

Maharashtra State Board
Class IX
Science and Technology Paper – II
Sample Paper 2 Solution

1. (A)

(1)

Protein	Body part
(1) Keratin	(c) skin
(2) Myosin	(a) muscles

(2) In vitro fertilisation (IVF)

(3) Differences between the different levels of biodiversity:

Genetic diversity	Species diversity	Ecosystem diversity
Diversity among the organisms of the same species	Diversity in the species of organisms that occur in nature	Diversity in the many ecosystems present in a particular region

(4) The given symbol emphasises that the use of a bicycle means the use of green energy. Riding a bicycle saves fuel and utilises our own muscular energy. It is the best eco-friendly, non-polluting vehicle.

(5) Lizard

Kingdom: Animalia

Phylum: Chordata

Class: Reptilia

(B)

(1) Telophase

During telophase, the spindle fibres completely disappear from the cell.

(2) Sugar is food for yeast, which bud due to sugar.

Due to the presence of sugar as food, yeast reproduce by budding and increase in number which aids in fermentation.

(3) Cnidaria

Phylum Cnidaria or Coelenterata includes radially symmetrical, acoelomate and diploblastic organisms.

(4) Wind

Wind is a non-conventional source of energy as it is renewable and inexhaustible.

(5) Malaria

Malaria is a parasitic disease which can be cured by drugs.

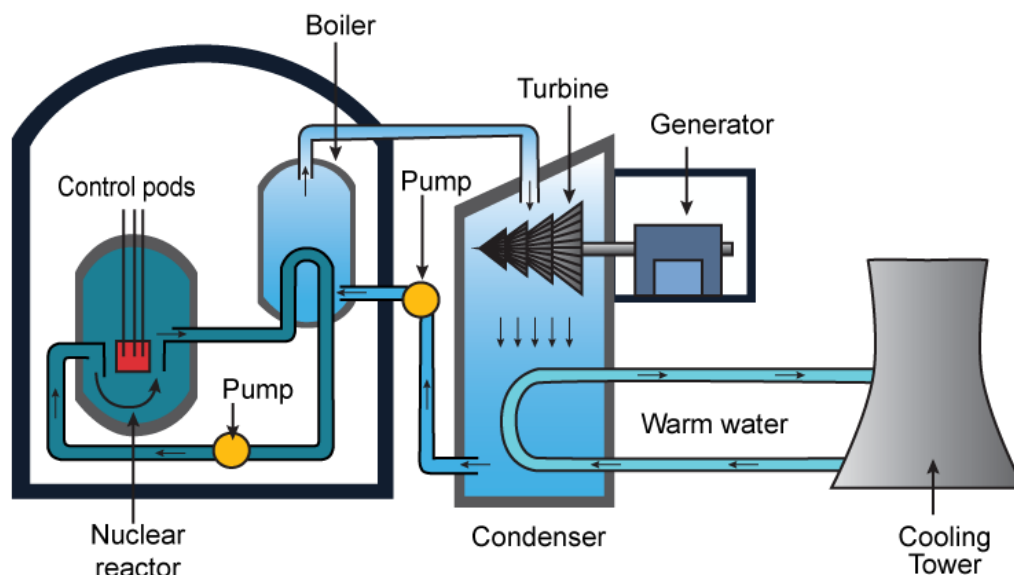
2.

(1) Causes of sterility in males and females:

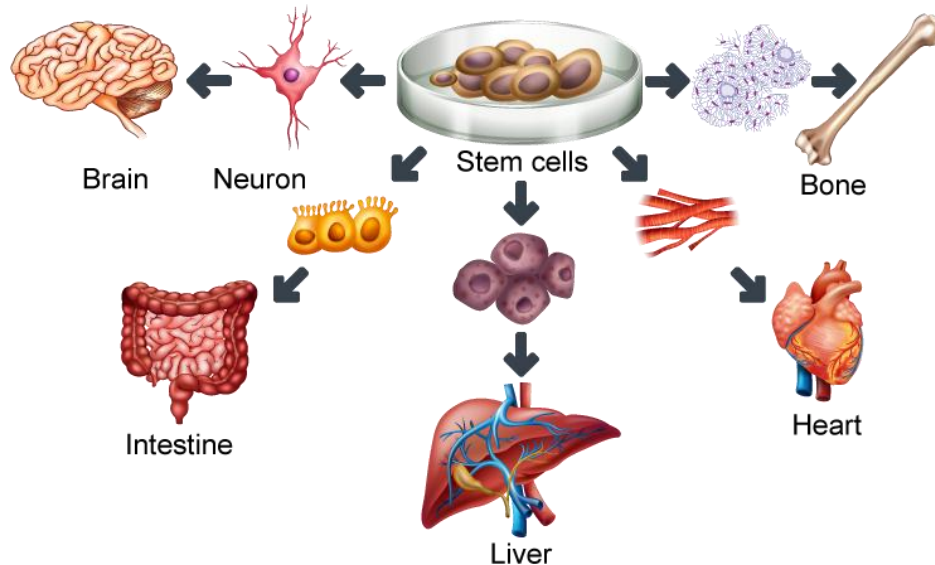
Females	Males
<ul style="list-style-type: none"> Irregularity in the menstrual cycle 	<ul style="list-style-type: none"> Absence of sperms in semen
<ul style="list-style-type: none"> Difficulties in oocyte production 	<ul style="list-style-type: none"> Slow movement of sperms
<ul style="list-style-type: none"> Obstacles in the oviduct 	<ul style="list-style-type: none"> Anomalies in sperms
<ul style="list-style-type: none"> Difficulties in implantation in the uterus 	

(2) Some types of transgenic potatoes that contain edible vaccine against Hepatitis can be cooked. Cooking does not destroy the antigen incorporated into these transgenic potatoes. However, according to some scientists, transgenic potatoes with enterotoxin vaccine if cooked show denaturation of the vaccine.

(3) Working of a nuclear power plant:



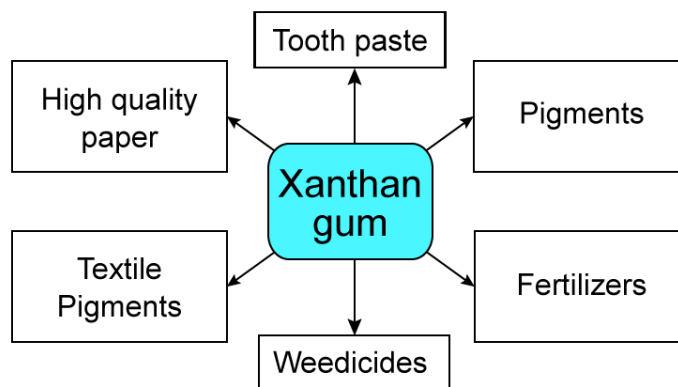
(4) **Stem cells and organ transplantation**



(5) **Pre-disaster management steps for gas leakage**

- Open the windows and doors immediately.
- Call the gas agency customer care department for help.
- Do not turn on the lights and electrical equipment to avoid accidents.

(6) **Uses of xanthan gum:**

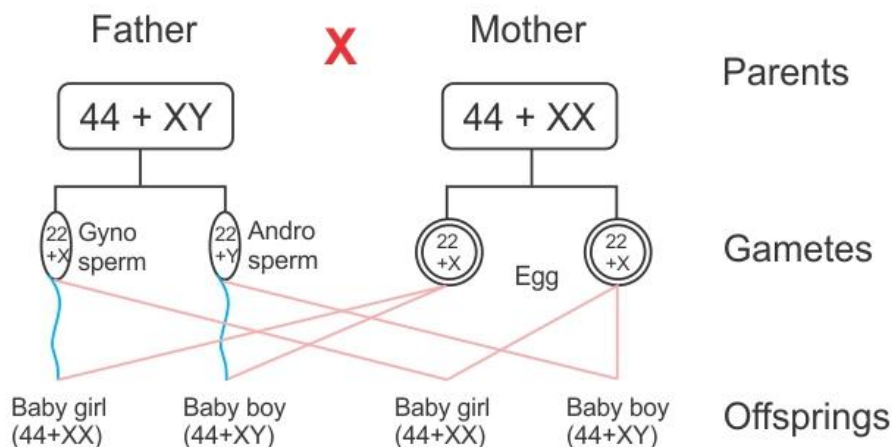


(7) **Activities which fall under the jurisdiction of Cyber Crime Law:**
(Any two)

- Bank transactions by procuring the PIN of someone.
- Misuse of written material of someone or illegal sale of the same.
- Hacking information of government institutes and companies.

3.

(1) Gender of the child is indeed determined by the male partner of the couple.



- A male has one X chromosome and one Y chromosome (XY). Therefore, half of the male gametes or sperms will have X chromosomes and the other half will have Y chromosomes.
- A female has both X chromosomes (XX). Therefore, female gametes or ova always have X chromosomes.
- If a sperm carrying the X chromosome fertilises an ovum which always carries the X chromosome, then the combination of sex chromosomes will be XX, and hence, the child born will be a female (girl).
- If a sperm carrying the Y chromosome fertilises an ovum, then the combination of sex chromosomes will be XY, and hence, the child born will be a male (boy).
- Thus, the male (father) is responsible for the sex of the baby.

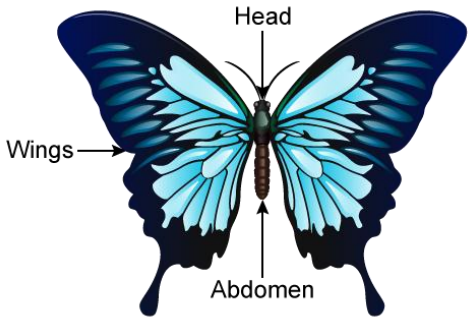
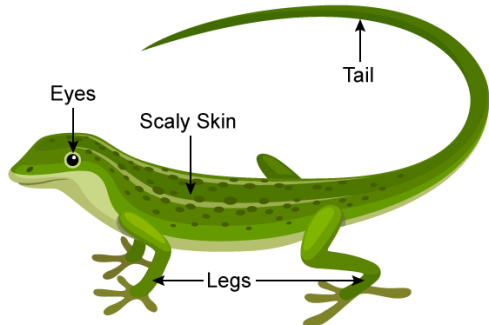
(2) Advantages of solar energy:

- No fuel is burnt in energy generation through solar radiation.
- It does not create any type of pollution.
- The technology can be utilised in regions with abundant sunlight.
- Solar energy is eco-friendly and green energy.

Limitations of solar energy:

- Sunlight is available only during the day time.
- Solar power generation gets affected during the rainy season and in cloudy conditions.
- Power produced by solar cells is DC, while most domestic equipment/appliances work on AC.

(3)

Organisms	Sketch	Classification
(a) Butterfly		Kingdom: Animalia Division: Non-chordata Phylum: Arthropoda Class: Insecta
(b) Lizard		Kingdom: Animalia Division: Chordata Sub phylum: Vertebrata Class: Reptilia

(4)

(a) Sequence of nucleotides present on one strand of DNA:

3' GCTTAAGAGCATA 5'

(b) Transcribed sequence on the mRNA molecule:

5' CGAAUUCUCGUAU 3'

(c) Enzyme RNA polymerase takes part in transcription.

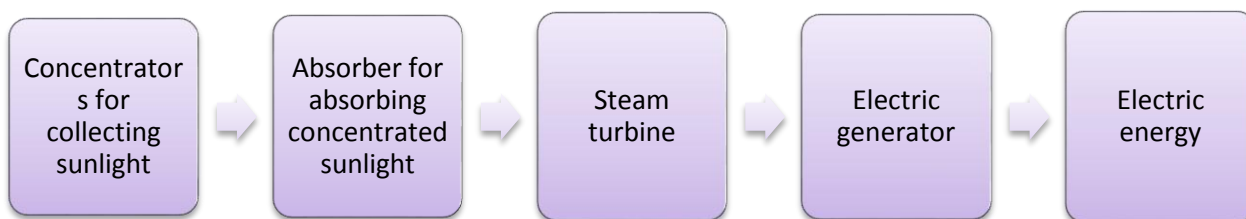
(5) **Voluntary organisations in India that work for the environment:**

(Any three)

- Bombay Natural History Society, Mumbai
- Chipko Centre, Tehri Garhwal
- Centre for Environment Education, Ahmedabad
- CPR Environment Group, New Chennai
- Gandhi Peace Foundation, Environment Cell, Delhi
- Kerala Science Literature Council, Thiruvananthapuram
- Indian Agro Industries Foundation, Pune
- Vikram Sarabhai Community Science Centre, Ahmedabad

(6) **Solar thermal power plant:**

- Solar radiation can be used to produce thermal energy.
- This solar thermal energy is used for electricity production.
- Solar radiation is absorbed by many reflectors to reflect and concentrate it.
- This solar energy is converted to heat energy which is then used to make steam which drives turbines and generates electricity through generators.

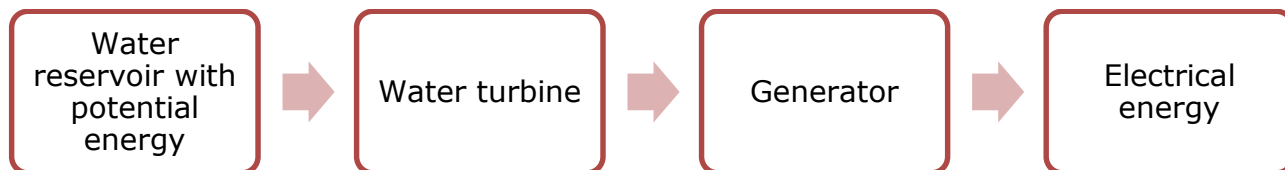


(7) **Main aspects of a disaster management cycle:**

- Preparation: A plan is prepared to minimise destruction in an event of disaster.
- Redemption: A plan is prepared for minimising damage to society and the country.
- Preparedness: A plan is chalked out to get a quick response from the public and administration.
- Impact of disaster: A review is conducted for the intensity of various aspects of disaster and disaster management.
- Response: The response given just before the disaster and immediately after the disaster is analysed in this step.
- Resurgence: This stage involves the extent of welfare and rehabilitation work done after the disaster.
- Restoration: This stage is the period of return of normalcy after the disaster and is useful for the progress of the nation and rehabilitation.

4.

- (1) Hydroelectric energy is a conventional type of energy. Kinetic energy in flowing water or potential energy in water is a conventional source of energy. Potential energy in water stored in a dam is converted to kinetic energy. Kinetic energy of flowing water rotates the turbine and the turbine generates electricity.



Advantages:

- Since there is no combustion, no pollution is caused by a hydroelectric power plant.
- As there is sufficient water in a dam, electricity can be generated whenever required.
- Water reservoirs are replenished in the rainy season, leading to the continuous generation of electricity.

Problems:

- Construction of a dam leads to rehabilitation of people.
- Storage of water in a dam may submerge villages and towns in the event of heavy rainfall and subsequent flooding.
- Such flooding can also submerge forests as well as fertile lands.
- Obstruction of the flow of river water has adverse effects on living things in river water.

(2)

- (a) The given stage is Telophase as the nuclear membrane is formed around each set of chromosomes reached at the poles. Two daughter nuclei and nucleoli can be seen and the spindle fibres completely disappear.
- (b) 1 – Daughter chromosome, 2 – Nuclear membrane
- (c) Karyokinesis is the technical term for the division of a nucleus.
- (d) Anaphase comes before the stage of Telophase.
- (e) Meiosis results in half the number of chromosomes in daughter cells.