Appendices
Draft Questionnaire used for Pilot Study

CRITICAL THINKING TEST IN PHYSICS (CT-TIP)

A. Comparison

Compare the alternatives given below and find out the best among them;

1) Mention the similar phenomenon among the following which produces heat;

(i) burning coal.
(ii) electric iron.
(iii) break applied for a vehicle.
(iv) rubbing two rough objects.

Answer pairs:
   a) (i) & (ii)   b) (iii) & (iv)
   c) (i) & (iii)  d) (i) & (iv)

2) Find out the situations which are similar in nature among the following;

i) Drying up of wet cloth in the hot sun.
ii) Conversion of solar energy into heat energy in a solar heater.
iii) Evaporation of sea water.
iv) Conversion of solar energy into light energy.

Answer pairs:
   a) (i) & (ii)   b) (iii) & (iv)
   c) (i) & (iii)  d) (i) & (iv)

3) Which one of the following is not equal in value to others?

a) 1 km = 1000 m.
   b) 1 km = $10^5$ cm.
   c) 1 km = $10^6$ mm.
   d) 1 km = $10^8$ mm.

4) A clinical thermometer is usually much shorter than a laboratory thermometer because;

a) a short one needs less mercury.
   b) it is easier to carry.
   c) the thin bulb cannot support a long column of mercury
   d) only a limited range of temperature is required.
5) The best method of stopping air pollution is to;  
   a) Make the surrounding green.  
   b) Reduce the use of petrol and diesel.  
   c) Use the atomic energy.  
   d) Go back to traditional farming.

6) Which one of the following is easy while opening a nut from the bolt?  
   a) Increase the length of the spanner.  
   b) Apply more force to rotate the nut.  
   c) Use thick spanner.  
   d) Hammer the nut.

7) A ball thrown on a wall comes back to its original position very late than expected. Which factor is the cause for the delay in return of the ball?  
   a) Hardness of the wall.  
   b) Smoothness of the wall.  
   c) Softness of the wall.  
   d) Height of the wall.

8) Which of the two following are similar?  
   (i) A bus wheel is being greased.  
   (ii) Washing soda is used along with soap for washing.  
   (iii) A main door hinge is oiled to reduce squeaking sound.  
   (iv) Iron windows are painted.  
   Answer pairs:  
   a) (i) & (ii)  
   b) (ii) & (iii)  
   c) (i) & (iii)  
   d) (i) & (iv)

9) A nail and a wooden piece are placed on the surface of water in two different vessels. Pair the similarities;  
   i) Both do not dissolve.  
   ii) Iron nail sinks.  
   iii) Wooden piece floats.  
   iv) The level of water raises.  
   Answer pairs:  
   a) (i) & (ii)  
   b) (ii) & (iii)  
   c) (iii) & (iv)  
   d) (i) & (iii)

10) Which of the following are similar in nature?  
    (i) Electric iron.  
    (ii) Halogen bulb.  
    (iii) Pressure cooker.  
    (iv) Solar lamp.  
    Answer pairs:  
    a) i, ii & iv  
    b) i, iii & iv  
    c) i, ii & iii  
    d) ii, iii & iv
B. Identifying the Pros and Cons:

Select the best possible alternative for the following:

11) The amount of light which is available to read in a room with only one window receiving the sunlight can be increased by: [ ]
   a) fixing the glass to window.
   b) painting the wall with blue colour.
   c) painting the window with white colour.
   d) white washing the inside walls of the room.

12) What change can be seen if length of a cardboard is increased without changing its total area? [ ]
   a) Breadth decreases.
   b) Breadth increases.
   c) Thickness decreases.
   d) Thickness increases.

13) How can you reduce the height of the liquid column of a vessel without changing its volume? [ ]
   a) Increase the height of the vessel.
   b) Increase the width of the vessel base.
   c) Decrease the height of the vessel.
   d) Decrease the width of the vessel base.

14) Which one of the following is the best alternative to make the nail to get into the wall fast? [ ]
   a) Increase the size of the hammer.
   b) Increase the length of the nail.
   c) Sharpen the tip edge of the nail.
   d) Shorten the length of the nail.

15) How do you get more grip to a tyre of your vehicle? [ ]
   a) Reduce the size of the tyres.
   b) Increase the treads of the tyres.
   c) Increase the width of the tyres.
   d) Sharpen the treads of the tyres.

16) What do you do to dissolve some more salt in a given saturated water at room temperature? [ ]
   a) Increase the size of the vessel.
   b) Heat the saturated water.
   c) Cool the saturated water.
   d) Stir the water well.
C. Reasoning

Select the best reason among the given alternatives for the following:

17) If you dip your hand into the warm water vessel, you feel hot at the upper level of water than at the bottom. This is due to that;
   a) heat goes directly to the upper level. [ ]
   b) hot water molecules become lighter hence move up.
   c) burning flame pushes the hot water up.
   d) cold air above the water level attracts the hot water.

18) The image of a body inside the water is less brighter than in reality because;
   a) water never remains pure. [ ]
   b) water medium contains dust particles.
   c) only a small portion of light gets reflected back.
   d) of optical illusion.

19) In industries hot water is transported through looped metal pipes from one point to another because;
   a) water can move fast in pipes. [ ]
   b) metal pipes are subjected to expansion and contraction.
   c) to check easily whether water flows or not.
   d) metal pipes are durable.

20) When boiling water is poured into a glass jar it gets cracked because glass;
   a) transfers the heat. b) absorbs the heat. [ ]
   c) does not transfer the heat. d) reflects the heat.

21) From among the pile of books, if one book from its middle is suddenly drawn out horizontally the book pile does not get disturbed, then;
   a) other books remain at the state of rest. [ ]
   b) reduction of friction is caused.
   c) reaction force is generated.
   d) some books will fall down.
22) The light is visible some time before the sun rises and after the sun sets, this is due to; 
   a) scattering of light by the atmospheric particles. [ ]
   b) reflection of light from the upper atmosphere.
   c) total internal reflection of light.
   d) refraction of the rays incoming towards the denser layers of the atmosphere.

23) The sky appears blue because; [ ]
   a) blue light from the atmosphere can come by total internal reflection.
   b) blue light is most readily reflected from the particles of the atmosphere.
   c) there is a large scattering of blue light by the atmospheric particles.
   d) blue light is not absorbed by the atmosphere.

24) A bird flying high up in the air does not cast a shadow on the ground because; [ ]
   a) the size of the bird is smaller than the earth.
   b) the ground lies beyond the umbral cone of the shadow.
   c) light rays coming from the sun are almost parallel.
   d) the shadow is so faint that can't be seen.

25) An iron ball fixed to a glass rod is dipped in an open vessel of glycerol, when looked from above; [ ]
   a) the iron ball becomes invisible.
   b) the iron ball looks floating in glycerol.
   c) both iron ball and the glass rod look floating.
   d) both iron ball and the glass rod become invisible.

D. Distinguishing Facts and Opinions:

State whether the following statement is a fact or an opinion. Tick '✓' in 'F' column for fact and in 'O' column for opinion:

26) The Sun rises in the East. [ ] [ ]
27) Salt dissolves in water. [ ] [ ]
28) Rainbow is formed when it rains in the afternoon. [ ] [ ]
29) Dry cell cannot be recharged. [ ] [ ]
30) All doctors are free from diabetes.
31) Ants are afraid of dark.
32) Sugar does not contain water.
33) Kerosene is a better fuel than cooking gas.
34) The Moon is a natural satellite.
35) It rains only by the grace of rain God Varuna.

E. Hypothesizing:

Find out the effect for the following causes:

36) If the Sun rises in the West, then identify that does not change;
   a) North will be South. [ ]
   b) Earth revolves in the opposite direction.
   c) East will be West. d) Day and nights.

37) A magnetic compass needle is brought near a conductor carrying current, then the needle deflects, the cause for deflection is;
   a) electric current. b) electrostatic force.
   c) magnetic force. d) static force.

38) When the cream and milk are set into rapid rotation together in a vessel, then;
   a) cream particles tend to remain nearer to the centre.
   b) milk particles tend to remain nearer to the centre.
   c) both cream and milk particles tend to remain at the same distance from the centre.
   d) both cream and milk particles tend to move away from the centre.

39) If North pole of a strong bar magnet is quickly brought near to the North pole of a freely suspended weak magnet, then;
   a) they repel each other. [ ]
   b) they attract each other.
   c) there will be no force between them.
   d) the weak magnet starts rotating round.

40) If a heavy object and a light object are dropped simultaneously from the top of the tower which is 100ft height. The object that reaches the ground first is;
   a) heavy object. b) light object.
   c) both at the same time. d) both struck in the middle.
F. Identifying the Assumptions:

The following are the situations given, accordingly select the appropriate alternative for each one of them:

41) Some water is taken in a glass bowl. Two pinch of Turmeric powder is added, it becomes yellow. Now to this solution a small quantity of lime water is added, it turns red. If lemon juice is added to the red solution, it becomes yellow again.

   The question you get from this reaction is;

   a) Why does turmeric powder makes water yellow?
   b) Why did it become red when lime water is added?
   c) Can we use this to test lime water?
   d) How can we make turmeric solution into red?

42) We know that a bar magnet attracts an iron nail. But, once a big iron block on the table attracted a small bar magnet.

   The question that you would get for this is;

   a) Why does magnet attract iron?
   b) Why does iron block attract magnet?
   c) What is the difference between magnet and iron?
   d) Does magnet attract iron or iron attract magnet?

43) When you see a rainbow, you;

   a) start counting the colours.
   b) admire the rainbow.
   c) expect rain.
   d) think of how it formed.

44) My father blew air to clean the dusted dining table, where as I wiped it with my palm. The next day the servant swept it with a broom. Another day my mother wiped it by a wet cloth.

   Who among these is best one?

   a) My father.
   b) Myself.
   c) Servant.
   d) My mother.

45) Anand keeps an ice cube on the surface of water in a beaker. Instead of sinking, it floated. The question he gets is;

   a) Why does it float on water?
   b) How much of time does it take to melt?
   c) Why does ice melt in water?
   d) How does water become cold?
G. Translation:

Suggest two alternatives for the following as shown in the example:

Eg. Cutting the vegetables with a knife.

Alternatives:

a) Keeping knife constant and cut the vegetables.
b) Keeping vegetable constant and move the knife to cut the vegetables.

46) Drawing a straight line on a paper with a pencil.

a) .......................................................
b) .......................................................

47) Removing the cap from a pen.

a) .......................................................
b) .......................................................

48) Loosening the nut from a bolt.

a) .......................................................
b) .......................................................

49) A person wants to sit on a chair.

a) .......................................................
b) .......................................................

50) Cleaning the teeth with a toothbrush.

a) .......................................................
b) .......................................................

51) To lit the match stick with a match box.

a) .......................................................
b) .......................................................

52) Pouring coffee from a kettle to a cup.

a) .......................................................
b) .......................................................

H. Identifying Relevant and Irrelevant:

Following are the situations / phenomenon with some information which are relevant and irrelevant to it. Identify them and write in the space provided:

53) Refraction of light phenomenon: What are the relevant for this to happen?
    light, mirror, ray passing from one medium to another, change in the path of light ray, optical bench, thermometer
    i) Relevant .................................................................
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54) A substance is identified as a bar magnet. What are the relevant properties in the following list helps in proving it? and write others as irrelevant.
    attraction, plastic piece, wooden plank, direction, repulsion, shape, iron piece, marble
    i) Relevant .................................................................
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55) The terms which are relevant and irrelevant while studying the motion of bodies.
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    i) Relevant .................................................................
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56) What are the relevant factors for the occurrence of rainbow among the following?
    sunlight, moonlight, rain, water droplets, colours, reflection of light, refraction of light.
    i) Relevant .................................................................
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57) Which among the following are relevant members of the solar system?
Earth, Mars, Stars, Comets, Jupiter, Meteroids, Saturn, Cloud
i) Relevant .................................................................
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A. Comparison

Compare the alternatives given below and find out the best among them;

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different vessels. Pair the similarities;
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34) What are the relevant factors for the occurrence of rainbow from among the following?
- sunlight, moonlight, rain, water droplets, colours, reflection of light, refraction of light.

i) Relevant

ii) Irrelevant

35) Which among the following are relevant members of the solar system?
- Earth, Mars, Stars, Comets, Jupiter, Meteroids, Saturn, Cloud

i) Relevant

ii) Irrelevant
EMOTIONAL INTELLIGENCE INVENTORY

Developed by: Dr. Shailendra Singh

Instructions:
On the following pages, there are given some sentences. Only you have to select the correct alternative by using the following five point scale. Tick (✓) against one point. Please try to answer in terms of what you actually like or feel,

Strongly Agree - SA  
Agree - A  
Uncertain - U  
Disagree - DA  
Strongly Disagree - SDA

A. Self Awareness

1) I am able to identify my feelings. □ □ □ □ □
2) I have learned a lot about myself through my feelings and emotions □ □ □ □ □
3) I understand the reasons for my ‘moods’. □ □ □ □ □
4) I am clearly able to see how my feelings impact my performance. □ □ □ □ □
5) My values and goals are very clear in my mind. □ □ □ □ □
6) I am aware of my strengths and weakness. □ □ □ □ □
7) I frequently seek feedback on my behaviour/performance

8) I have full confidence in myself and in my decisions

9) I take initiative to meet people in social situation

10) When I contribute to group discussions I believe my contributions are as valuable as those of others.

11) If I am convinced that my position is right, I prefer to maintain my position, even if it means becoming unpopular.

12) I am clear what I want from life.

B. Self Regulation

1) I can achieve what I want through my determination.

2) I don’t easily give up even if I received set backs.

3) When I have a problem that creates undue tension, I try to relax and gain a feeling of tranquility so that I can re-evaluate things.

4) When I face a problem I focus on what I can do to solve it.

5) I can adjust very quickly to new challenges, problem and information.
6) I am sensitive to the development in the environment and capture the opportunity there.

7) I am able to anticipate changes, and I plan in advance to encash the opportunities.

8) I am able to handle multiple demands and rapid changes.

9) I am quite flexible in my approach to life and problems.

10) I am frequently anticipate solutions to my problems.

11) When a certain approach to a problem does not work, I can quickly re-orient my thinking.

12) I seek out fresh ideas from a wide variety of sources.

C. Motivation

1) I constantly try to improve my performance.

2) I set challenging goals for myself and strive to achieve them.

3) I work hard for a ‘better’ future reward rather than accept a lesser reward now.

4) I constantly scan the environment to seize any new opportunity.

5) I prefer to proact.
6) I mobilize others through unusual, enterprising effort.

7) I take initiative to start dialogue for a new adventure.

8) I prefer to be idea leader.

9) I believe in performance rather than just following the rules.

10) I believe where there is a will there is a way.

11) I start any activity with the firm determination to complete it.

12) Under pressure, I am confident I will find the way.

D. Social Awareness

1) People don’t have to tell me what they feel I can sense it.

2) I can sense the pulse of others and state unspoken feelings.

3) I listen to the feelings of people while they are talking.

4) I can sense the feelings of people when I walk into a room.

5) I anticipate people’s need and try to satisfy them.

6) I try to understand and meet the expectations of people.
7) I seek information about people’s need and then provide service accordingly.

8) I take initiative in talking to people in order to serve them better.

9) I am very comfortable in working with people of different background.

10) I am able to identify who has real power in the group / organization.

11) I am able to relate well with people who matter in the organizational dynamics.

12) I am able to influence the opinion of important people.

E. Social Skills

1) I am able to convince people.

2) I present myself in such a way that people get impressed.

3) I keep my knowledge base updated and influence people through that.

4) I am able to read the needs of the hour and influence people through my initiative.

5) I am a good communicator.

6) I am able to put across my messages effectively.

7) I use a variety of medium of communication to get the desired response.
8) I am able to arouse enthusiasm in people.
9) I emerge as a natural leader during unstructured situation.
10) I recognize the need for removing the barriers.
11) I create such an atmosphere where people enthusiastically interact and participate in the team work.
12) I build team identity and promote commitment among team members.
APPENDIX - D

A NEW TEST OF CREATIVITY (VERBAL)

Developed by: Dr. Roma Pal

Part 1 : FLUENCY

Total Time 56 minutes

Instructions:

Some questions are given below, kindly go through them carefully. Question No. 1 to 11 are to be answered in 2 minutes (each question). Similarly in 2 minutes time the response of each question i.e. 7 sub questions of question No. 11 are to be given. In question No. 12, there are 10 sub-questions which should be answered within 10 minutes (i.e., 1 minute each question). Question No. 13 to 18 should be answered within 12 minutes (i.e., 2 minutes each question). Blank space is provided for writing the answers. Respond either in Kannada or in English. Now start writing answers of Part-1.

AS. FL.

1) Write the name of round things that you can think.
2) Mention the names of such birds and animals that are white in colour.
3) Write the names of such vehicles that run by petrol.
4) Mention the names of those things that produce sound.
5) Mention as many things you can think, which are square in shape.
6) Write the names of such flowers that have natural fragrance.
7) Write the names of drinking things that are fluid in nature.
8) Write the names of such that are function through electricity.
E. FL.

9) Write such words that start with the alphabet ‘A’.

10) Write such sentences that are related with, ‘lamp’ in such a manner that no two sentences have similarity.

11) Idioms have several meanings some of the idioms are given below. Write their meanings in short.
   a) One flower makes no garland.
   b) All’s well that ends well.
   c) Do evil and look for like.
   d) A burnt child deeds the fire.
   e) Do good and cast in into the rivers.
   f) No pains no gains.
   g) A honey tongue, a heart of gall.

W. FL.

12) Write the words that start with the following alphabets.

   A...............   M..............
   B...............   P..............
   C...............   L..............
   D...............   N..............
   K...............   R..............

Id. FL.

13) If an individual is isolated from the society then what will be its results?

14) What would have happened if men had four hands instead of two?

15) If you have the ability and facility of carrying out a business, then what will be your efforts for attaining more profit from it?
16) If you become a MLA or MP then what will you intend to do?

17) Several feeling occur on account of seeing a beautiful flower. What will be your feelings?

18) What would happen if men never experience tiredness?

**Part 2 : FLEXIBILITY**

**Instructions**:

This part has 16 questions which you have to complete within 32 minutes. In other words you will get 2 minutes for the answer of each question. Now, please start.

**S. FLX.**

1) Knife is used to cut vegetables at home. Besides this what are its other uses?

2) Clothes get a new form through colour. What can be the other uses of colour?

3) It has been read in newspapers and the elders also say that TV is very useful for us. In your views what can be the its uses?

4) Paper is used for reading and writing. What else can be the uses of paper?

5) What can be the various uses of newspaper?

6) What can be the uses of tyre and tubes?

7) A carpenter makes tables and chairs. Besides this, what else can he make?

8) Whether it is village or city, Purse is used every where by everybody. In your opinion what can be the other uses of purse?
9) At night when you are sleeping, a thief comes in your house. What will you do in such situation?

10) You are passing though a narrow lane when suddenly you face a wicked man. What will you do in such a situation?

11) Suppose in your working place which is far from your house, malice evokes. In such situation what will be your activities?

12) Suppose you are cleaning the house and suddenly something falls from the roof. On seeing it carefully you come to know that it is a black snake. What will be your activities in such a situation?

13) Suppose a child misses his parents in an unknown place. What will he do in such situation?

14) Suppose you are working in a firm and suddenly you are turned out from it. You are in need of money for your family. What type of activities you will do in such situation?

15) Suppose you have borrowed much money from your friend and have promised to return it today. So you bring money from the bank but on reaching home you find that it is lost. What will be your activities in such situation?

16) Suppose a lady of your house in cooking in the gas and you come to know that the gas is leaking. What will be your activities in such situation?
Part 3: ORIGINALITY

Total Time 15 minutes

Instructions:

"Every individual has imaginations of his wishes and aspirations. Creative aspect is essential for imagination because man is a thoughtful creature. There lies decency originality and vividness in his thoughts."

Below such type of questions are given which you have to respond on account of your decency, originality and vividness 3 minutes times is given for answering each questions i.e., you have to respond the 5 questions of this part within 15 minutes time.

1) If degrees can be attained without any effort then what will be the nature of education?

2) It is said that whatever man does, he does for his bread. What will happen if men never feel hungry?

3) If men become the product of test-tube baby then what will be the characteristics in man’s nature?

4) If life is possible in space then what type of life will men lead?

5) What would have happened if men had feathers alike birds?
APPENDIX - E

SOCIO-ECONOMIC STATUS SCALE

Standardised by: Dr. Lakshminarayana

Please furnish the following information:

1) Name: ________________________________
2) Sex: Male / Female
3) Age: _________
4) Education: _________
5) Marital Status: Married / Unmarried / Widow / Widower
6) Size of the family: _________
7) Caste: ________________________________
8) Locality: Urban / Rural
9) Village: ________________
10) Panchayat: _________
11) Taluk: ________________
12) District: _________

Instructions:

1) On the basis of this information socio-economic status of your family is being measured.
2) You are requested to give the particulars about you and your family members according to the given format.
3) This information is only used for research purpose.
Please furnish the particulars of yourself and members of your family in the appropriate column.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Members of the family</th>
<th>Educational level</th>
<th>Occupation pursued</th>
<th>Annual Income (Rs.)</th>
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<tbody>
<tr>
<td>1.</td>
<td>Subject</td>
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<td>2.</td>
<td>Husband / Wife</td>
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<td>Father</td>
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<td>4.</td>
<td>Mother</td>
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<td>5.</td>
<td>Guardian (if parents are not alive)</td>
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<td>6.</td>
<td>Children</td>
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<td>Brothers</td>
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<td>8.</td>
<td>Sisters</td>
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<td>9.</td>
<td>Others. (Ex. Brothers’ wife, Sisters’ husband and their children, Grand Father, Grand Mother and others)</td>
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<td>10.</td>
<td>Annual Income from other sources</td>
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400
AN ACHIEVEMENT TEST IN SCIENCE

Name: 
School: 
Time: 2 hrs 
Max. Marks: 100

Instructions:

• This question paper consists of two parts.
• All questions are compulsory.
• Answer should be written in the space provided.
• All questions carry one mark each.
• For all the questions four choices are given. Select the appropriate one and write its alphabet in the box provided.

Part A: PHYSICS

1. The S.I. unit of electric current is; [ ]
   a) coulomb.   b) volt.    c) ampere.    d) watt.

2. When a bus suddenly starts, a person standing in the bus leans backward, it is due to; [ ]
   a) inertia.  b) momentum.   c) friction.  d) gravitational force.

3. The weight of a body is maximum at; [ ]
   a) equator.  b) poles.  c) latitude of 30°.  d) latitude of 60°.

4. Change of position of a body with time when compared with that of another body is called; [ ]
   a) motion.  b) distance.  c) displacement.  d) speed.

5. Rate of change of displacement is called; [ ]
   a) speed.  b) velocity.  c) acceleration.  d) deceleration.

6. The number of oscillation in unit time is called; [ ]
   a) frequency.  b) period.  c) amplitude.  d) oscillation.

7. Example for longitudinal wave is; [ ]
   a) movement of pendulum.  b) water waves.  
   c) sound waves.  d) oscillation of swing.

8. The kinetic energy of the molecules is least in; [ ]
   a) gas.  b) liquid.  c) solid.  d) plasma.
9. The increase in the length of a wire on heating is called;
   a) linear expansion.          b) cubical expansion.
   c) superficial expansion.     d) conical expansion.

10. The S.I. unit of speed is;
    a) metre.    b) metre second.    c) metre per second.    d) second.

11. Like poles of two magnets;
    a) attract.   b) repel.   c) no response.   d) neutralise.

12. Magnetic lines of force are relatively compact wherever field strength is;
    a) weak.    b) strong.    c) constant.    d) zero.

13. The most convenient form of energy is;
    a) electrical.  b) light.  c) heat.  d) chemical.

14. The S.I. unit of power is;
    a) joule.    b) kilo joule.    c) joule/second.    d) watt.

15. Nitrogen is filled in the bulb because;
    a) gives long life.  b) emits more light.
    c) emits less heat.  d) absorbs heat.

16. The freely suspended magnet comes to rest in the direction of;
    a) North-South.  b) South-West.
    c) North-West.  d) East-West.

17. Magnetic lines of force are;
    a) visible.  b) invisible.  c) transparent.  d) blur.

18. The fuse wire is made up of alloy of;
    a) tin and bronze.  b) lead and bronze.
    c) bronze and graphite.  d) lead and tin.

19. An example for paramagnetic non metal is;
    a) carbon oxide.  b) nitrogen.  c) oxygen.  d) benzene.

20. An example for non-magnetic substance is;

21. The electromagnetic radiation used in the treatment of cancer is;
    a) infrared.  b) violet.  c) ultra violet.  d) gamma.

22. The passengers inside an automobile moving fast along a curve feel pushed outwards due to;
    a) centripetal force.  b) centripetal reaction.
    c) centrifugal reaction.  d) centripetal acceleration.
23. The ray that bends most in the dispersed light when sun light is passed through a prism is;
   a) red. b) blue. c) orange. d) violet.

24. The principle of radar gun used by traffic control authorities to detect vehicles crossing speed limit is;
   a) Doppler effect. b) Raman effect. c) Tyndall effect. d) Newton effect.

25. The velocity of recession of celestial bodies is directly proportional to;
   a) mass. b) distance. c) volume. d) period of rotation.

26. The main source of electricity for artificial satellite is;
   a) dry cells. b) acid cells. c) solar cells. d) dynamo.

27. The reason for painting the copper pipes with black paint in solar water heater is to;
   a) reflect sunlight. b) prevent the heat loss. c) absorb solar energy. d) prevent rusting.

28. The effect produced by an electric current passing through a conductor is;
   a) electromagnetic effect. b) green house effect. c) magnetic effect. d) photoelectric effect.

29. The device used to measure potential difference and electromotive force is;
   a) voltmeter. b) voltameter. c) galvanometer. d) ammeter.

30. Substances which allow electric current to pass through them are called;
   a) semiconductors. b) conductors. c) insulators. d) capacitors.

31. Motion along a circular path with constant speed is;
   a) uniform circular motion. b) uniform linear motion. c) variable acceleration. d) retarded motion.

32. The law that can be suggested to find the distance between the sun and the earth is;
   a) Newton’s first law. b) Newton’s third law. c) Kepler’s second law. d) Kepler’s third law.

33. The inventor of modern steam engine is;

34. A device which converts heat into mechanical energy is;
   a) transistor. b) heat engine. c) diode. d) boiler.

35. Rainbow is formed due to the dispersion of light by;
36. Sun light is made up of various colours was experimentally showed by; [ ]
a) Newton. b) Raman. c) Tyndall. d) Galileo.

37. The colour of the ray which comes out when a red ray of light is passed through a prism is; [ ]
a) green. b) white. c) red. d) yellow.

38. The device used to measure the angle of prism and refractive index is; [ ]
a) spectrometer. b) telescope. c) spectroscope. d) microscope.

39. The phenomenon of the separation of composite light into its constituent colours, is called; [ ]
a) spectrum. b) scattering. c) refraction. d) dispersion.

40. The device which uses ultrasonic sound waves to measure the distance of underwater objects is; [ ]
a) radar. b) scanner. c) sonar. d) detector.

41. Vibrating bodies produce; [ ]
a) light. b) sound. c) heat. d) speed.

42. Speed of sound in air is about; [ ]
a) 320 ms⁻¹. b) 330 ms⁻¹. c) 340 ms⁻¹. d) 350 ms⁻¹.

43. SONAR stands for; [ ]
a) Sound Navigation And Ranging. b) Sound Networking And Researching. c) Sound Navigation And Researching. d) Sound Networking And Ranging.

44. The medium in which propagation of sound is maximum is; [ ]
a) gas. b) liquid. c) vacuum. d) solid.

45. Key assumption of the Big Bang theory is that the universe is; [ ]
a) expanding. b) closed. c) open. d) collapsing.

46. Weight of an object on a planet will be; [ ]
a) different at the same place. b) different at different place. c) same at different place. d) changing with time.

47. To travel from the Sun to the Earth the light takes; [ ]
a) 4 minutes. b) 6 minutes. c) 8 minutes. d) 10 minutes.

48. The nearest star to the earth is; [ ]

49. The visible disc of the sun is called; [ ]
a) chromosphere. b) radiation zone. c) photosphere. d) core.

50. Our galaxy is; [ ]
a) Milkyway. b) Rigel. c) Quasars. d) Sun.
Part B : CHEMISTRY

51. Octaves law was proposed by ;

52. The atomic number and atomic mass of Carbon is ;
   a) 6, 12. b) 5, 10. c) 7, 14. d) 4, 8.

53. In modern periodic table the number of groups and periods are ;
   a) 17, 7. b) 7, 17. c) 18, 7. d) 7, 18.

54. The quantity of matter present in the material is ;
   a) weight. b) gram. c) mass. d) density.

55. The maximum number of electrons present in s-sub shell is ;
   a) 10. b) 8. c) 6. d) 2.

56. The atomic symbol of potassium is ;
   a) P. b) K. c) Po. d) Pt.

57. The molecular formula of sulphuric acid is ;

58. Atomic number of oxygen is ;
   a) 8. b) 16.

59. The lightest element is ;

60. The molecular mass of H2O is ;
   a) 29. b) 22. c) 18. d) 25.

61. An example for solid is ;
   a) water. b) stone. c) milk. d) smoke.

62. The positive path of an electric charge is called ;
   a) nucleus. b) nucleon. c) proton. d) neutron.

63. The electronic configuration of carbon is ;
   a) 1s^22s^2. b) 1s^22s^22p^2. c) 1s^22s^22p^6. d) 1s^22s^22p^4.

64. The value of Avagadro number is ;
   a) 6.028x10^{23}. b) 6.024x10^{23}. c) 6.021x10^{14}. d) 6.023x10^{23}.

65. Molecular formula of Aluminium oxide is ;

66. An example of monovalent is ;
   a) He. b) Fe. c) Cl. d) Kr.
67. In an equation the liberation of gas is indicated by ;  
   a) →.  b) →.  c) ←.  d) ↑.

68. An example for ionic compound is ;  
   a) NaCl.  b) HCl.  c) NaOH.  d) H2O.

69. An example for heterogeneous mixture is ;  
   a) water and sugar.  b) water and milk.  
   c) water and oil.  d) water and salt.

70. An example for metal is ;  
   a) C.  b) N.  c) Cu.  d) O.

71. An atom is made up of these fundamental particles ;  
   a) proton, neutron, nucleon.  b) proton, electron, nuclide.  
   c) proton, neutron, electron.  d) positron, electron, neutron.

72. Nucleons means ;  
   a) Protons and Electrons.  b) Electrons and Neutrons.  
   c) Protons and Neutrons.  d) Radioactive radiations.

73. The number of protons in an atom is called its ;  
   a) atomic number.  b) atomic mass number.  
   c) atomic size.  d) nucleon number.

74. Which one of the following is not a radioactive element ;  
   a) Uranium.  b) Sodium.  c) Polonium.  d) Cadmium.

75. The nucleus formed by the fusion of two deuterium nuclei is ;  
   a) tritium.  b) hydrogen.  c) neon.  d) helium.

76. The energy released during a nuclear reaction is ;  
   a) water energy.  b) atomic energy.  c) wind energy.  d) heat energy.

77. The biggest source of metal on the earth is ;  
   a) earth’s core.  b) oceans.  c) earth’s crust.  d) mountains.

78. Goldsmith mixes a small quantity of copper to pure gold to make it ;  
   a) attractive.  b) hard.  c) brittle.  d) soft.

79. An alloy of iron in which nickel is not used is ;  
   a) steel.  b) invar steel.  c) nichrome.  d) stainless steel.

80. Metals at normal temperature exist as ;  
   a) plasma.  b) gaseous.  c) liquids.  d) solids.

81. Sodium is preserved in ;  
   a) water.  b) petrol.  c) kerosene.  d) diesel.
82. The chemical name of rust is;
   a) iron oxide.          b) hydrogen oxide.  
   c) anhydrous calcium chloride.  d) hydrated oxide of iron.

83. The chemical name of quartz is;
   a) silicon carbide.       b) silicon dioxide.  
   c) silicon chloride.      d) silicon carbonate.

84. A non-metal which is the good conductor of electricity is;
   a) carbon.               b) phosphorous.     
   c) sulphur.              d) graphite.

85. The branch of science which studies the compounds of carbons is called;
   a) Organic chemistry.    b) Inorganic chemistry. 
   c) Physical chemistry.   d) Industrial chemistry.

86. The simplest hydrocarbon is;
   a) ethene.               b) ethane.         
   c) methane.              d) benzene.

87. The molecular formula of benzene is;
   c) C_8H_8.               d) C_{10}H_{10}.

88. A compound made up of hydrogen and oxygen is;
   a) water.                b) hydroxide.      
   c) sulphuric acid.       d) oxyhydroxide.

89. Pure water has;
   a) both colour and taste.   b) neither colour nor taste.  
   c) colour but not taste.   d) taste but not colour.

90. Water that gives lather with soap easily is called;
   a) hard water.           b) pure water.     
   c) soft water.           d) rain water.

91. A method of water conservation is;
   a) deforestation.        b) using more ground water.  
   c) using only bore well water.      d) rain water harvesting.

92. The hardness of water can be removed by adding;
   a) sodium carbonate.   b) sodium bicarbonate.  
   c) calcium carbonate.  d) calcium bicarbonate.

93. The field in which water is used at maximum level is;
   a) animal husbandry.    b) industry. 
   c) agriculture.        d) domestic life.

94. A mixture of calcium silicate and calcium aluminate is called;
   a) cement.              b) glass. 
   c) porcelain.           d) Teflon.

95. The homogeneous mixture of sodium silicate and calcium silicate is commonly known as;
   a) cement.              b) glass. 
   c) porcelain.           d) Teflon.
96. Sea contains metals in the form of; 
   a) precipitate salts. b) floating salts. 
   c) insoluble salts. d) soluble salts. 

97. An example for metals which exists in liquid form is; 
   a) copper. b) bronze. c) mercury. d) iron. 

98. An example for renewable source of energy is; 
   a) solar energy. b) petroleum. c) gas. d) coal. 

99. Heat from the sun reaches us in the form of; 
   a) x-rays. b) gamma rays. c) infrared rays. d) violet rays. 

100. In a solar water heater the pipe is made up of; 
    a) silicon. b) iron. c) steel. d) copper.