean the microscope and lenses.
    iii) Focus the material with the help of coarse adjustment.
    iv) Place the low power objective lens above the slide.
    v) Sharpen the focus with fine adjustment.
    vi) Bring high power objective lens over the slide.

Which one of the following is the correct sequence of steps for focusing the slide under high power?
    a) i)>ii)>iii)>iv)>v)>vi)
    b) i)>ii)>vi)>iii)>iv)>v)
    c) ii)>i)>iv)>vi)>iii)>v)
    d) ii)>i)>iv)>iii)>vi)>v)

16. If a photosynthesising plant releases oxygen containing more than the normal amount of ^{18}O, it is concluded that the plant has been supplied with
    a) $C_6H_{12}O_6$ containing ^{18}O
    b) H_2O containing ^{18}O
    c) CO_2 containing ^{18}O
    d) Oxygen in the form of ozone

17. In fluid mosaic model of plasma membrane:

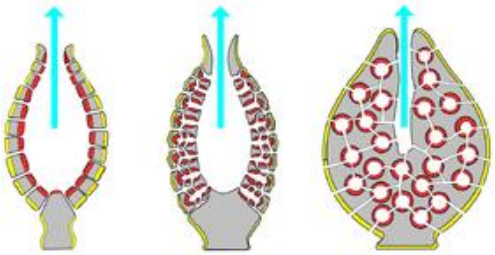


a) Upper layer is non-polar and hydrophillic
b) Upper layer is polar and hydrophobic
c) Phospholipids form a bimolecular layer in middle part
d) Proteins form the middle layer

18. Select the statements that describe characteristics of genes:
i) genes are specific sequence of bases in a DNA molecule
ii) a gene does not code for proteins
iii) in individuals of a given species, a specific gene is located on a particular chromosome
iv) each chromosome has only one gene

a) (i) and (ii)
b) (i) and (iii)
c) (i) and (iv)
d) (ii) and (iv)

19. The path of water in sponge is:



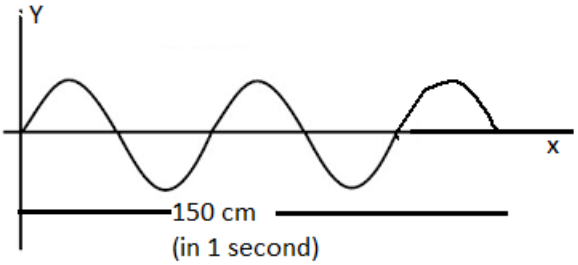
a) Pinacocytes→choanocytes→enteron→osculum
b) Dermal ostia→gastralostia→spongocoel→osculum
c) Dermal ostia→spongocoel→gastralostia→osculum
d) Osculum→spongocoel→choanocytes→ostia

20. Read the following statements carefully and select the appropriate option given below:
i) Crop field and an aquarium may also be considered as man-made ecosystem.
ii) Decomposers break down complex organic matter into organic substances, this process is called decomposition.
iii) Secondary productivity is defined as the rate of formation of new organic matter by producer.
iv) Primary production is defined as amount of the biomass and organic matter produced per unit area over a time period by plants during photosynthesis.
v) Bacterial and fungal enzyme degrades detritus into simpler organic substance by process called catabolism.

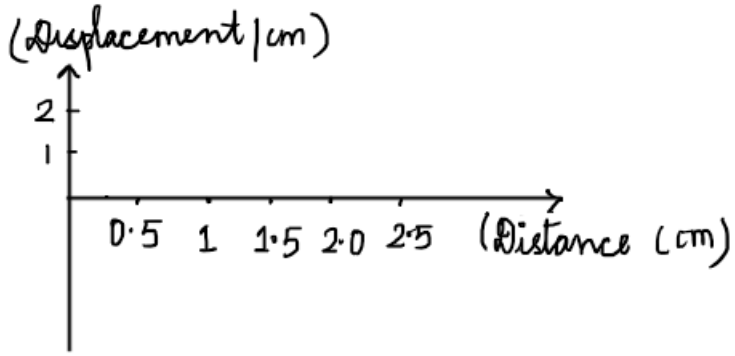
a) Only one statement is incorrect
b) Only two statements are incorrect
c) Only three statements are incorrect
d) Only four statements are incorrect

SUBJECTIVE

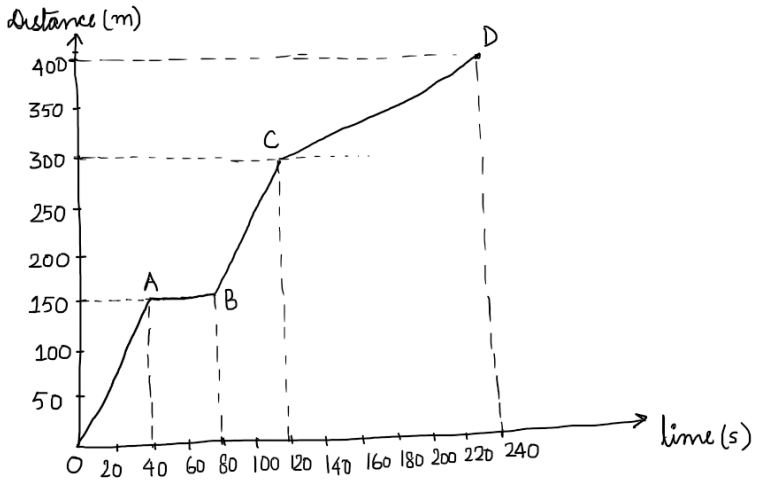
1. One end of a string is moved to and fro so that a transverse travelling wave is produced, as shown in the figure.



(i) What is the wavelength and the frequency of the above waveform?
(ii) On the axes provided, draw a wave of wavelength 2 cm. its amplitude should be 1 cm.



2. Part of the bus route is along a high street. The distance time graph shows how far the bus travelled along the high street and how long it took.



(i) Between which two points was the bus travelling slowest?

(a) Put a cross (x) in the box next to your answer.

Points	Cross (x)
O-A	
B-C	
C-D	

(b) Give reasons for your answer.

(ii) A cyclist made the same journey along the high street. The cyclist started at the same time as the bus and completed the journey in 200 seconds. The cyclist travelled the whole distance at constant speed.

(a) Draw a line on the graph to show the cyclist's journey

(b) The cyclist overtook after _____ seconds.

3. An unsaturated hydrocarbon has a molecular mass of 70. Write any two possible structural isomers of this compound.

4. How much copper can be obtained from 100g of Copper sulphate ($CuSO_4$) ? Atomic mass of Cu= 63.5u)

5. A woman has a daughter. There are three men claiming to be the father of the child. The judge in the paternity court orders for the blood group reports of all three men, the mother and the daughter. According to the report,

mother was, Type A;
daughter was, Type O;
Man#1 was, Type AB;
Man#2 was, Type B;
Man#3 was, O.
The mother pleads this Man#3 is the little girl's father.

(i) Is the mother correct? Why or Why not?

(ii)The judge is not satisfied, so he asks for the medical records of the people involved. He discovers that the girl is colourblind. Man # 1 and 2 are also colourblind; Man#3 has normal vision, as does the mother. With this additional information can you now identify the name of the probable father?