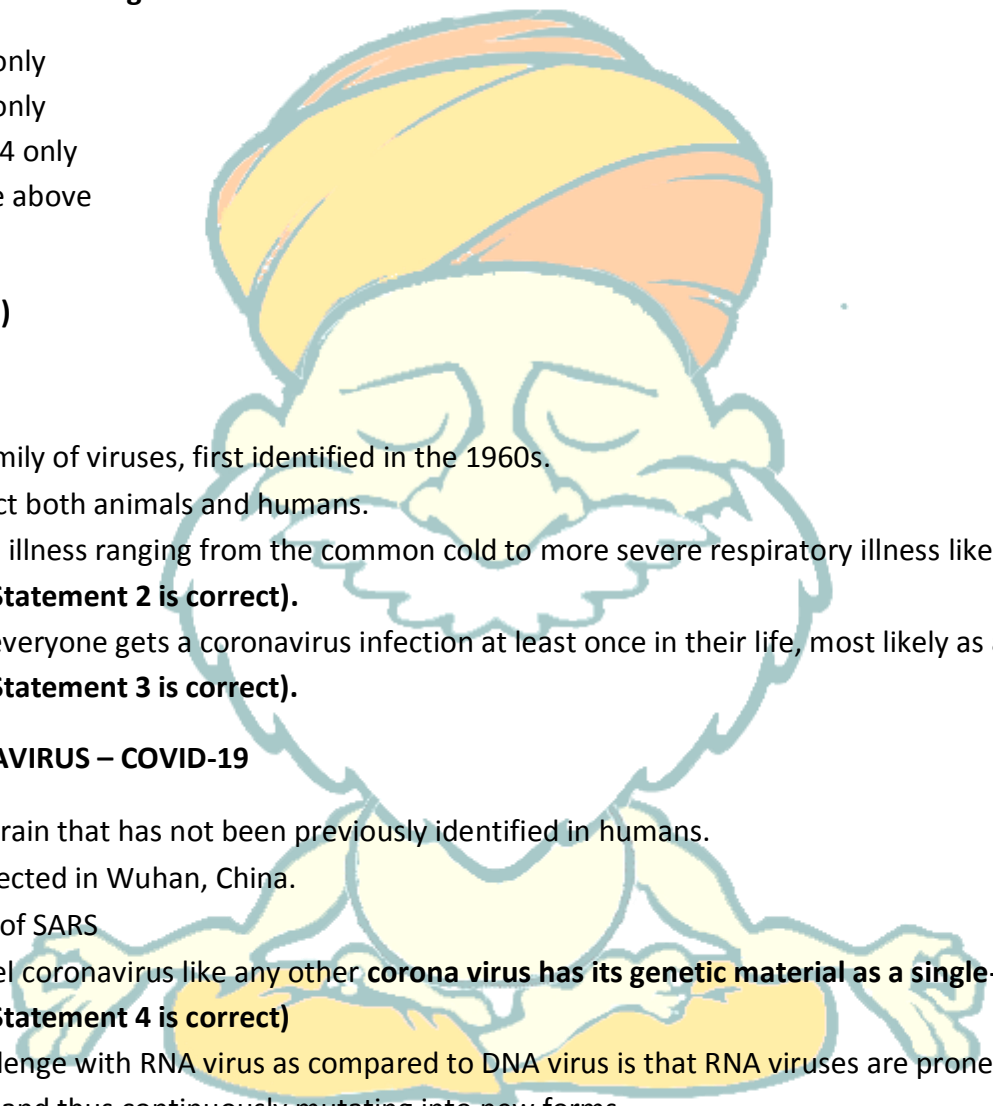
IASbaba 60 Day plan 2020- Day 35 Science and technology

Q.1) Consider the following statements about the Coronavirus:

1. It is zoonotic in nature.
2. Middle-East Respiratory Syndrome (MERS) is also caused by coronavirus.
3. Almost everyone gets a coronavirus infection at least once in lifetime.
4. It is RNA based Virus.

Which of the statements given above are correct?

a) 1 and 4 only
b) 1 and 2 only
c) 1, 2 and 4 only
d) All of the above



Q.1) Solution (d)

CORONAVIRUS

- Large family of viruses, first identified in the 1960s.
- Can infect both animals and humans.
- It causes illness ranging from the common cold to more severe respiratory illness like **SARS & MERS. (Hence Statement 2 is correct).**
- Almost everyone gets a coronavirus infection at least once in their life, most likely as a young child. **(Hence Statement 3 is correct).**

NOVEL CORONAVIRUS – COVID-19

- A new strain that has not been previously identified in humans.
- First detected in Wuhan, China.
- Relative of SARS
- The novel coronavirus like any other **corona virus has its genetic material as a single-stranded RNA**. **(Hence Statement 4 is correct)**
- The challenge with RNA virus as compared to DNA virus is that RNA viruses are prone to quick changes and thus continuously mutating into new forms.

TRANSMISSION

- These viruses are **zoonotic** – transmitted from animals to humans. **(Hence Statement 1 is correct)**
- Human-to-Human: Mother to baby: Breastfeeding and placenta
- WHO has named the new coronavirus disease as ‘Covid-19’

- Remdesivir: An anti-viral drugs under trials in Wuhan 2019

Q.2) Consider the following statements with regard to virus -

1. All viruses have an outer lipid layer that protects them when they are outside the cell.
2. Coronavirus has different structure than rotavirus.
3. Virus is not a living entity.
4. Viruses have RNA as the nuclear material and completely lack DNA.

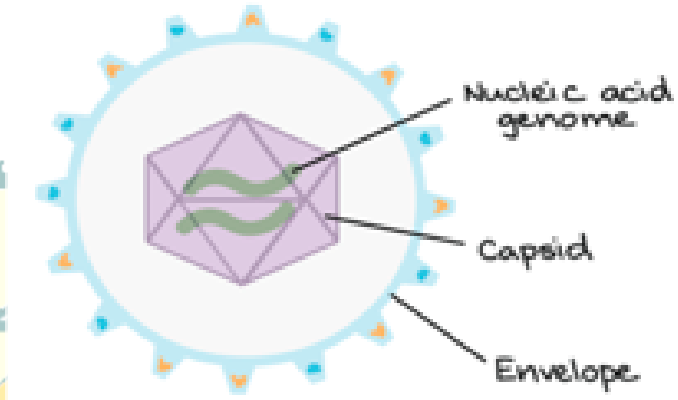
Select the correct option -

a) 3 only
b) 2 and 3 only
c) 1 and 3 only
d) All of the above

Q.2) Solution (b)

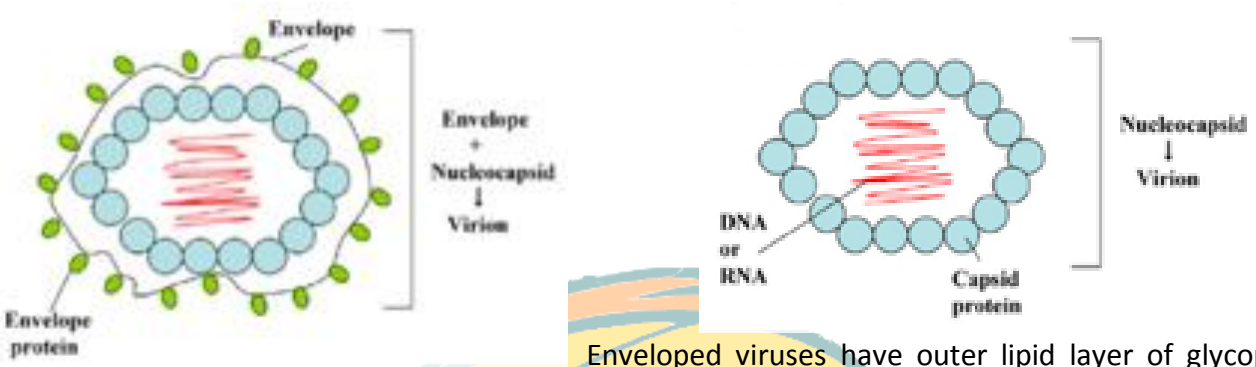
Basics of Virus

- Virus does not have DNA producing machinery. So it enters into the cell and uses the machinery of the cell. It does so by reprogramming the host DNA instead of producing its own DNA cell.
- Because they can't reproduce by themselves, viruses are not considered living. **(Hence Statement 3 is correct)**
- Viral particles consist of two or three parts:
  - **the genetic material made from either DNA or RNA. (Hence Statement 4 is incorrect)**
  - a protein coat, called the capsid, which surrounds and protects the genetic material
  - an envelope of lipids that surrounds the protein coat when they are outside a cell



Virus could be Enveloped viruses and naked virus depending on presence and absence of outer lipids layer. **(Hence Statement 1 is incorrect)**

Enveloped viruses and naked virus



Enveloped viruses have outer lipid layer of glycoprotein and lipoproteins (envelop). They can only survive under special conditions ("wet conditions") and they are generally transmitted in "wet" body fluids, like blood or respiratory droplets. Naked viruses can survive under harsh conditions.

The protein capsid of naked viruses is less susceptible to environmental conditions (lipid solvents, pH, temperature etc) than enveloped viruses. Example of naked virus – **norovirus, rotavirus, Human papillomavirus (HPV) and polio** etc **(Hence Statement 2 is correct)**

Function of the envelope

- Protection against the host immune system (as these membranes are usually obtained from host cells)
- Receptors usually located on that envelop which recognize the host cells.
- Contain ligands helping in the attachment to the host cell surface
- These membranes are also effectively infused to the cell membrane and release the core of virus or its genetic material into the cell.

Thus, **losing the membrane will impair the infectivity of the virus.**

Coronaviruses (including COVID-19) have a lipid membrane that makes up their outer coating.

Q.3) Consider the following statements with regard to m-RNA Vaccine –

1. It triggers the body into producing some of the viral proteins itself.
2. It was first approved for Polio.
3. It could also trigger the innate immune system.
4. It will be easier and quicker to produce than traditional vaccines.

Select the correct option –

a) 1 and 3 only
b) 1, 2 and 3 only
c) 1, 3 and 4 only
d) 1, 2 and 4 only

Q.3) Solution (c)

Note – a number of RNA vaccines are under development to combat the 2019–20 coronavirus pandemic. This is a very important topic for coming prelims examination.

What is m-RNA?

- Every cell in an organism contains all of the information needed to manufacture every protein in its body.
- The DNA is the storehouse of information, an instruction book to build these proteins.
- The message to build these proteins from DNA to the cytoplasm of the cell is carried by a middle man called m-RNA.

m-RNA based Vaccines

A vaccine basically trains the immune system to recognize parts of a virus (antigen) and fight it before it enters the cell.

An RNA vaccine is a novel type of vaccine which is composed of the nucleic acid RNA, packaged within a vector such as lipid nanoparticles.

Traditional vaccines are made up of small or inactivated doses of the whole disease-causing organism, or the proteins that it produces, which are introduced into the body to provoke the immune system into mounting a response.

mRNA vaccines, in contrast, trick the body into producing some of the viral proteins itself. They work by using mRNA, or messenger RNA, which is the molecule that essentially puts DNA instructions into action. Inside a cell, mRNA is used as a template to build a protein. 'An mRNA is basically like a pre-form of a protein and its (sequence encodes) what the protein is basically made of later on. **(Hence Statement 1 is correct)**

To produce an mRNA vaccine, scientists produce a synthetic version of the mRNA that a virus uses to build its infectious proteins. This mRNA is delivered into the human body, whose cells read it as instructions to build that viral protein, and therefore create some of the virus's molecules themselves. These proteins are

solitary, so they do not assemble to form a virus. The immune system then detects these viral proteins and starts to produce a defensive response to them.

There are two parts to our immune system: **innate** (the defenses we're born with) and **acquired** (which we develop as we come into contact with pathogens). Classical vaccine molecules usually only work with the acquired immune system and the innate immune system is activated by another ingredient, called an adjuvant. Interestingly, **mRNA in vaccines could also trigger the innate immune system**, providing an extra layer of defence without the need to add adjuvants. **(Hence Statement 3 is correct)**

All kinds of innate immune cells are being activated by the mRNA. This primes the immune system to get prepared for an endangering pathogen and thus the type of immune response that is triggered is very strong.

And **by getting the human body to produce the viral proteins itself, mRNA vaccines cut out some of the manufacturing process** and should be easier and quicker to produce than traditional vaccines. **(Hence Statement 4 is correct)**

So far, no such vaccine has been licensed for infectious disease. (Hence Statement 2 is incorrect)

Q.4) Hydroxy-chloroquine drug, recently in news, is most commonly used to treat which of the following disease?

a) Tuberculosis
b) Malaria
c) Typhoid
d) AIDS

Q.4) Solution (b)

The medicine is used to treat **malaria** and lupus.

The National Task Force COVID-19 constituted by Indian Council of Medical Research (ICMR) recommended the use of hydroxy-chloroquine for the treatment of COVID-19 for high-risk cases.

Q.5) In which of the following ways hand sanitizers protect against viral infection?

1. Denaturation of protein structures that stick out of the lipid structure

2. Dissolving the outer lipid layer
3. Stressed mutation of the virus
4. Dissolution of protective protein called capsid

Select the correct option -

a) 1 and 2 only
b) 1, 2 and 3 only
c) 1, 2 and 4 only
d) All of the above

Q.5) Solution (a)

How do hand sanitizers work?

- The most feasible explanation is denaturation of protein structures that stick out of the lipid structure. It also dissolves the lipid envelope. **(Hence Statement 1 and 2 are correct)**
- For a virus, sanitizers also work by disrupting the virus's outer coat. [However, they are not effective against viruses that do not have these coatings, norovirus, rotavirus, Human papillomavirus (HPV) and polio etc]
- For a bacterium, they work by disrupting its cell membrane.
- WHO recommends hand sanitizer that has at least 60 percent alcohol.

Advantages of hand sanitizers

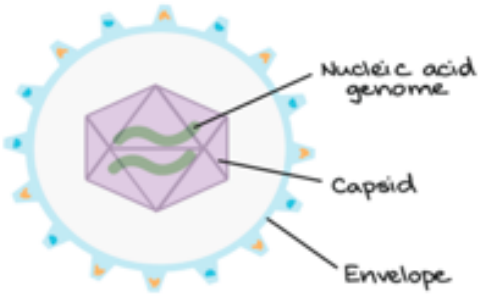
- The bacteria it kills don't develop a resistance to it, so alcohol doesn't lose effectiveness with continued use.
- Ethanol is so powerful that in high concentrations, it's better at getting rid of— Escherichia coli, Serratia marcescens and Staphylococcus saprophyticus — compared with washing hands with regular or antibacterial soap.

Limitation of hand sanitizers

- Alcohol doesn't work for all germs, such as norovirus; Clostridium difficile, which can cause life-threatening diarrhea; or Cryptosporidium, a parasite that causes a diarrheal disease.
- Hand sanitizers also don't remove harmful chemicals like pesticides or heavy metals, nor does hand sanitizer work well on especially dirty or greasy hands.
- Swallowing alcohol-based hand sanitizers can cause alcohol poisoning.

Statement 3 is too farfetched and should be eliminated by common sense.

Statement 4 is incorrect – capsid is the inner layer in the structure of the virus. Only the outer layer gets dissolved.



Q.6) Consider the following pairs of diseases and affected plants:

Diseases	Plant
1. Yellow rust	Wheat
2. Fall armyworm	Rice
3. Pink bollworm	Cotton
4. Sheath blight disease	Maize

Which of the above pairs have been correctly matched?

a) 1 only
b) 1 and 3 only
c) 1, 2 and 3 only
d) All of the above

Q.6) Solution (b)

YELLOW RUST

- It is a fungal disease which turns crop's leaves yellowish and stops photosynthesis activity.
- It is one of the three wheat rust diseases principally found in wheat grown in cooler environments (northern latitudes or cooler seasons)

FALL ARMYWORM

- Invasive Specie
- Spodoptera frugiperda is a species in the larval life stage of a fall armyworm moth.
- Native of America
- First detected in Karnataka this year (now has spread to W. Bengal and Gujarat)

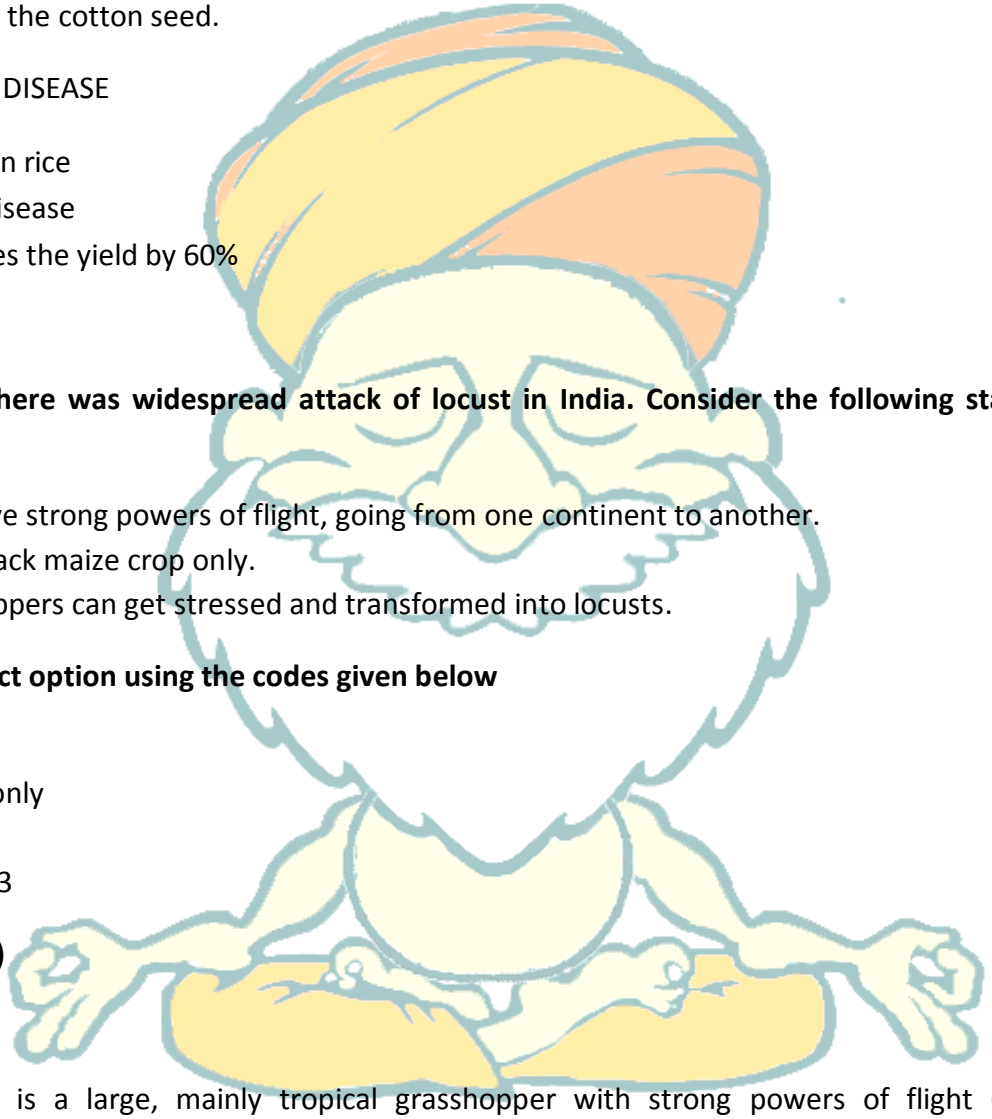
- Attacks crops particularly maize.

PINK BOLLWORM

- Infects cotton
- BT cotton grown in India is genetically modified for developing resistance to the pink bollworm pest in the crop.
- This is done by inserting 'Cry1Ab' and 'Cry2Bc' genes from the soil bacterium, Bacillus thuringiensis (Bt), into the cotton seed.

SHEATH BLIGHT DISEASE

- Disease in rice
- Fungal disease
- Decreases the yield by 60%



Q.7) Recently there was widespread attack of locust in India. Consider the following statements about locust:

1. They have strong powers of flight, going from one continent to another.
2. They attack maize crop only.
3. Grasshoppers can get stressed and transformed into locusts.

Select the correct option using the codes given below

a) 1 only
b) 1 and 2 only
c) 1 and 3
d) 1, 2 and 3

Q.7) Solution (c)

LOCUST

- A locust is a large, mainly tropical grasshopper with strong powers of flight (unlike ordinary grasshoppers)
- Under dry and stressful condition grasshoppers are getting stressed and transformed into locusts.
- Only four species of locusts are found in India
    - Desert locust
    - Migratory locust
    - Bombay Locust

    - Tree locust
- Locust adults can eat their own weight every day, posing huge threat to food security.

Q.8) Consider the following statement with respect to antimicrobial resistance:

1. India is a member of Global Antimicrobial Resistance Surveillance System (GLASS) launched by WHO.
2. Genetic predisposition of some people also may cause antimicrobial resistance.
3. Kerala is the first state to develop an action plan to manage antimicrobial resistance.

Select the correct option using the codes given below

a) 1 only
b) 1 and 2 only
c) 2 and 3 only
d) All of the above

Q.8) Solution (d)

GLOBAL ANTIMICROBIAL RESISTANCE SURVEILLANCE SYSTEM (GLASS)

- WHO system launched in 2015
- Aim: Support global surveillance and research in order to strengthen the evidence base on antimicrobial resistance (AMR) and help informing decision-making and drive national, regional, and global actions.
- **India has enrolled to GLASS system.**

NATIONAL ACTION PLAN TO COMBAT ANTIMICROBIAL RESISTANCE 2017

- Adopted by Delhi declaration
- Objectives
    - enhancing awareness
    - strengthening surveillance
    - improving rational use of antibiotics
    - reducing infections
    - promoting research
- In addition, support to neighbouring countries in collective fight against infectious diseases.
- **Kerala, followed by Madhya Pradesh, has developed an state-level action plan to manage antimicrobial resistance (AMR).**

Q.9) What is Candida auris that was recently in news?

a) An arterioid
b) Man-made mineral
c) Multidrug-resistant fungus
d) Yeast cultivated for food security

Q.9) Solution (c)

CANDIDA AURIS

- Multidrug-resistant fungus (yeast)
- It can cause many different types of infections such as bloodstream infection, wound infection, ear infection etc.

Q.10) Consider the following statements about TrueNat that was in news recently?

1. TrueNat can be used to detect multi-drug resistant TB strain too.
2. Diagnosis of TB becomes cheaper and faster with TrueNat compared to existing molecular diagnostic testing tool.

Select the correct option using the codes given below

a) 1 only
b) 2 only
c) Both 1 and 2
d) None of the above

Q.10) Solution (c)

TRUENAT

WHO has endorsed TrueNat, an indigenous molecular diagnostic tool for TB.

- Early diagnosis is extremely important in fighting TB.
- Widely followed diagnosis methods include Sputum smear microscopy which studies phenotype of the pathogen from the sputum sample of the infected patient.
- However studying the phenotype makes this method less sensitive as it cannot detect drug-resistant pathogen.
- On the other hand molecular studies have enabled study of genotype of the pathogen resulting in detection of drug resistant strain.

COMPARISON BETWEEN Genexpert AND TrueNat

PARAMETERS	GENEXPERT	TRUENAT
Sensitivity and Specifity	Same	Same
Time required	More time	Less Time
Airconditioning	Required	Not Required
Power	Continuous Electricity Supply	Battery operated
Cost advantage	Expensive as test for MDR TB and TB diagnostic is done simultaneously	Cheaper since second test for MDR TB is carried on only after positive TB test

- While sputum microscopy has only about 50% sensitivity, Molecular Test has been found to have higher sensitivity upto 89%.
- Currently Genexpert is the molecular diagnostic test commonly used. However, it is run on electricity and air-conditioned atmosphere. The advantage of TrueNat over GeneExpe
- TrueNat is portable as it is battery operated.

Q.11) Which of the following is not a benefit of seaweeds, from the point of view of health and nutrition?

a) Edible Seaweeds are high-calorie nutrient-dense food items.
b) They are rich in vitamins A and C.
c) They are a good source of minerals such as Ca, Mg, Zn, Se and Fe.
d) They also have a high level of vegetable proteins and omega 3 and 6 fatty acids.

Q.11) Solution (a)

SEAWEEDS: A SOLUTION TO HUNGER

- Also called brown algae
- Multi-cellular photosynthetic eukaryotes.
- Very similar to plants, the only difference being they live only in water or on very moist land surfaces, in other words they grow in the tidal zone.
- Exhibit highest photosynthesis efficiency due to moist conditions.
- As a result they contribute to about 50% of all photosynthesis in the world.

ADVANTAGES OF EDIBLE SEAWEED

- **Low-calorie** and nutrient-dense food items. **(Hence statement 1 is incorrect)**
- Rich in vitamins A and C.
- Good source of minerals such as Ca, Mg, Zn, Se and Fe.
- High level of vegetable proteins and omega 3 and 6 fatty acids.
- Since Seaweeds live in water they do not require irrigation.
- They do not require pesticides, fertilizers.

Q.12) Which of the following benefit can come out of our understanding of human genome sequence?

1. Genetic disorders like cystic fibrosis or sickle cell anemia can be identified.

2. Personalized medication can be prescribed.
3. Treatments for common cancers can be developed.

Select the correct option using the codes given below

a) 1 only
b) 1 and 2 only
c) 1 and 3 only
d) All of the above

Q.12) Solution (d)

Genome sequencing is figuring out the order of DNA nucleotides, or bases, in a genome—the order of As, Cs, Gs, and Ts that make up an organism's DNA. The human genome is made up of over 3 billion of these genetic letters. In a sense, a genome sequence is simply a very long string of letters in a mysterious language.

The genetic maps form the basis of positional cloning, the ability to isolate disease genes based on patterns of inheritance. This will help in identification of genetic disorders like cystic fibrosis or sickle cell anaemia. Using gene editing technique such diseases can also be treated. (Hence statement 1 is correct)

Personalized medicine is an emerging practice of medicine that uses an individual's genetic profile to guide decisions made in regard to the prevention, diagnosis, and treatment of disease.

Genomics is playing a big role in the emergence of personalized medicine, because it gives us a window in a very specific molecular way into those differences between us and allows the opportunity for making individual predictions about disease risk that can help somebody choose a prevention plan that is right for them. It also allows the possibility in some instances of picking the right drug at the right dose for the right person instead of the "one size fits all" approach to drug therapy. (Hence statement 2 is correct)

Whole genome sequencing of tumour cells could help predict the prognosis of a patient's cancer and offer clues to identify the most effective treatment. (Hence statement 3 is correct)

Q.13) Consider the following statements regarding National Stem Cell Registry:

1. It comes under the ageis of Ministry of Science & Technology.
2. A person enrolling for Pradhan Mantri Jan Arogya Yojana will be automatically enrolled in National Stem Cell Registry.
3. It will help in treating patients with blood-related disorders.

Which of the statements given above is/are correct?

a) 1 and 3 only

b) 2 and 3 only
c) 3 only
d) All of the above

Q.13) Solution (c)

NATIONAL STEM CELL REGISTRY

- India is developing a National Stem Cell Registry of its own.
- **It is an initiative of Ministry of Health and Family Welfare. (Hence statement 1 is incorrect)**
- It is a government managed database of unrelated bone marrow donors.
- Main aim is to find matching donors for treating patients with **blood-related disorders** such as
    - blood cancers (lymphoma, leukemia)
    - thalassaemia,
    - sickle-cell anaemia,
    - haemophilia

  (Hence statement 3 is correct)

- **The registration to the database is voluntary. (Hence statement 2 is incorrect)**

IMPORTANCE

- About 3.5-5Lakh people in India suffer from blood-related disorders like thalassaemia which require frequent blood transfusions. The only cure for blood related disorders is bone-marrow transplantation.
- Matching Donors can be found with ease.
- For bone-marrow transplantation, the donor and patient should have exactly the same white blood cell type.
- Siblings usually have the exact match and thus suitable for bone-marrow transplantations.
- Thus matching donors is extremely low and the database will help connect unrelated matching donors

Q.14) Consider the following statement with regard to World Health Organisation (WHO) –

1. It is an intergovernmental body with headquarter in Geneva, Switzerland.
2. It reports to the Economic and Social Council.
3. Any new disease is named by WHO only.

Select the correct option –

a) 1 only

b) 1 and 2 only
c) 2 only
d) All of the above

Q.14) Solution (b)

World Health Organization (WHO)

- The United Nations' specialized agency for Health was founded in 1948.
- Its headquarters are situated **in Geneva, Switzerland.**
- There are 194 Member States, 150 country offices, six regional offices.
- It is an inter-governmental organization and works in collaboration with its member states usually through the Ministries of Health.
- The WHO provides leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends.
- In 1997, WHO rolled out the Global Public Health Intelligence Network (GPHIN), which took advantage of information on the Internet to function as an early warning system for potential epidemics.

World Health Assembly

- It is the decision-making body of WHO
- Each Member is represented by not more than three delegates, one of whom is designated by the Member as chief delegate.
- The Health Assembly determines the policies of the Organization, supervises the financial policies, reviews and approves the budget.
- It reports to the Economic and Social Council in accordance with any agreement between the Organization and the United Nations.

WHO and India

- India became a party to the WHO on 12 January 1948.
- Regional office for South East Asia is located in New Delhi.
- In 1967, the WHO launched the Intensified Smallpox Eradication Programme. With a coordinated effort by Indian government with the World Health Organization (WHO), smallpox was eradicated in 1977.
- India began the battle against the disease in response to the WHO's 1988 Global Polio Eradication Initiative with financial and technical help from World Bank.

- The WHO Country Cooperation Strategy – India (2012-2017) has been jointly developed by the Ministry of Health and Family Welfare (MoH&FW) and the WHO Country Office for India (WCO).

WHO came up with the new guidelines in May 2015. The WHO identified the best practices to name new human diseases in consultation and collaboration with the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO). The main aim behind this exercise was to "minimise unnecessary negative impact of disease names on trade, travel, tourism or animal welfare, and avoid causing offence to any cultural, social, national, regional, professional or ethnic groups".

According to the guidelines, name of a new disease should consist of a combination of terms. These terms consist of a generic descriptive term based on clinical symptoms (respiratory), physiological processes (diarrhoea), and anatomical or pathological references (cardic). It can refer to specific descriptive terms such as those who are afflicted (infant, juvenile, and maternal), seasonality (summer, winter) and severity (mild, severe). The name can also include other factual elements such as the environment (ocean, river), causal pathogen (coronavirus) and the year the new disease is first detected with or without mentioning the month.

The year is used when it becomes "necessary to differentiate between similar events that happened in different years". In the case of COVID-19, coronavirus has caused other diseases such as the Severe acute respiratory syndrome (SARS) and Middle East Respiratory Syndrome (MERS).

Q.15) Moscow declaration recently seen in news is related to which of the following?

a) Multi Drug Resistance
b) Malaria Elimination
c) Non communicable diseases
d) Global TB response

Q.15) Solution (d)

MOSCOW DECLARATION

- Global commitment to end TB by 2030
- Adopted at 1st WHO Global Ministerial Conference on Ending Tuberculosis in 2017

Q.16) Which of the following statements is/are correct regarding the Global Antimicrobial Resistance (AMR) Research and Development (R&D) Hub?

1. It is European Union led initiative
2. It is an initiative to tackle the threat of resistant pathogens.
3. India is a member, represented by Ministry of Health and Family Welfare.

Select the correct answer using the code given below:

a) 1 and 2 only
b) 2 only
c) 2 and 3 only
d) All of the above

Q.16) Solution (b)

India has recently joined the Global Antimicrobial Resistance (AMR) Research and Development (R&D) Hub as a new member.

India is represented by department of Biotechnology, Ministry of Science & Technology in New Delhi.

The Global AMR R&D Hub was launched in 2018 in the margins of the World Health Assembly, following a call from G20 Leaders in 2017.

The Global AMR R&D Hub supports global priority setting and evidence-based decision-making on the allocation of resources for AMR R&D through the identification of gaps, overlaps and potential for cross-sectoral collaboration and leveraging in AMR R&D.

The operation of the Global AMR R&D Hub is supported through a Secretariat, established in Berlin and currently financed through grants from the German Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Health (BMG).

Q.17) Consider the following statements:

1. It is an initiative of the Public Health Foundation of India to eliminate malaria from India by 2030.
2. There is no vaccine against malaria.

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.17) Solution (d)

MOSQUIRIX is the 1st ever vaccine against malaria **(Hence statement 2 is incorrect)**

Note: At the East Asia Summit in 2015, India pledged to eliminate the disease by 2030. Following this public declaration, India launched the five-year National Strategic Plan for Malaria Elimination. This marked a shift in focus from malaria "control" to "elimination".

MERA INDIA INITIATIVE

- Launched by ICMR to eliminate malaria by 2030. **(Hence statement 1 is incorrect)**
- Malaria Elimination Research Alliance (MERA) India – a conglomeration of partners working on malaria control – in order to prioritise, plan and scale up research to eliminate the disease from India by 2030
- Malaria is the most deadly vector-borne disease.
- Malaria is caused by a Plasmodium Parasites that is transmitted from one human to another by the bite of infected Anopheles mosquitoes.

E-2020 INITIATIVE

It is part of the Global Technical Strategy for Malaria 2016- 2030 endorsed by WHO.

Q.18) India has collaborated with which of the following for **New Influenza Research Programme**?

a) Japan
b) USA
c) European Union
d) Russia

Q.18) Solution (c)

Indian and European Union collaborated for new influenza research programme to develop Next Generation Influenza Vaccine.

The programme will get fund under EU funding programme for research and innovation called 'Horizon 2020'

Q.19) Which of the following initiative comes under the aegis of Ministry of Health and Family Welfare?

1. SAANS campaign

2. National Health Resource Repository Project
3. UMMID initiative
4. Replace program

Select the correct option

a) 1 and 2 only
b) 1, 2 and 3 only
c) 1, 2 and 4 only
d) All of the above

Q.19) Solution (a)

SAANS campaign – Social Awareness and Action to Neutralise Pneumonia - launched by Ministry for Health and Family Welfare

NATIONAL HEALTH RESOURCE REPOSITORY PROJECT

- India's 1st ever healthcare establishment census to collect data of all public and private healthcare establishments.
- It is launched by the Union Ministry of Health and Family Welfare.
- Indian Space Research Organisation (ISRO) is technology partner for this project mainly for data security.

UMMID INITIATIVE

- UMMID (Unique Methods of Management and treatment of Inherited Disorders) has been launched to tackle inherited genetic diseases of newborn babies.
- **It is launched by the Ministry of Science & Technology**
- Shifting of focus from "sick-care" to "wellness" by promoting the prevention of genetic diseases.
- NIDAN (National Inherited Diseases Administration) Kendras are established under the initiative to provide counselling, prenatal testing and diagnosis, management, and multidisciplinary care in Government Hospitals wherein the influx of patients is more.

WHO'S REPLACE Program

Strategic approach to eliminating industrially-produced transfat from national food supplies by 2023.

Q.20) Consider the following pairs:

Report	Releasing Institution
1. India state-level disease burden initiative report	Niti Aayog
2. Healthy states progressive India report	NITI Aayog + MoH&FW + World Bank
3. Global nutrition report	WHO
4. Performance of health outcome index	MoH&FW

Which of the pair have been incorrectly matched?

a) 1 and 2 only
b) 1, 2 and 4 only
c) 2 only
d) 2, 3 and 4 only

Q.20) Solution (c)

Report	Releasing Institution
1. India state-level disease burden initiative report	It is a joint initiative of the Indian Council of Medical Research (ICMR), the Public Health Foundation of India (PHFI) and the Institute for Health Metrics and Evaluation (IHME) in collaboration with the Ministry of Health and Family Welfare
2. Healthy states progressive India report	NITI Aayog + MoH&FW + World Bank
3. Global nutrition report	Expert Group of the Global Nutrition Report; **WHO is a partner**.
4. Performance of health outcome index	NITI Aayog

Q.21) JAGA Mission of Odisha protects the rights of which of the following?

a) Women victims
b) Tribals
c) Slum dwellers
d) Manual Scavengers

Q.21) Solution (c)

- **Odisha Liveable Habitat Mission (OLHM) or JAGA Mission** is Odisha state government's initiative to grant land **rights to thousands of slum dwellers**.
- Under the programme 1,725 slums were surveyed using drones and GIS technology, while door-to-door household survey also conducted to grant land rights certificates (LRCs) to 52,682 families.
- Exercise also involved community mobilisation to get the slum dwellers to agree and cooperation in the exercise.
- JAGA Mission won the bronze at World Habitat Awards given by World Habitat, a UK-based organisation in partnership with UN-Habitat.

Q.22) Consider the following statements about Typbar TCV vaccine:

1. It is a typhoid vaccine developed by National Institute of Immunology.
2. It is a conjugate vaccine made using a combination of two different components.

Which of the statements given above is/are *NOT* correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.22) Solution (a)

Statement 1	**Statement 2**
Incorrect	**Correct**
Bharat Biotech has developed a typhoid vaccine (Typbar TCV) has better efficacy than the previously used vaccinations in preventing typhoid fever. Typbar TCV, an antigen is chemically liked to a carrier protein to create more powerful combined immune response.	**It is a type of conjugate vaccine** which has already been pre-qualified by the World Health Organization's Strategic Advisory Group of Experts on Immunization (WHO-SAGE). **Conjugate vaccines are made using a combination of two different components.**

Q.23) Sometimes seen in news, 'Article 6 of Paris Agreement' deals with

a) Climate Action Targets
b) Transparency norms

c) Loss and Damage
d) Climate Cooperation Mechanisms

Q.23) Solution (d)

- **Article 6 of the Paris Agreement** aims at promoting integrated, holistic and balanced approaches that will assist governments in implementing their nationally determined contributions (NDCs) through **voluntary international cooperation**.
- Article 6 could also establish a policy foundation for an emissions trading system, which could help lead to a global price on carbon.
- Under this mechanism, countries with low emissions would be allowed to sell their exceeding allowance to larger emitters, with an overall cap of greenhouse gas (GHG) emissions, ensuring their net reduction.

Q.24) Which of the following are advantages of the Light detection and ranging (LiDAR) technology?

1. Data can be collected quickly and with high accuracy
2. Can be used day and night
3. Can be used to map inaccessible and featureless areas
4. It is not affected by extreme weather

Select the correct answer using the code given below:

a) 2 and 4 only
b) 1, 2 and 3 only
c) 1, 3 and 4 only
d) 1, 2, 3 and 4

Q.24) Solution (d)

- **Light detection and ranging (LiDAR)** is a remote sensing method that uses light in the form of a pulsed laser to measure ranges to the Earth.
- The technology is used to map the land and is used to measure seafloor and riverbed elevations.

Advantages of using LiDAR

- **Data can be collected quickly and with high accuracy**: LiDAR is an airborne sensing technology which makes data collection fast and comes with extremely high accuracy as a result of the positional advantage.
- **Capable of collecting elevation data in a dense forest**: LiDAR technology is capable of collecting elevation data from a densely populated forest thanks to the high penetrative abilities. This means it can map even the densely forested areas.
- **Can be used day and night**: LiDAR technology can be used day and night thanks to the active illumination sensor. It is not affected by light variations such as darkness and light. This improves its efficiency.
- **It is not affected by extreme weather**: LiDAR technology is independent of extreme weather conditions such as extreme sunlight and other weather scenarios. This means that data can still be collected under these conditions and sent for analysis.
- Does not have any geometry distortions
- It can be integrated with other data sources
- It has minimum human dependence
- Surface data has a higher sample density
- Can be used to map inaccessible and featureless areas

Disadvantages of LiDAR

- High operating costs in some applications
- Ineffective during heavy rain or low hanging clouds
- Degraded at high sun angles and reflections
- Unreliable for water depth and turbulent breaking waves
- No International protocols
- Elevation errors due to inability to penetrate very dense forests
- The laser beams may affect human eye in cases where the beam is powerful
- Inability to penetrate thick vegetation
- Requires skilled data analysis techniques
- Low operating altitude of between 500-2000m

Q.25) Consider the following statements about Indian Ocean Dialogue (IOD):

1. The IOD is a flagship initiative of the Indian Ocean Naval Symposium.
2. It is a Track 1.5 discussion involving both officials and non-officials.
3. The recent Indian Ocean Dialogue (IOD) was held in Chennai.

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) 2 and 3 only
d) 1 and 3 only

Q.25) Solution (b)

Statement 1	Statement 2	Statement 3
Incorrect	**Correct**	**Incorrect**
The IOD is a **flagship initiative of the Indian Ocean Rim Association (IORA).** Indian Ocean Rim Association is an inter-governmental organisation aimed at strengthening regional cooperation and sustainable development within the Indian Ocean region. The Association has 22 member states and 9 dialogue partners.	**It is a Track 1.5 discussion**, encouraging an open and free flowing dialogue by academia and officials on strategic issues of the Indian Ocean Region. Track 1.5 diplomacy **involves both officials and non-officials** (business leaders, business organizations and all possible non diplomats).	**The 6th Indian Ocean Dialogue (IOD) was held in Delhi.**

Q.26) Consider the following statements with respect to 'Front of Packet Labelling (FoPL)'.

1. It was included within the draft Food Safety and Standards (Labelling and Display) Regulations, 2019.
2. It is aimed at making consumers aware of food products that are high in fat, sugar and salt content.

Select the correct statements

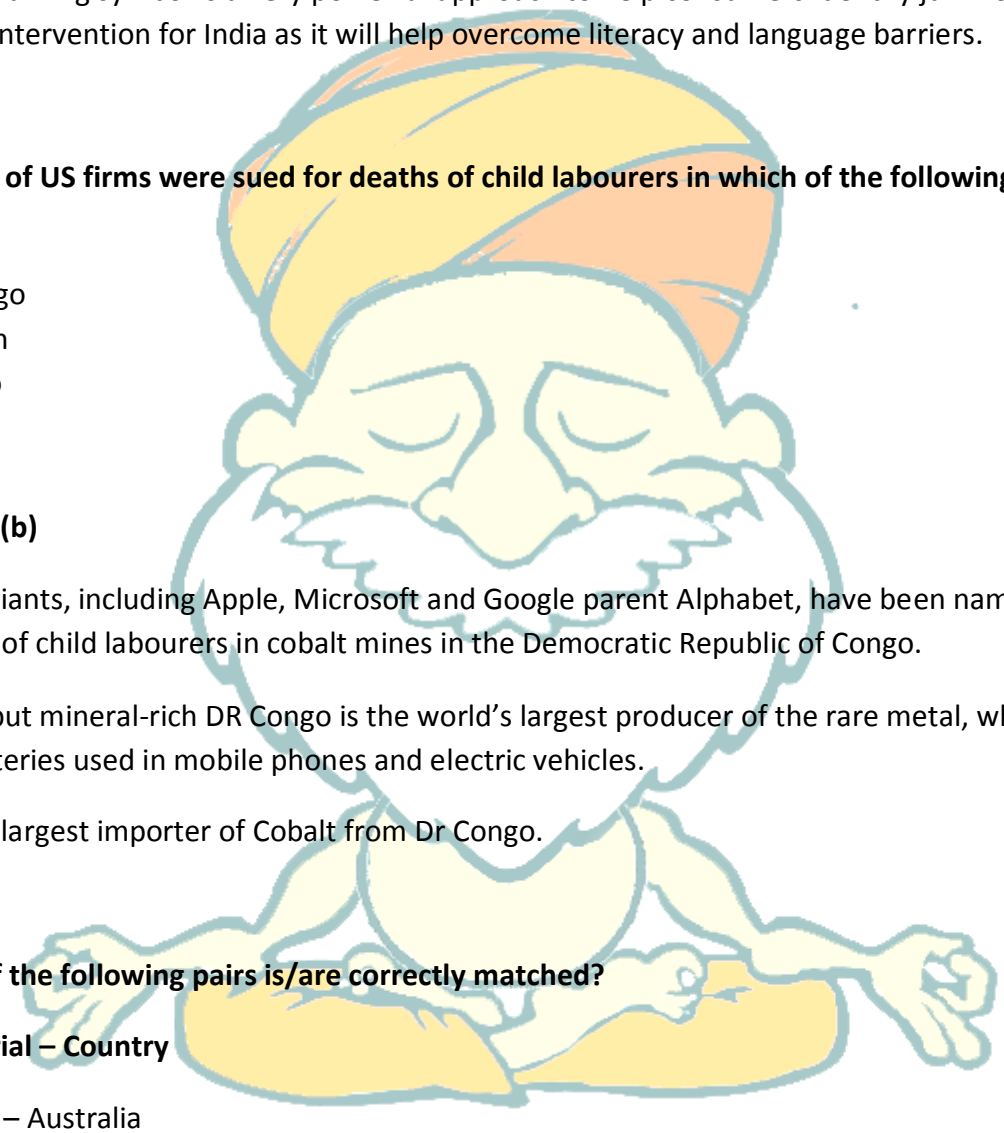
a) 1 Only
b) 2 Only
c) Both 1 and 2
d) Neither 1 nor 2

Q.26) Solution (c)

Food Safety and Standards Authority of India's (FSSAI) recently introduced draft Food Safety and Standards (Labelling and Display) Regulations, 2019.

The most important part of the draft rules is the Front-of-Pack (FoP) labelling and 'red-coloured' warning symbol to help identify foods high in calories, saturated fats, transfats, added sugar and salt. The proposed FoP label will depict information on number of calories and quantity of salt, added sugar and fats per serve. The label will also include how much of the RDA is exhausted by eating one serve of the packaged food. If salt, added sugar and fats in a packaged food exceeds a certain threshold level, the red warning symbol will appear on the package.

Red-coloured warning symbol is a very powerful approach to help consumers identify junk foods. It is a much-needed intervention for India as it will help overcome literacy and language barriers.



Q.27) A couple of US firms were sued for deaths of child labourers in which of the following countries?

a) Mexico
b) DR Congo
c) Pakistan
d) Lesotho

Q.27) Solution (b)

Five U.S. tech giants, including Apple, Microsoft and Google parent Alphabet, have been named in a lawsuit over the death of child labourers in cobalt mines in the Democratic Republic of Congo.

Impoverished but mineral-rich DR Congo is the world's largest producer of the rare metal, which is crucial for making batteries used in mobile phones and electric vehicles.

India is second largest importer of Cobalt from Dr Congo.

Q.28) Which of the following pairs is/are correctly matched?

Material – Country

1. Lithium – Australia
2. Graphite – South Africa
3. Manganese – India

Select the correct code:

a) 1 Only
b) 2 and 3

c) 1 and 3
d) 1, 2 and 3

Q.28) Solution (a)

Lithium – Australia

Graphite – China

Manganese – South Africa

Q.29) Which of the following countries are members of the 'East Mediterranean Gas Forum (EMGF)'.

1. Cyprus
2. Israel
3. Italy
4. Palestine
5. Egypt

Select the correct code:

a) 1, 2, 3 and 5
b) 1, 3 and 5
c) 2, 3, 4 and 5
d) All of the above

Q.29) Solution (d)

Members - Cyprus, Greece, Israel, Italy, Jordan, Palestine and Egypt. The East Med Gas Forum is evolving into a permanent organisation, with the support of the European Union and the encouragement of the US and France.

HQ – Cairo

Q.30) 'Provisions for reservations for SCs/STs and Anglo- Indians' are extended under

a) Article 334

b) Article 331
c) Article 333
d) Article 131

Q.30) Solution (a)

Provisions for reservations for SCs/STs and Anglo- Indians are extended under Article 334 (a) and (b) of the Constitution.