St. Xavier's Sr. Sec. School
Delhi-54

Summative Assessment II

SCIENCE – Std. 9

M. Marks : 90

28-2-2017

Time : 3 hrs.

Roll No: | | |

Total printed pages :	06
Total printed questions :	36

General Instructions :

i) This question paper comprises of three sections A and B. You are to attempt both the sections.

ii) All questions are compulsory.

iii) There is no overall choice.

iv) **In Section A**

- Question nos. 1 to 3 carry one mark each.
- Question nos. 4 and 5 carry two marks each.
- Question nos. 6 to 16 are three marks questions.
- Question nos. 17 to 21 are five marks questions.
- Question nos. 22, 23 & 24 are OTBA based questions.

v) **In Section B**

- Question nos. 25 to 33 are multiple choice questions based practical skills, and carry one mark each. You are to select one most appropriate response out of the four provided to you. Write the answer in the answer sheet.
- Question nos. 34 to 36 are two marks questions based on practical skills.

Section A

1. Give an example where both positive and negative work is done simultaneously. (1)

2. Define Isotopes. Give an example. (1)

3. How are phanerogams further classified? (1)

4. Give reasons for the following:

   a) It is difficult to walk on loose sand when we are wearing a pointed heal.
   b) The egg floats on salt water whereas it sinks in pure water. (2)

5. Explain briefly how sound propagates through a medium. (2)

6. State the law of conservation of energy. Establish the law on the basis of the following data:

   An object of mass 4kg is dropped from a height of 4m above the ground. (3)

7. a) Who discovered
      i) Neutrons ii) Electrons.
   b) Draw a sketch of Bohr's model of an atom with three shells.
   c) Summarise the rules for writing the distribution of electrons in various shells for the first eighteen elements. (3)

8. a) What are protochordates?
   b) Name the biologist who
      i) divided monera into eubacteria and archaebacteria
      ii) introduced binomial nomenclature (1+2)

9. a) Define power. What is its SI unit?
   b) Calculate electric energy consumed by two 60W bulbs used for 5 hours a day for 10 days. (3)

10. a) Give the full form of SONAR.
    b) A powerful sound signal sent from a ship is received again after 2.4 seconds. How deep is the ocean bottom? (Speed of sound in water = 1500 m/s). (3)

11. a) The average atomic mass of a sample of an element x is 16.2u. What are the percentages of isotopes ${}^{16}_{8}X$ and ${}^{18}_{8}X$ in the sample?
    b) Find out the number of protons and neutrons in an element ${}^{27}_{13}X$.
    c) An element is having seven protons and eight neutrons in it
       i) Identify the valence shell ii) Find out its valency. (3)

12. a) Define the terms:
       i) Poly atomic ion ii) Chemical formula
    b) Write the chemical formulae of the following compounds
       i) Magnesium Nitrate ii) Aluminium hydroxides.
    c) Give an example each of
       i) Triatomic molecule ii) Cation (3)

13. State any three differences between acute and chronic diseases. (3)

14. a) What are the constituents of a balanced diet?
    b) State any two differences between 'being healthy' and 'disease free'. (1+2)

15. a) Define Density. Give its SI unit.
    b) The volume of a 500g sealed packet is $350cm^3$. Will the packet float or sink in water? What will be the mass of water displaced by this packet? (3)

16. a) What is meant by intensity of sound?
    b) What is ultrasonography?
    c) Why the walls of the auditorium covered with wood or cloth material? (3)

17. a) Define kinetic energy. Derive its mathematical expression for a car of mass m, starting from rest and acquiring a velocity of v m/s in time t.
    b) Certain force acting on a body of 20kg mass changes its velocity from 5m/s to 2m/s.

       Calculate the work done by the force. (5)

18. a) What is the mass of 10 moles of Na_2SO_3?
    b) Find out the number of moles in 6.8 g of NH_3.
    c) Calculate the percentage of Oxygen inwater molecule.
    d) Find out the number of particles in
    i) 5 moles of Carbon atom ii) 4g of Oxygen molecule. (5)
    Atomic mass Na-23, S-32, O-16, N-14, H-1, C-12

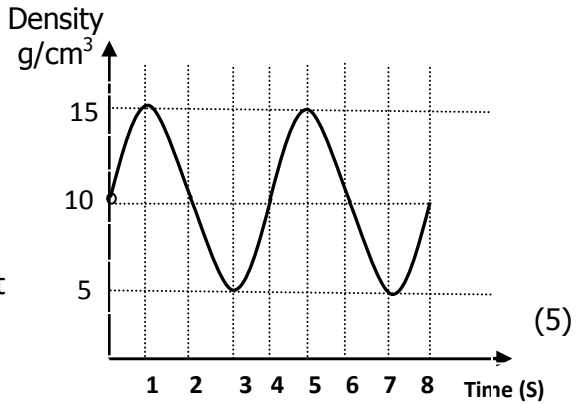
19. a) What are communicable diseases? Give an example.
    b) Explain why it is said that if you had small pox once there are no chances of suffering from it again. (2+3)

20. a) What do you mean by the term 'triploblastic'?
    b) State any two similarities between annelids and arthropods.
    c) Give two differences between bryophytes and pteridophytes (1+2+2)

21. a) Differentiate between longitudinal and transverse wave. (2 points)
    b) Observe the wave given below and find the following characteristics:

    i) Wavelength
    ii) Time period
    iii) Frequency
    iv) Amplitude
    v) Speed of the wave.

    Given that the distance between the crest and trough is 1.5cm. (5)



Theme 1
Solid Waste Management - How to bring best out of waste?
Abstract

Solid Waste Management (SWM) is the efficient disposal of unwanted substances which we can characterize as waste. In our country, practices and methodologies used for SWM are still following the unscientific and inefficient methods and are mainly dependent on the informal sector. Besides, owing to the population explosion, enormous amount of waste is generated leading to the overflowing landfills. These overburdened landfills pose serious implications including environmental, health, air, water and soil pollution and even global warming. Adding to the woes is the large scale dependence on the informal sector for waste segregation, disposal and recycling working on outdated technology.
State-of-the-art technology along with prudent planning is required for scientific disposal of waste in future. Moreover, our country also needs something in terms of policy and guidelines to enable the municipal corporations to run the waste services efficiently.

Every day we generate so much of solid waste,
Isn't this such a disgrace?
There is so much of waste all around,
Heaps of garbage lying on the ground.
These are an open invite,

To all vectors who spread diseases via their bite.
Glass bottles and plastic bags litter the city,
oh! Isn't this a pity?
The things like aluminum tins and foil,
do nothing more than polluting the soil.
All this is harming the environment at an alarming rate,
Let us keep a check before it is too late.

Solid Waste Management has always been an issue of serious concern in a densely populated country like India and this concern is in terms of both health and environment, depending on the following challenges put forth due to usage of conventional methods in handling waste. The issues include:

- Less awareness about reducing waste at source.
- Lack of segregation, poor collection, illegal dumping, open dumping and burning of waste.
- Limited involvement of private sector and communities.
- Relying on Landfills & Composting.
- Generation of the Green House Gases.

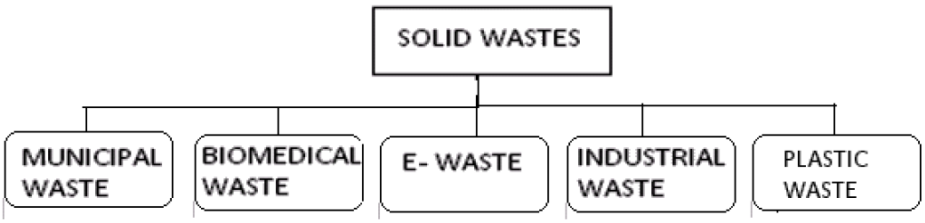
Figure1: land fill site: Despite composting and incineration, a massive amount of waste remains to be sent to landfill sites. Though three of four landfills have exhausted their lifespan, dumping continues there.
[Source: Hindustan Times]

Waste Management encompasses activities ranging from its collection at the source, its transport, different types of treatment and eventually disposal of the treated waste. But, Waste Management is becoming a major bottleneck in clean civic society due to the lack of finances, outdated technologies, and the callous attitude of the society as a whole. Recent outbreak of all vector borne diseases such as dengue, chikungunya, malaria and typhoid are due to the profuse and unhygienic method of dumping waste in open.

Objective of Solid waste management

- To control, collect, process and dispose solid waste in an economical and consistent way with public health protection.
- To reduce the quantity of toxic and hazardous chemicals and materials.
- To maintain waste recycling programs regularly.

- To reuse and recover the material from waste.



A. Municipal Solid Waste

It consists of household waste, construction and demolition debris, sanitation residue and waste from streets. This garbage is generated mainly from residential and commercial complexes. More than 25% of the municipal solid waste is not collected at all. The Government of India has framed Municipal Solid Waste (Management and Handling) Rules 2000, under the Environmental Protection Act, 1986 which frame the guidelines for collection, handling and disposal of solid waste.

Case Study- Kanjurmarg Landfill in Mumbai

Source: http://www.mcgm.gov.in/irj/go/km/docs/documents/Circulars/01101506_Kanjur%20 bioreactor% 20project.pdf

In an endeavor to fulfill the MSW (M&H) Rules 2000, MCGM has proposed Integrated Solid Waste Management Programme (ISWMP). As a part of ISWMP, MCGM has established MSW processing plant at Kanjurmarg. After overcoming various hurdles right from 2009, finally MCGM has succeeded to start the project of Bio-reactor land filling having capacity of processing 3000 MT per day.

Bioreactor technology is an environmental friendly technique in which microbial cultures are used to treat the waste produced and is converted into compost or manures by using the enzymes present in the microbes. Thus, reducing the amount of waste and also generating useful product from the same.

Benefits of Bio-reactor technology: Waste degradation time is reduced and this leads to the increased rate of gas generation. They allow efficient conversion of waste into electricity.

B. Biomedical Waste

According to Biomedical Waste (Management and Handling) Rules, 1998 of India "Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities or in the production or testing of biological samples are referred to as biomedical waste". Improper disposal increases risk of infection and develops resistant microorganisms. Mixing of hazardous waste with the non-hazardous waste results in contamination and makes the entire waste hazardous. The Ministry of Environment has recently released the new Bio-medical Waste Management Rules, 2016 which will bring in a wider and more comprehensive regime for bio waste management.

C. Electronic Waste (E-waste)

The E-Waste constitutes all types of unwanted products obtained from the disposal of electronic gadgets and their manufacturing units. Owing to the present mad race for buying smart phones, laptops to the buying of AC and fridge, e-waste is increasing exponentially due to global warming. This impact is even worse where the people are living near these landfills or dumping sites and are working without any safe guards or protection from the possible health hazards of e-waste exposure. The Central Government under Environment (Protection) Act, 1986 has prepared E-Waste (Management & Handling) Rules, 2015. Most important feature of the e-waste is Extended Producer

Responsibility (EPR). EPR management means setting up an effective channelization system such as collection centers, take back systems, registered dismantler or recycler.

D. Industrial waste

Industrial waste is the waste generated from the industrial units. These are considered to be hazardous as they generally contain toxic substances which are discharged into soil, water or evaporate in the air affecting the growth, development and health of all living organisms (plants and animals). In the industrial sector, the major generators of hazardous waste are metal, chemical, paper, pesticide, dye, refining, and rubber goods industries. The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 notified by the Ministry of Environment distinguish hazardous waste from others such as waste tyres, paper waste, metal scrap and used electronic items. The rules recognize the latter as a resource for recycling and their reuse thereby adding to the country's GDP and reducing the load on the country's resources.

E. Plastic Waste

Plastics, due to their versatility in use and impact on environment can be grouped under a different category of solid waste. Non-judicious disposal of plastics leads to the choking of drains, reducing the soil fertility, killing animals on ingestion and hindering the recharge of groundwater. Thus, conventional plastics, right from their manufacture to their disposal are a major problem to the environment. As per Plastic waste (Management and handling), Rules, 2011, a State Level Advisory committee has to be constituted to oversee the handling, use and disposing of plastic waste. The rules have introduced the concept of Extended Producer Responsibility (EPR) for the first time with respect to plastic waste.

Case study of Jambulingam Street, Chennai

The tar road in the bustling Nungambakkam area has weathered a major flood, several monsoons, recurring heat waves and a steady stream of cars, trucks and auto rickshaws without showing the usual signs of wear and tear. Built in 2002, it has not developed the mosaic of cracks, potholes or craters that typically make their appearance after it rains. Holding the road together is an unremarkable material: a cheap, polymer glue made from shredded waste plastic. Jambulingam Street was one of India's first plastic roads. The environmentally conscious approach to road construction was developed in India around 15 years ago in response to the growing problem of plastic litter. With time, polymer roads proved to be surprisingly durable, winning support among environment scientists and policymakers in India. Today, there are more than 21,000 miles of plastic road in India, and roughly half are in the southern state of Tamil Nadu. Most are rural roads, but a small number have also been built in cities such as Chennai and Mumbai.

Waste hierarchy

The waste hierarchy simply deals with categorization of the waste in 5R's category i.e. reduce, reuse and recycle, refuse and regenerate. This hierarchy is laid down as a reference point for the others to classify and manage the waste in a sustainable manner. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.

Benefits of Waste Management

Waste management done in an efficient and effective manner that not only solves the problem of excess waste but can also generate other benefits which include:

1. **Economic** – Creation of new job opportunities and business activities are the direct implication of effective waste management as is evident from their reuse and recycle.
2. **Social** - By reducing adverse impacts on health by proper waste management practices, social benefits can be reaped easily. One such example is the prevention of the outbreak of the recent vector borne diseases such as dengue and chikungunya.

3. **Environmental** - Reducing, reusing and recycling reduces or eliminates adverse impact on the environment. It also improves the quality of air and water and help in reduction of greenhouse emissions.
4. **Inter-generational Equity** - Effective waste management practices can provide subsequent generations a more robust economy, a fairer and more inclusive society and a cleaner environment.

Effect of solid waste on soil, water and air and the prospective solution

Improper disposal of hazardous and other waste through burning or incineration leads to emission of toxic fumes comprising mercury and heavy metals, causing air pollution and associated health related problems. Municipal dumps or disposal in water bodies leads to leaching of toxic substances in land and water degrading soil, water and air quality.

Key concepts in waste reduction

Source reduction: The procedure to reduce wastes at the point of generation, in contrast to sorting out recyclable components after they have been mixed together for collection.

Role of informal sector (Ragpickers) in Waste management

Waste pickers in Sangam Vihar, New Delhi. Plastic production is growing 2.5 times faster than the GDP in India. Chotu is a waste dealer in Seemapuri in Delhi, who employs around 15 people to segregate mixed waste into paper, plastic and bottles. His monthly income of around Rs. 30,000 is just enough to survive, but his business is always at stake. Waste pickers work for about six days per week and around 9-12 hours per day without protective gear. This puts them at a risk of frequent injuries like cuts and bruises. The disposal of plastic also carries severe health risks as it contains heavy metals like lead, copper, cobalt, selenium, cadmium, and chromium, which are highly toxic. The informal sector is the backbone of waste management, especially plastic and solid waste. The Plastic Waste Management Rules 2016 mention including waste pickers in the waste management system, but do not mention how that would happen. The state pollution control boards or the approving authority must ensure the integration of the informal sector in the waste management plan made by the producer, Municipal corporations, should enumerate waste pickers and other informal waste workers with the help of civil society organizations.

Source: http://www.downtoearth.org.in/news/trashing-the-ragpicker-53516

Source separation: Different categories of recyclables and organics separate at source, i.e. at the point of generation, to facilitate reuse, recycling, and product formation like compost.

Reuse: It includes reusing a product for the same or a different purpose.

Recycling: It is defined as the process of transforming materials into secondary resources for manufacturing new products.

Producer responsibility: Sometimes producers of products or services accept a degree of responsibility for the wastes that result from the products they market, by reducing materials used in production, making recyclable goods, and reducing packaging. The case study of some villages in Rajasthan has shown that the burning of rice husk which is the waste material in the paddy fields, has caused air pollution. Subsequently, it has been utilised as raw material in the formation of bricks, averting the problem of air pollution and adding income to the farmers.

Yamuna is accruing the problem of water pollution by dumping of solid wastes making it difficult to treat the Yamuna water. If the segregation of the waste is performed at the source level than the

additional cost of water treatment can be saved and water can be purified easily. Moreover, if the solid waste is discharged into the soil, the texture of the soil will not be healthy that will further add to the woes of the farmers as the crop productivity will be highly impaired. It can be concluded from the above that segregation at source is the best remedial measure. We have seen the usage of smart composters in kitchens, agricultural waste utilization for commercial purposes like brick formation using rice husk and municipal waste utilization for biofuel production, manure production and so on. Subsequently, waste hierarchy tells us the importance of 5R's (reduce, reuse, recycle, refuse and regenerate). The importance of waste management is that it results in social, economic, environmental and inter-generational benefits. This is proved by the case study of Kanjurmarg which lies in greater Mumbai Municipal Corporation which further reinforces the utilization of waste for production of biofuels and other useful products and of Jambulingam Street, Chennai where plastic waste is used in making roads which is an innovative and practical use of the plastic waste.

22. What do you mean by e-waste? (2)

23. What is bio-medical waste? State few of its harmful effects. (3)

24. Explain how plastic waste is harmful and also tell why are they grouped under a different category of solid waste. (5)

Section B

25. There are three vessels (A, B, C) containing 10% saline water, distilled water and 90% saline water, respectively. A body is immersed in each. In which case, loss of weight is minimum?
    a) A b) B
    c) C d) Same in all three cases (1)

26. Amit was asked to study the pressure exerted on sand by a brick of weight 20N by placing its different faces on sand. He performed the experiment by placing the brick on faces A, B and C successively. Correct observations would be:
    (1)
    a) Depression on sand will be same irrespective of the face on which it is placed
    b) Depression will be maximum when it is placed on face A (l x b)
    c) Depression will be maximum when it is placed on face B (l x h)
    d) Depression will be maximum when it is placed on face C (b x h)

27. While performing an experiment to verify the laws of reflection of sound, the observed experimental difference between the values of angle of incidence and angle of reflection is likely to be minimum when a student chose
    (1)
    a) Wide tube and a faint source of sound.
    b) Narrow tube and a faint source of sound.
    c) Narrow tube and a strong source of sound.
    d) Wide tube and a strong source of sound.

28. A pulse is created in a slinky of length 2 m by a group of four students. They observed that it returned after reflection, at the point of creation 5 times in 10s and calculated the speed as follows: (1)

Student	A	B	C	D
Speed (m/s)	0.4	2.4	2	4

The correct conclusion will be drawn by the student:
a) A b) B c) C d) D

29. In a chemical reaction A and B are reactants and C and D are products. According to law of conservation of mass, the mass of
a) A = C b) A + C = B + D
c) A + B = C + D d) B = D (1)

30. To which group does agaricus belong? (1)
a) Fungi b) bryophyte c) algae d) pteridophyta

31. Which of the following are the amphibians of the plant kingdom?
a) Gymnosperms b) bryophytes c) fungi d) algae (1)

32. The disease causing micro organisms are called
a) Pathogens b) Carriers c) Vectors d) Agents (1)

33. The carrier for 'Malaria' is
a) Aedes mosquito b) Plasmodium
c) both a & b d) female Anopheles mosquito (1)

34. a) State Archimedes principle.
b) Give its two applications. (2)

35. a) State law of conservation of mass.
b) What mass of Silver nitrate will react with 5.85g sodium chloride to produce 14.35g of silver chloride and 8.5 g of Sodium nitrate. (2)

36. What are cryptogams and phanerogams? (2)

-x-x-x-x-x-x-