

UPSC CAPF (AC) 2019 Paper 1: Solution

1. Ans. C.

A phreatophyte is a deep-rooted plant that acquires a significant portion of the water that it requires from the phreatic zone (i.e. the zone of saturation) or the capillary fringe right above the phreatic zone. Phreatophytes are those plants that are supplied with surface water and often have their roots continuously in touch with the moisture.

A phreatophyte is that plant that absorbs its water from a continuous source on the ground. They can usually get located along streams where there is a uniform flow of surface or groundwater in areas where the water table is closer to the surface. These plants are adapted to grow in the arid environments.

Phreatophytes live in areas of standing or running water, in arid areas and along the riverbeds and areas, apparently dry, where the water table is very shallow and near the surface. These plants have very deep roots that are able to reach to the water table. Phreatophytes are not only the characteristic of arid or in desert zones, but also of wetlands, depressions, floodplains that hold water and estuaries.

2. Ans. D.

Liberal Democracy is the category of representative (indirect) Democracy, which is operated in the United Kingdom and many parts of the Western World.

It possesses a variety of features:

• Firstly, it encourages political, social, and economic competition among the political parties and the pressure groups.

• The Government gets its authenticity from the people through regular elections, in which the majority of adults can vote, with a good option of candidates and a secret ballot.

• It also provides that the Constitutional Government based on formal, generally legal, rules. The Government should be accountable to the people for what the actions it does, with Parliament holding its accountability.

• It even provides guarantees of civil liberties and individual rights. There should be a free press, speech, and in majority countries a written Bill of the rights that favor the rights of the individual.



• It supervises the political authority with potentially unlimited power. A central objective of liberal Democracy as a system is that it tries to controls the power of the main branches of the Government over the individuals.

Liberal Democracy was get developed from the ideas of ideological thinkers such as Adam Smith, who thought that individuals should have reasonable freedom, especially in trade and business. Meanwhile, John Locke believed that people must be able to replace governments from power if the running Government Is abusing it.

3. Ans. C.

Significance of the DPSP-

The Directive Principles place a role model before the legislator of India, which shows that light while they formulate the policies and laws. These are basically a code of conduct for the legislature and for the administrators of the country. They show the path to the leaders of the country, which takes the country to attains the ideal of the Constitution, which get embodied in the Preamble.

• The Fundamental rights are directly guaranteed by the Constitution, but on the other hand, the directive principles are only a few guidelines, and they also require legislation for their implementation. For instance, Panchayati Rat Act was passed to implement the directive of the article 40.

Comparison of Fundamental Rights and DPSPs-

• While most Fundamental Rights have some negative connotation, i.e., they prohibit the State from doing something, while the DPSPs direct the State for doing something.

• While Fundamental Rights are enforceable in court, DPSPs are not enforceable in court.

• While the aim of the FRs is to establish political Democracy, on the other hand, the objective of DPSPs is to establish a social and economic order.

• While FRs have a legal sanction, DPSPs have moral sanction rather.

• While Fundamental Rights are individualistic, on the other hand, DPSPs are collectivistic i.e. they promote the welfare of entire community.

4. Ans. B.



It does not refer to the dominant class character; in fact, it is based on the Specialization of labor.

At the end of the 19th century, it was a German sociologist and the author of 'The Protestant Ethic' and also of the 'Spirit of Capitalism (1905),' Max Weber, who was the first one to use and describe the term bureaucracy. This is also called as the *bureaucratic theory of management, bureaucratic management theory*, or also recognized as the Max Weber theory.

He believed bureaucracy was the most significant way to set up an organization, administration, and also the organizations. Max Weber believed that bureaucracy was a better concept than traditional structures. In a bureaucratic organization, each person is treated equally, and the division of labor is clearly outlined for each employee.

He even instituted the belief that an organization must have a fixed hierarchical structure and clear rules and regulations, and also the lines of authority which governs it.

Max Weber bureaucracy ideally has these following characteristics:

- Specialization of labor
- A formal set of rules & regulations
- Well defined hierarchy within the organization
- Impersonality in the application of the rules

5. Ans. D.

Lord Mountbatten came to India with a desire to the partition of India and the quick transfer of responsibility, starting in the form of Dominion Status, to the Indian Governments for the portions of a divided India. On June 3rd, 1947, Lord Mountbatten put forward his plan, which indicates the steps for the answering of India's political problem.

Provisions of the Mountbatten Plan were:

• British India was to be partitioned into two dominions – India & Pakistan.

• The constitution framed by the Constituent Assembly would not be applied to the Muslim majority areas (as these would become Pakistan in the future). The question of an independent constituent assembly for the Muslim majority areas would be decided by these provinces.



• As per this plan, the legislative assemblies of the Bengal and Punjab met and voted for the partition. Accordingly, it was made decided to partition these 2 provinces along religious lines.

• The legislative assembly of Sind would than decide whether to join the Indian constituent assembly or not. As a result, It decided to go with Pakistan.

• A referendum was to be conducted on NWFP (North-Western Frontier Province) to decide which dominion was to join. As a result, NWFP decided to join Pakistan while Khan Abdul Gaffar Khan rejected and boycotted the referendum.

• The date decided for the transfer of power was to be 15 August 1947.

• To fix the international boundaries among the two countries, the Boundary Commission was get established chaired by Sir Cyril Radcliffe. The commission duty was to demarcate Bengal and Punjab into the 2 new countries.

• The British monarch would no longer use the title 'Emperor of India'.

On the midnight of 14th and 15th August 1947, the dominions of Pakistan & India respectively came into existence. Lord Mountbatten was get appointed as the first Governor-General of independent India, and M.A. Jinnah became the Governor-General of independent Pakistan.

6. Ans. D.

The phenomenon of DPSP is not an indigenous one. Our Constitution makers borrowed this idea from the Irish Constitution (Article 45); it has its genesis in the Spanish Constitution. Part IV of the Constitution of India deals with the Directive Principles of the State Policies.

To better understand the meaning of the directive principle of state policy, we need to first understand the meaning of each word i.e. Directive + principle + state + policy , which indicates that these are the principles that direct the state when it makes policies for its own people. These DPSPs also acts as a guideline for the state and are required to be taken into consideration when coming up with any new law, but a citizen can't compel the state to follow the DPSPs.

List of DPSPs under the Indian Constitution:



Article Number	Article's description	
Article 36	Defines State as same as that of Article 12 unless the	
	context otherwise defines.	
Article 37	Application of the Principles contained in this part.	
Article 38	It authorizes the state to protect a social order for the	
	promotion of the welfare of people.	
Article 39	Certain principles of policies to be followed by the	
	state.	
Article 39A	Equal justice and free legal aid.	
Article 40	Organizations of the village panchayats.	
Article 41	Right to work, to education and to that of public	
	assistance in certain cases.	
Article 42	Provision for just and humane conditions of work and	
	alos for maternity leaves.	
Article 43	Living wage etc. for the workers.	
Article 43-A	Participation of the workers in management of	
	industries.	
Article 43-B	Promotion of the cooperative societies.	
Article 44	Uniform civil code for all the citizens.	
Article 45	Provision for the early childhood care and educa	
	to children below the age of 6 years.	
Article 46	Promotion of education and economic interests of SC,	
	ST, and for the other weaker sections.	
Article 47	Duty of the state to increase the level of nutrition and	
	the standard of living and to improve the public health.	
Article 48	Organization of the agriculture and animal husbandry.	
Article 48-A	Protection and improvement of the environment and	
	safeguarding the forests and wildlife.	
Article 49	Protection of the monuments and places and objects	
	of national importance.	
Article 50	Separation of judiciary from that of the executive.	
Article 51	Promotion for the international peace and security.	

7. Ans. C.

Starting point is O, and the directions & distances traveled are marked in the below diagram.

 \therefore A's distance from the starting point O is OT which is 5 m

So, the answer is 5m



8. Ans. B.

Given that the first day of a normal year was Sunday Odd days of the mentioned year = 1 (Since it is an ordinary year)



Hence First day of the next year = (Sunday + 1 Odd day) = Monday Therefore, the last day of the mentioned year = Sunday

9. Ans. C.

x² + y² = 1, u² + v² = 1xu + yv = 0

Let

$$x = \frac{-1}{\sqrt{2}}, y = \frac{1}{\sqrt{2}}$$
$$u = \frac{1}{\sqrt{2}}, v = \frac{1}{\sqrt{2}}$$

These all value satisfied the above equations

Now for the

$$x^{2} + u^{2} = 1$$

$$\left(\frac{-1}{\sqrt{2}}\right)^{2} + \left(\frac{1}{\sqrt{2}}\right)^{2} = 1$$

$$\frac{1}{2} + \frac{1}{2} = 1$$
1st equation
$$1 = 1$$

Now for the 2nd equation

$$y^{2} + v^{2} = 1$$

$$\left(\frac{1}{\sqrt{2}}\right)^{2} + \left(\frac{1}{\sqrt{2}}\right)^{2} = 1$$

$$\frac{1}{2} + \frac{1}{2} = 1$$

$$1 = 1$$

Now for the 3rd



$$xu + yv = 0$$

$$\left(\frac{-1}{\sqrt{2}}\right)\left(\frac{1}{\sqrt{2}}\right) + \left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{\sqrt{2}}\right) = 0$$

$$\frac{-1}{2} + \frac{1}{2} = 0$$

$$0 = 0$$

Hence all the statement are true.

10. Ans. B.

Let the length of a side of square be a, and the radius of the circle be r.

Since the square and circle have the same perimeter.

Therefore, $2\pi r = 4a$ $\Rightarrow r = 2a/\pi$

Т

hus, Area of the circle/Area of the square = $\pi r^2 / a^2$

Hence, the area of the circle is greater than the area of the square.

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11. Ans. D.
3^9 + 3^12 + 3^15 + 3^9 * 3^m= 3^9*[1+3^3+3^6+3^m]
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Where: m = n - 9

Since 3^9 is a cube of 3^3 , let us find the value of 3^m which result in a cube for expression $[1+3^3+3^6+3^m]$

Therefore, $1 + 27 + 729 + 3^m = 757 + 3^m$

i. When m=1, then $757+3^{1}=760$ (which is not a cube)

ii. When m=2, then $757+3^2=766$ (which is not a cube)

iii. When m=3, then $757+3^3=784$ (which is not a cube)

iv. When m=4, then $757+3^{4}=838$ (which is not a cube)



v. When m=5, then 757+3^5=1000 (which is a cube, i.e. 10^3)

Hence, m=5

So, n = 9 + 5 = 14

Therefore, 14 is the answer.

12. Ans. D.

The geography of the rest of India is such that, during the Cretaceous period, the north-west area of the Peninsula was turned into a great center of vulcanicity of a type which has not a single parallel among the volcanic phenomena of the present world.

13. Ans. A.

Gwadar Port is located on the shores of the Arabian Sea in the city of Gwadar, which is located in the Pakistani province of Balochistan. The port is situated 533 km from Pakistan's largest city, i.e., Karachi, and is approximately 120 kms from the Iranian border. It is situated 380 km (i.e. 240 mi) away from Oman and to the near key oil shipping lanes from the Persian Gulf.

<u>Ports's significance</u>: The port holds great strategic and economic importance for Pakistan. It is the third significant deep seaport of Pakistan after Karachi and that of Qasim ports. It is situated at the cross-junction of the international sea shipping and of oil trade routes. Gwadar may act as an international trade hub for Pakistan.

14. Ans. C.

Suitable graphical conditions required for wheat cultivation are:

1. **Temperature:** The temperature required for wheat during the growing season is about 10-15°C, and at the time of harvesting, it is about 25-30°C. The weather must be warm and moist during the initial stage of the growth and sunny and dry in the later on stages. The average temperature of the hottest month must not exceed 20°C. A frost-free period of 100 days is usually needed, but some fast-ripening varieties can get mature only within 90 days.

2. **Rainfall:** The quantity of rainfall needed for wheat cultivation varies between 30 cm to 100 cm. The most wheat lands of the temperate regions have an annual rainfall of 38-80 cm. The spring wheat regions of Canadian Prairies only receives approx. Around 46 cm of rainfall, but it comes in the initial summers when the wheat is growing. Wheat is even grown in areas having a lesser amount of rainfall, i.e., around 25 cm. This



has been done by adopting the dry farming method. Also, where the irrigation facilities are available, wheat gets cultivated in drylands also.

3. **Soils:** The soil most suitable for wheat is either light clay or that of heavy loam. The world's best wheat comes from that of chernozem soils in the 'Black Earth' areas of the Ukrainian Steppes, the dark brown soil of North America, and even the grey-brown podzolic soils of the deciduous forest region.

4. **Topography:** Wheat is grown in the plain as well as in the areas of rolling topography, which provides sufficient drainage and at the same point of time facilities of the use of machinery. The largest commercial wheat lands in the world are the undulating temperate grasslands of Steppes, the Prairies, the Pampas, and the Australian Downs.

5. **Economic Factors:** The economic factors that favor wheat cultivation are:

- Technology
- Transport
- Capital
- Market
- 15. Ans. D.

Refractive index of diamond is very much large and structure of the diamond is such that when light enters inside the diamond, there is a 'total internal reflection' which happens in the diamond, i.e., light gets reflected from one internal surface of the diamond and further reflect from other parts of the surface. This phenomenon gets repeated many times. It is because of this phenomenon the diamond shines.

Diamonds are recognized for their spectacular brilliance, mostly due to the complete internal light reflection. The critical angle for the diamond and air interface is very small, so whenever the light enters a diamond, it will likely be completely reflected internally. In nature, diamonds rarely get display the brilliance they are known for. It is the technical ability of the diamond cutter that brilliantly sparks out diamonds. By suitably cutting of the diamond, many internal reflections can be made to a cutter that made the diamonds so brilliant. By suitably cutting the diamond, multiple internal reflections may happen.

16. Ans. C.



Sound waves are examples of the mechanical waves, while the light waves, Radio waves, and Microwaves are examples of electromagnetic waves. Electromagnetic waves are formed by the vibration of an electric charge. This vibration makes a wave that has both an electric and also a magnetic component. Sound waves are the longitudinal waves that require a medium to travel, and it can't travel through the vacuum. Light generally refers to the visible light, which is electromagnetic radiation that is seen to the human eye and is even responsible for the sense of sight.

Electromagnetic waves are waves that can travel via the vacuum of outer space. Mechanical waves, unlike that of electromagnetic waves, need the presence of a material medium in order to carry their energy from one location to another.

17. Ans. C.

The electromagnetic waves (EM waves) are transverse in nature, not longitudinal.

Applications for the Electromagnetic waves:

- Electromagnetic waves get to accomplish the transmission of energy via a vacuum or using no medium.
- As EM waves transmit energy, it plays an essential role in our day to day lives, including communication technology.
- They are even used to transmit short/long-wavelength radio waves.
- They are also used to transmit TV or wireless signals and energies.
- EM waves are responsible for the transmission of energy in the forms of microwaves, visible light, ultraviolet light, infrared radiation, gamma rays, and also of X-rays.

• Electromagnetic radiation is the basis for working of radar, which in turn is used for directing and remote sensing the understanding of our planet Earth.

• UV rays are germicidal in nature, and they destroy bacteria, viruses, and molds from various surfaces, air/water.

• Ultraviolet rays are even used to detect the forged banknotes. Real banknotes do not turn fluorescent under the Ultraviolet light.

• UV rays have even sanitary and therapeutic properties.



• X-rays detect the bone breaks by passing it through the flesh and capturing the image of it.

• Gamma rays can cause and also helps in the treatment of cancers. High doses of gamma rays kill the normal cells, which can cause cancer while, when taken in the proper amount, can kill mutated cells.

18. Ans. C.

Given information: Velocity of Snowboard = 5m/s Power = 3000 watt Then, *Power = force * Velocity* 3000 = force * 5 Force = 600 N

19. Ans. C.

Uranium-235 has 92 protons, so the proton number of 235U is 92. It has 92 protons plus 143 neutrons inside its nucleus, so it's total nucleon number is 235.

Uranium-235 (235U) is an isotope of Uranium forming up about 0.72 percent of natural Uranium. Unlike that of predominant isotope Uranium-238, it is much fissile, i.e., it may sustain a fission chain reaction. This is the only fissile isotope that is primordial and is found in relatively sufficient quantities in nature. Uranium-235 possesses a half-life of 703.8 million years. It was first discovered in 1935 by Arthur Jeffrey Dempster. Its fission cross-section for slow thermal neutrons is almost about 584.994 barns. For quick neutrons, it is on the order of 1 barn. Mostly but not all neutron absorptions result in fission; a minority even results in neutron capture making uranium-236.

Uses:

Uranium-235 has several uses, such as that of fuel for nuclear power plants and nuclear weapons such as nuclear bombs. Some artificial satellites, like the SNAP-10A and the RORSATs, were powered by nuclear reactors, which get fueled with U-235 satellites.

20. Ans. B.

When a disturbance is produced inside a medium, it gets transported by oscillating particles of the medium, and the disturbance is a type of energy which is carried by oscillating particles by making passing it to the next particle, in this way a longitudinal wave get propagates; as a result, energy propagates in a longitudinal wave.



As there is no equivalent movement of the medium particles in the propagation of the wave, they only vibrate about the centers of rarefaction and of compressions; therefore momentum isn't transferred in a longitudinal wave . Thus only the energy is propagating inside the direction of the wave.

21. Ans. C.

The Order of Zayed is the United Arab Emirates' highest civil decoration, which was named after Zayed bin Sultan Al Nahyan.

UAE's President Sheikh Khalifa Bin Zayed Al Nahyan in the year 2019 announced that the Indian Prime Minister Narendra Modi would be honored with the Zayed Medal, i.e., the UAE's highest civil honor.

This medal, awarded to kings, presidents, and heads of states, was conferred upon Modi for boosting the relations among the Emirates and India. Previously, Russian President Vladimir Putin, the Chinese President Xi Jinping have also been conferred with this honor.

22. Ans. B.

'Kandhamal Haldi,' which is a variety of turmeric indigenous to southern Odisha, has earned the Geographical indication (GI) tag from the Intellectual Property India, an organization that is functioning under the aegis of the Union Ministry of Commerce and Industry.

The recognition coexisted with the State's Foundation Day (known as the Utkal Divas). Odisha, on 1 April 1936, was shaped out as a separate state in the then British India on the basis of linguistic identity. Kandhamal in Odisha's southern hinterland is getting famed for its turmeric, a spice that recognizes for its pride of place in the array of cuisines. The agricultural product even stands out for its healing properties and for arresting aroma.

The GI tag was initially developed with the aim of recognizing the unique identity combining different products and places. For the product to get the GI tag, it must have a unique quality, reputation, or a characteristic which is attributable to its own geographic origin. 'Kandhamal Haldi' has been put under the Class-30 type.

23. Ans. A.

Telugu poet K Siva Reddy has been picked for the prestigious Saraswati Samman, 2018. He has been awarded for his tremendous work *Pakkaki Ottigilite* which is a collection of poetry.



K Siva Reddy was born in 1943 in a farmer family in Andhra Pradesh's Guntur district. He is considered as one of the most renowned modern poets in Telugu. Siva Reddy has even published critical essays on poetry.

Pakkaki Ottigilite was published in the year 2016. It is an anthology of 104 poems in blank verse. It includes the responses of the poet over the years to social change, the evolution of his own self, and his dynamic relationship with the world.

About Saraswati Samman Awards:

Saraswati Samman Award was introduced by the KK Birla Foundation in 1991. This award has been given annually to those individuals for their outstanding literary work written in any official Indian language and gets published during the preceding ten years. It carries a cash purse of Rupees 15 lakh, apart from a citation and a plaque. Some other popular literary awards comprised by the Birla Foundation are Vyas Samman (i.e., for Hindi) and Bihari Puraskar (i.e., for Hindi and Rajasthani writers of Rajasthan).

24. Ans. C.

The United Nations Population Fund (UNFPA) has launched its annual flagship report, State of World Population-2019. The report was titled <u>"Unfinished business - the pursuit of rights and choices"</u> that describes issues and information about the population worldwide.

This UNFPA report informs us that India's population grew at an average annual rate of 1.2 percent between the year 2010 and 2019 to 1.36 billion. UNFPA report also said that despite global gains in securing sexual and reproductive rights over the last 50 years, plenty of population groups are still left behind. The Activists, advocates, public health specialists, and several others have pushed relentlessly for the transformations that we saw around us today, but much still remains to be done.

In the year 2018, on World Population Day, UNFPA celebrated as the theme <u>"Family Planning is a Human Right</u>t." This year marks the 50th anniversary of the 1968 International Conference on Human Rights, in which family planning was, for the first time ever, globally affirmed to be a human right.

25. Ans. B.

The Government of India informed the amended Conduct of Elections Rules, 1961, on 14th August 2013, enabling the Commission to make use of VVPAT with EVMs. The Commission used VVPAT with EVMs (electronic voting machine) first time in bye-election from 51-Noksen (ST) Assembly



Constituency of Nagaland. After that, VVPATs have been used in selected constituencies in every election to Legislative Assemblies and eight Parliamentary Constituencies in General Election to the House of the People in 2014.

About VVPAT:

Voter Verifiable Paper Audit Trail is an independent system that is attached to the Electronic Voting Machines, which allows the voters to verify that their votes are cast as they intended. When a vote is cast, a slip is printed on the VVPAT printer containing the serial number, name, and symbol of the candidate and remains exposed through a transparent window for seven seconds. After that, this printed slip automatically gets cut and falls in the sealed drop box of the VVPAT.

VVPAT consists of a Printer and also a VVPAT Status Display Unit (VSDU). However, in M3 VVPAT, there is no VSDU and status of VVPAT display on the Control Unit of M3 EVM. VVPAT runs on a power pack (Battery) of 22.5 volts. Control Unit and VSDU are maintaining with the Presiding Officer or Polling Officer, and Balloting Unit and Printer remain in the voting compartment.

26. Ans. A.

Sonoran is a desert in North America. It covers the area of Arizona in United States, California, and Sonora in Mexico, Baja California and California Sur. It is having an area of 100000 square miles. Also, it is the hottest desert in Mexico. The desert area includes the Colorado Desert, Yuma desert, Colorado River, Tonopah desert, Yuha desert and Lechuguilla desert.

The area also includes national parks, monuments, natural reserves, city parks, museums and botanical gardens etc. some of the examples are : Arizona-Sonora desert museum, sonorant desert national monument, Boyce Thompson state park, Joshua tree national park, Sonoran Arthropod studies institute etc.

27. Ans. A.





The Karakoram Range is a very big range which divides India with the other part of central Asia. It has the Karakoram pass as a connector between Yarkend market, Leh and Kashgar.

Ladakh range is present south of Karakoram Range. It is a part of the trans-Himalayan range and merges with Kailash range. It is having khardung la and digar la passes.

Zaskar range act as a back of Ladakh. It is present in the south of Indus River. In the east, it continues till Lahaul and Spiti district and north to Kinnaur and west to Uttarakhand. Fatu la Chacha la, Nubrang la are some of the passes present here.

Pir Panjal is present in the south of the main Himalayas and having a height of 5000 meters. Pir Panjal is having passes named Banihal pass, Sythan pass etc.

Shiwalik is present south of Dhuladhar Range. It has a height up to 1500 to 2000 m. it is present in the foothills of Himalayas.

28. Ans. C.

24⁰ North Latitude is present north of the equatorial plane. It is almost 60 km north of tropic of cancer. It crosses Africa, Asia, Indian Ocean, Pacific Ocean, North America and the Atlantic Ocean.

It crosses maximum states in India. The state which comes in the line of 24^o N latitude are - Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura, Manipur and Mizoram.

29. Ans. A.

Honshu is the largest island of Japan. It is the most populous one too. The location of the Honshu island is south across of south of Hokkaido island. The island separates Sea of Japan to the North Pacific Ocean.

It is 7^{th} largest island of world and 2^{nd} most populous in the world. It is having an area of 2,27,960 square km.





30. Ans. B.

Arunachal Pradesh is having the largest area under dense evergreen forest in the country. The state experiences heavy rainfall every year. The forests are densely covered with the trees like Oak, Pine and fir etc.

The part of Arunachal Pradesh is covered by the Himalayan mountain, several wildlife sanctuaries and national parks. Namdapha Park is situated in the state.

31. Ans. B.

The principle involved is paper chromatography. In these, substances are partitioned or distributed between liquid phases. One phase is water which is stable between the pores of filter papers, and the other one is moving over the paper.

When the *moving phase* starts moving, then the separation of particles will occur. The mixture will separate themselves according to the affinity towards both the phases under the capillary action of pores.



32. Ans. D.

Sound waves *get reflected* as same as light waves. If the sound wave is reflecting back from the surface of solid or liquid is called a reflection of sound waves.

When sound wave changes medium at an angle other than 90° then it will bend from the original direction causing it to *be refracted*. The change in the angle of direction is called refraction, causing the part of waves to enter into new medium first and then change the speed.

When the two travelling waves exist in the same medium will interfere with each other. If their amplitudes add, then it is called constructive interference. If they are out of phase or subtracting in nature, called *destructive interference*.



Polarization is the property only with the transverse waves and does not exist with the longitudinal waves. A sound wave is a longitudinal wave, so it does not have this phenomenon.

33. Ans. B.

When the white light falls on the prism, then the wavelength and frequency of deviated colours are different. All the colours deviate at a different angle because of different velocity. Red has a maximum wavelength, so it deviates the least while violet is minimum in wavelength and deviates the most.

34. Ans. D.

Non luminous object is those who do not emit their own light outside. Moon and other planets are non-luminous objects because they do not emit their own light but glow by the reflecting light of the sun.

Candle, sun and electric lamp gives out the own energy, so all of it is the luminous object.

35. Ans. C.

If the equatorial plane not inclined to its orbit then, there is no change of season at the Earth.

Because if the Earth were not tilted than the whole planet will the same equidistant position from the Sun, and hence there would be no change in the season.

36. Ans. B.

Sant Basha is having composed vocabulary common to the North Indian language. It was mostly used by Saints and poets to compose the religious verses.

Sant Bhasha is a language of Ulatbansi mystics.

Kabir was also one Ulatbansi mystic poet. Amir Khusro also borrowed this mystic from the Nan Panthis.

37. Ans. B.

When the viceroy of India Lord Curzon announced the partition of Bengal in 1905, then the Swadeshi movement started in India. It was one of the most successful pre-Gandhian Movement. The main personalities of the movement were - Aurobindo Ghosh, Bal Gangadhar Tilak, Bipin Chandra Pal and Lala Lajpat Rai.



The main features of the movement were:

ÂBoycotting government school, colleges, services and courts.

ÂBoycotting foreign goods and promoting swadeshi goods.

ÂPromotion of national education and establishment of national schools.

ÂMassive demonstration were organized on the day of partition in Kolkata

ÂHartal and large meetings was organized in Kolkata.

38. Ans. D.

Ramkrishna mission is a Hindu religious organization. It spread the spiritual movement worldwide known as Ramkrishna or Vedanta movement. It formed by Swami Vivekananda in May 1897.

The Arya Samaj was founded by the Dayanand Saraswati in April 1875. They believe in one god and reject the worship of idols.

Brahmo Samaj was founded by Raja ram Mohan Roy and Dwarkanath Tagore on August 1828 at Kolkata. It was a social branch of Brahmanism and one of the reformist movements in India.

Paramahansa Mandali is a socio-religious group. It was established by Atmaram Pandurang in 1848 at Bombay. He was helped by Dadoba Pandurang and Bal Krishna Jaykar.

39. Ans. D.

The *Indian Forest Act 1878* divided the forest into:

ÂReserved forest: it is completely controlled by the government

ÂProtected forest: it is partially controlled by the government

ÂVillage forest: controlled by village people

It was amended by the Indian Forest act 1927.

40. Ans. C.

The concept of "*Paradox of Thrift"* was popularized by British economist John Maynard Keynes. The concept describes that individual usually try to save more during the economic recession, and it will lead to a fall in aggregate demands. This will further create a fall in economic growth.



41. Ans. A.

Production possibility frontier graph indicates all the possibilities of production of two different commodities when resources are fixed. Production of one commodity can be increased by decreasing the production of another commodity.

It also measures the production efficiency of the commodities. The curve is a downward-sloping curve.

42. Ans. B.

A *price ceiling* is a method by which government or any other authority imposed price control on the market. It sets a limit by which how high a price is charged for any product and services. It is usually done for the protection of consumers.

The price printed on Biscuit packets is determined by the market. It depends upon the demand and supply method. So it does not come under the price ceiling.

43. Ans. A.

In the Keynesian perspective of aggregate demand, firms produce output only if they want to sell it. It states that aggregate real consumption expenditure is a function of real national income. This function should have the following properties:

ÂAggregate real consumption expenditure is a function of real income which is stable.

ÂSlope must lie between 0 and 1 which is positive

ÂIf income increases then marginal propensity to consume itself decreases or remains constant.

44. Ans. A.

The *multiplier effect* is referred to as the injection of extra income and then more spending, and it will create more income. The effect refers to an increase in any final income cause by injection of any new spending. To calculate multiplier for Marginal propensity to consume:

Multiplier = 1 / 1 - MPC

= 1 / 1 - 0.9

= 1 / 0.1



= 10

45. Ans. C.

Given that Chemical formula of the sodium salt of given anion X is Na₂X.

We know that sodium is a single ionized atom so; it can lose only one electron from its ground state.

So oxidation state of sodium ion in salt is +1.

Then, $+1 \times 2 + y = 0$

2+y = 0

y = - 2

Oxidation state of anion is -2.

Now the chemical formula of an *aluminium salt* is,

Oxidation state of aluminium is +3

Then $+3 \times r + (-2) \times q = 0$

r/q = 2/3

So, the chemical formula will be Al₂X₃

46. Ans. C.

Sodium Hexa metaphosphate $Na_6P_6O_{18}$ is also known as Calgon is used for the water softening. The reaction is as follows:

 $2CaCl_2$ (Hard Water) (+) $Na_6P_6O_{18}$ or $Na_2[Na_4(PO_3)_6]$ (sodium hexa metaphosphate) $\rightarrow Na_2[Ca_2(PO_3)_6]$ (complex salt) (+) 4NaCl

47. Ans. B.

Quartz is a crystalline form of silica. Quartz consists of silica and oxygen atoms in a continuous manner of SiO_4 . It is silicon-oxygen tetrahedral where each oxygen atom is shared by two tetrahedral.

It is the second most abundant mineral on the Earth.

48. Ans. B.



Root epidermal cells have an extension which is called Root Hairs. It increases the surface area of the root and making it to increase the absorption of water and minerals.

It is also directly involved in root nodules formation in legume plants. They are having a large surface area and making efficient absorption by osmosis.

49. Ans. B.

When the stem of a plant bends towards the sunlight, then this is called *positive Phototropism*. When it is opposite to the light source, then it is called *negative Phototropism*. The occurrence of Auxins causes the bending of the plant away or towards the sunlight.

Auxins found in the shoot tip of the plant which is responsible for directional movement by the plant.

50. Ans. C.

Hydra organism belongs to the Coelenterata, which is also called Cnidaria. It usually includes jellyfish, corals, sea anemones etc. Coelenterata mostly consists of marine animals, but sometimes hydras also found in freshwaters like lake, ponds and streams etc.

51. Ans. D.

Total number of questions in the test = 150

Given, she scored 40% of the first 90 questions correctly

So the total no. of questions correctly answered = 40/100 * 90 = 36

Now, Let the no. of questions of 60 to be correctly answered be x

So,
$$36 + x / 150 \times 100 = 60$$

=> 36 + x = 60 * 150 / 100

$$=> 36 + x = 90$$

=> x = (90 - 36)

Therefore, x = 54

Therefore, percentage of questions out of 60 she needs to do correct is

= (54/60 * 100)%



= 90%

Therefore, she needs to solve 90% of the questions correctly.

52. Ans. A.

Innovation in Science Pursuit for Inspired Research (i.e. INSPIRE) is an innovative programme which is sponsored and get managed by the Department of Science & Technology for the attraction of talent to the Science. The basic aim of INSPIRE is to communicate with the youth of the country the encouragements of creative pursuit of science, also attract talent to the study of science at an early age itself and thus build the required critical human resource pool for expanding and strengthening the Science & Technology system and the Research & Development base. A prominent feature of the programme is that it doesn't believe in conducting the competitive exams for identification of talent among them at any level. It faith in and relies on the efficacy of the existing educational structure for the identification of talent.

INSPIRE has three components:

- Scheme for Early Attraction of Talent (SEATS)
- Scholarship for Higher Education (SHE)
- Assured Opportunity for Research Careers (AORC)

53. Ans. C.

Palaeoclimatology: It is the study of past climates from the traces which were left behind in the geologic record. It is supposed that the uniformitarian principle has obtained, but this might not be the situation, and the geologic data are invariably insufficient for palaeoclimatological purposes. Dating methods and the palaeogeographic reconstructions are suspect, and repeatedly fossil faunas and floras can't be related easily in terms of the time. Majority of the glacial strata can be dated only within the wide limits, and several climatic criteria leave no mark in the rocks.

Palaeoclimatic indicator: One of the main sources from which evidence regarding past climates can be obtained. Such indicators comprise glacial, ice sheets and ice cores, periglacial, Lacustrine deposits, Sedimentary deposits and pluvial deposits, which gives morphological information related to the climate and cave deposits, dunes, and also the dune fields, which give lithologic information. Plants (including pollen), molluscs, beetles, foraminifera and ostracods are among the organisms that have been used to derive the biotic information.

54. Ans. A.



The gently sloping accumulation of coarse alluvial deposits by the braided stream is known as a sand bar.

• A sandbar is a portion of sand, gravel or fine sediment that sits above the water. It may be get connected to the shoreline, or it may be offshore. It is usually narrow and straight. A sandbar is also called as a shoal or a sandbank. A large sandbar is also called a barrier island.

• Sandbars begin forming underwater. As the waves break, this attracts material from the shoreline, migrating even further into the ocean. During the time of heavy storms, large waves can build sandbars far from the shore, until they rise above the water's surface.

Sandbar Landforms Have 3 Main Characteristics:

- Made of sand, silt or gravel
- Formed by the wave action and currents
- Generally forms the straight line

Famous Sandbars (or Barrier Islands):

- Miami Beach, Florida, USA
- Bolivar Island, Texas, USA

55. Ans. A.

Doldrums, also known as equatorial calms, equatorial regions of light ocean currents and winds inside the intertropical convergence zone (ITCZ), a belt of converging winds and the rising air encircling the earth near the Equator.

• The Doldrums are the regions of the Atlantic and the Pacific oceans that have little if any wind.

Since sunlight beams down directly on the area nearby the equator.

• This heating makes the air to warm and to rise straight up rather than below horizontally.

• The result is very little or no wind, sometimes for weeks on the ends.

• The Doldrums are situated a little north of the equator, but the effects can be felt from even five degrees north of the equator to five degrees south of it.



• The trade winds border with the Doldrums both to the north and to the south direction.

• The rising moist air in the Doldrums may spawn the tropical storms and hurricanes.

• Almost all Atlantic hurricane arises in/near the Doldrums.

• The unexpected/unpredictability of the weather, either no winds or even potential hurricanes, shape the Doldrums one of the least favourite sailing lanes back when all those ships had to power them beyond the ocean was their sails.

56. Ans. D.

Location of Monsoon Deciduous Forest Biome:

Normally, the tropical deciduous forests are located in the regions of monsoon climate, but there are few departures from this close relationship and to the near correspondence among the regions of the monsoon climate and the deciduous forest.

There are 3 major areas of tropical deciduous forest biome:

• The Neotropics mainly West Indies,

• Indo-Malaysian Zone (mainly comprising in the south and south-east Asia except for the equatorial evergreen rainforest areas) and

• Eastern Africa and northern Australia.

Apart from these major areas, some discontinuous localities of the tropical deciduous forest biomes are even found in South Africa, South-Eastern U.S.A., Southern Brazil, Formosa (Taiwan), southern China and Japan.

The climate of Monsoon Deciduous Forest Biome:

This tropical deciduous forest biome is marked by two distinct seasons viz. moist season and dry season.

57. Ans. B.

The HDI (Human Development Index) is a statistical composite index of the life expectancy, education, and also per capita income indicators, which are used to rank the countries into four layers of human development.



A country whoever scores a higher HDI when the lifespan is higher, the education level is higher, and also the gross national income GNI (PPP) per capita is higher. This concept was developed by Pakistani economist Mahbub ul Haq and the Indian economist Amartya Sen and was even further used to calculate a country's development by the United Nations Development Programme (UNDP) Human Development Report Office. The Human Development Report of the year 2019 by the United Nations Development Programme was released on 9th Dec 2019 and measured HDI values based on the data collected in the year 2018. Below is the list of the top 10 countries or territories with' very high human development':

Rank	Country	
1	Norway	
2	Switzerland	
3	Ireland	
4	Germany	
5	Hong Kong	
6	Iceland	
7	Australia	
8	Sweden	
9	Singapore	
10	Netherlands	

58. Ans. C.

Thayumanavar or Tayumanavar was a Tamil spiritual philosopher from the Tamil Nadu, India. Thayumanavar articulated the Saiva Siddhanta philosophy. He wrote various Tamil hymns of which approx. 1454 are available. His first 4 songs were sung 250 years past ago at the Congress of Religions in the Tiruchirappalli. His poems followed his own mystical experience, but they even highlight the philosophy of South Indian Hinduism, and the Tirumandiram by the Saint Tirumular in its highest form, one that is at once devotional and nondual, one that saw God as both the immanent and as transcendent. Thayumanavar's important teaching is to discipline the mind, control the desires and meditate peacefully.

<u>His Spiritually Elevating songs</u>: Thayumanavar was a very respected scholar in both Sanskrit and in Tamil and was a minister to the King in



Trichinopoly in South India. His name got hails from the name of the deity of the Rockfort Temple located in the Trichinopoly. When he became godminded, he left his job and began roaming, preaching the Shaiva-Siddhanta philosophy and started Shiva worship. His songs are complete of the divine bliss which he enjoyed and transmitted in his abundance.

59. Ans. A.

East India Association

• Dadabhai Naoroji started the East India Association in London in the year 1867.

• The association's main target was to make the people of the UK aware of the conditions in India and to generate popular support among the British People for Indian Welfare.

• This association is also known as the predecessor to the Indian National Congress.

• In 1866, the Ethnological Society of London attempted to prove that Asians were inferior to the Europeans. The East India Association's work even targeted to challenge this notion.

• This association had opened many branches in Bombay, Madras and Calcutta in 1869.

Poona Sarvanajanik Sabha

• This Sabha was started in 1870 by Mahadev Govind Ranade and his associates in Pune.

• They aimed to be a combining link between the Government and the common people.

• It even worked for the legitimate rights of the peasants.

• Many prominent leaders of the Freedom struggle such as Lokmanya Tilak were also a member of this organisation.

<u>Madras Mahajan Sabha</u>

• It was established in 1884 in Madras by B. Subramaniya Aiyyar, P. Ananda-Charlu and M. Viraraghavachari.

• The organisation aimed to take a moderate stance on opposing government policies in the beginning.



Bombay Presidency Association

• The association was established in 1885 by Pheroshah Mehta, Badruddin Tayabji and KT Telang.

• It was made in opposition to the Ilbert Bill and Lytton's other reactionary policies.

60. Ans. C.

• Vasudev Balwant Phadke was an Indian independence period activist and a revolutionary who sought India independence from the British Raj. Phadke was got moved by the plight of the farming community and he was of believed that the Swaraj was the only remedy for their ills. With the assistance of the Koli, Bhil and Dhangar communities in the region, he organised a revolutionary group of the Ramoshi people. <u>The group also</u> <u>started an armed struggle to overthrow the British Raj in the year the</u> <u>1870s</u>, launching raids on to the rich English businessmen to get funds for the purpose. Balwant Phadke came to prominence when he got control of the city of Pune for some days after catching the British soldiers off-guard during one was a surprise attack.

• <u>Co-founding of the Maharashtra Education Society</u>: Phadke was one of the earliest person graduated from a British established institution in the Bombay presidency. In 1860, along with his fellow social reformers and revolutionaries Waman Prabhakar Bhave and Laxman Narhar Indapurkar, Phadke co-founded the Poona Native Institution (PNI) which was later with time renamed as the Maharashtra Education Society (MES). It is through the PNI, he went on set up Bhave School in Pune. At present time, the MES operates over 77 institutions in many parts of Maharashtra.

61. Ans. A.

What INC demands:

• The Indian National Congress (INC) was established in 1885. There was a growing feeling of the nationalism, and this led the INC to put forward some demands to the British authorities.

- One of their main demands was the reform of the legislative councils.
- They even wanted the principle of the election inspite of nomination.

• The INC even wanted the right to conduct discussions on financial matters which was hitherto not even allowed.

• The Viceroy at the time Lord Dufferin formed a committee to look into the matter. But the Secretary of State was not agree to the plan of direct



elections. He, later on, agreed to representation by the way of indirect election.

What they got:

India Council Act, 1892 provisions:

• The act resulted in increasing the number of additional or non-official members in the legislative councils as given:

o Central Legislative Council should have 10 to 16 members

o Bengal should have 20 members

o Madras should have 20 members

- o Bombay should have 8 members
- o Oudh should have 15 members
- o North Western Province should have 15 members
- In the 1892 Act, out of a total of 24 members, only 5 were Indians.

• The members were also given the right to ask questions on the budget (which was prohibited in the Indian Councils Act 1861) or on the matters of the public interest but had to give notice of six days for it.

• They were not able to ask supplementary questions.

• The principle of representation was introduced through this act. The district boards, universities, chambers of commerce, municipalities and zamindars were authorised to recommend members to the provincial councils.

• The legislative councils were also empowered to make new laws and to repeal old laws with the permission of the Governor-General.

62. Ans. A.

Prarthana Samaj or the "Prayer Society" in Sanskrit, was a movement for the religious and social reform in Bombay, India, build on the earlier reform movements. Prarthana Samaj was established by the Dadoba Pandurang and with his brother Atmaram Pandurang in the year 1867 when Keshub Chandra Sen got visited Maharashtra, with a goal to make people believe in one God and worship in only one God. It than became popular when Mahadev Govind Ranade joined. The important reformers were the intellectuals who advocated the reforms of the social system of



the Hindus. It was spread to southern India by famous Telugu reformer and writer, Kandukuri Veeresalingam.

Religious reforms

By comparing with the parallel Brahmo Samaj of Bengal, and the concept of rational or the theistic belief and the social reform, the Prarthana Samaj(ists) were the followers of the great religious tradition of the Marathi Sant Mat such as Namdev, Tukaram. The Brahmo Samaj founders examined various world religions, constitutes ancient Vedic texts, which subsequently were not adopted to be the infallible or divine. Although the adherents of Prarthana Samaj were the devoted theists, they also didn't regard the Vedas as divine/infallible. They drew their nourishment from that of the Hindu scriptures and also used the hymns of the old Marathi "poet-saints" in their prayers. Their principle trace back to the devotional poems of the Vitthalas as part of the Vaishnava bhakti devotional movements of the 13th century in southern Maharashtra.

Social reforms

Prarthana Samaj critically surveyed the relations between the contemporary social and cultural systems and religious beliefs and gave the priority to the social reform as compared with that of the political changes already introduced by the British government. Their comprehensive reform movement has led several impressive projects of cultural change and social reform in Western India, like the improvement of a lot of women and depressed classes, an end to the caste system, the abolition of child marriages and infanticide, educational opportunities for women, and remarriage of widows.

63. Ans. C.

The 'ecoradicals' are eth ones who think that the ecosystem has a limited carrying capacity. Such a limit 'defines how large a species population can become before it overuses the resources available in the ecosystem'. Ecoradicals believe that human societies on earth are moving dangerously closer to the limits of the planet's carrying capacity; they also think that there are no simple technological fixes that can take care of the problem. Therefore, many 'eco radicals' call for strict population control and dramatic changes in modern lifestyles towards a more environment-friendly, less consumption-oriented and waste-producing way of life. It is the eco radical position that challenges the traditional IR methods.

Ecoradicals calls for the dramatic changes in the lifestyles, including very important changes in the economic and political organization. They criticize arguments, such as the Brundtland Report, which call for environment protection within a framework of sustainable growth.



Ecoradicals find that this is not at all-sufficient. For some, real sustainability means abandoning industrial mass production and reverting to some form of deindustrialized society. Behind such radical ideas lies a world view profoundly different from the 'modernist-anthropocentric' view that is dominant in Western secular thinking, i.e., that 'man is above nature'.

64. Ans. A.

NALSA (National Legal Services Authority of India), along with other Legal Services Institutions, conducts Lok Adalats. Lok Adalat is one such alternative dispute redressal mechanisms; it is a forum where cases or disputes pending in the court of the law or at the pre-litigation stage are settled or compromised amicably. Lok Adalats have also been given the statutory status/power under the Legal Services Authorities Act, 1987 Under this Act, the award (or decision) made by the Lok Adalats is to consider to be an order of a civil court and is final and binding on all the parties, and no appeal against such a decision that lies before any court of law. If the parties were not satisfied with the decision of the Lok Adalat though, there is none provision for an appeal against such a decision, but they are free to introduce litigation by approaching to the court of appropriate jurisdiction by filing the case by following the required mentioned procedure, in the exercise of their right to litigate.

Levels & Composition of Lok Adalats:

At level of the State Authority:

At level of the High Court:

At level of District:

At the Taluk Level

65. Ans. B.

Following the 42nd Constitution (Amendment) Act, 1976, a new Chapter IV-A which comprises of only one Article, i.e. Article 51-A was added which dealt with a Code of 10 Fundamental Duties for citizens. Fundamental duties are planned to serve as a constant reminder to every citizen that while the constitution especially conferred on them certain Fundamental Rights, it even requires citizens to declare certain basic norms of the democratic conduct and also democratic behaviour as the rights and duties are correlative.

FUNDAMENTAL DUTIES

It will/shall be the duty of every citizen of India-



• to abide by the Constitution and to respect its ideals and institutions, the National Flag and the National Anthem;

• to cherish and to follow the noble ideals which inspired our national struggle for freedom;

• to uphold and to protect the sovereignty, unity and integrity of India;

• to defend the country and to render national service when called upon to do so;

• to promote the spirit of common brotherhood and harmony amongst all the people of India transcending religious, regional or sectional diversities and linguistic; to renounce practices derogatory to the dignity of women;

• to value and to preserve the rich heritage of our composite culture;

• to protect and to improve the natural environment including forests, lakes, rivers and wildlife, and to have a compassion for the living creatures;

• to progress the scientific temper, humanism and the spirit of inquiry and reform;

• to protect the public property and to abjure violence;

• to strive towards the excellence in all the spheres of individual and in collective activity so that the nation uniformly rises to higher levels of endeavour and the achievements;

• who is a parent or a guardian to provide opportunities for the education to his child or, as the situation may be, ward between the age of six and fourteen years

66. Ans. B.

Money Bill refers to a bill (draft law) initiated in the Lower Chamber of Indian Parliament (Lok Sabha) which usually covers the matters of receipt and spending of money, like tax laws, laws governing the borrowing and expenditure of the government, prevention of the black money etc.

Examples of the Money bills - Finance Bills and Appropriation Bills and the Undisclosed Foreign Income & Assets (Imposition Of the Tax) Bill, 2015 etc.

The term "money bill" hence, connotes specific characteristics of the proposed bill.



Under Article 110(1) of the Constitution of India, a money bill is defined as given:

1) Article 110(1), a Bill is considered to be a Money Bill if it includes only allocations dealing with any or all of the subsequent matters, namely:

a) the imposition, remission, abolition, alteration/regulation of any tax;

b) the regulation of the borrowing of money/the giving of any guarantee by the Government of India, or making the amendment of the law with respect to any financial obligations which is undertaken or which is to be undertaken by the Government of India;

c) the charge of the Consolidated Fund or that of the Contingency Fund of India, the payment of money within or the withdrawal of money from any such fund;

d) the appropriation of the money out of the Consolidated Fund of India;

e) the proclaiming/declaring of any expenditure which is to be charged on the Consolidated Fund of India or of the increasing of the amount of any such expenditure;

f) the money receipt on account of the Consolidated Fund of India or of the public account of India or the custody or in the issue of such money or the audit of the Union accounts or of the State; or any other matter incidental to any of the matters specified in sub-clauses from (a) to (f).

2) A Bill is not considered to be Money Bill by reason only that it gives for the imposition of fines or some other pecuniary penalties, or for the demand/payment of fees for the licences or fees for services rendered, or by the reason that it provides for the imposition, remission, abolition, alteration/regulation of any tax by any local authority or body for the local purposes.

67. Ans. B.

Polyarchy - a concept which was coined by the American political scientist Robert Dahl to signify the acquisition of democratic institutions inside a political system that guides to the participation of a plurality of the actors. Polyarchy, which signifies "rule by many," describes the process of democratization, in contrast to the democracy itself. This form of government was first got defined and implemented in the United States and France and was gradually accepted by various other countries. A polyarchy is a State that has certain defined procedures that are necessary conditions for following the democratic principle.



Central to the appropriate functioning of polyarchy is not only the operation and existence of the institutions but also the existence of the societal groups and of adequate space for them to manoeuvre and organise. The institutionalization of the democratic process of an accountable government is a necessity for the polyarchy, while the establishment of a regime as a fully-fledged democracy is not. The necessary institutions are, according to Dahl:

- Universal suffrage and the right to run the public office
- Free and fairly conducted elections for all the adults

• Observance and Availability of the right to free speech and for protection to exercise it

• The existence of and free access to the alternative information (not controlled by the government)

• The undoubted right to form and to join the relatively autonomous organizations —in particular, political parties (and, efficiently, parties in opposition)

• Responsiveness of the government (& parties) to voters

• Accountability of the government (& parties) to election outcomes and government.

68. Ans. C.

We know that,

Fraction = x/y

Given, Numerator of a fraction is increased by 200% and denominator is increased by 300%:

x+2x / y+3y = 9/17

3x/4y = 9/17

Now, finding the fraction:

3x/4y = 9/17

x/y * 3/4 = 9/17

x/y = 9/17 / 3/4



x/y = 9/17 * 4/3

x/y = 12/17

Therefore, the original fraction is 12/17.

69. Ans. C.

Let the number be x

Then, 1/6*x=53

x/6=53

x=53*6

x=318

57% of x = 57/100*318

Therefore, the answer is 181.26

70. Ans. D.

Friendship meaning: a state of mutual trust and support between two people.

Intimacy meaning: close familiarity/friendship.

<u>Attachment meaning</u>: affection, fondness, or sympathy for someone/something.

Enmity meaning: a state or a feeling of active opposition/hostility.

All three words, Friendship, Intimacy and Attachment describes togetherness and bonding, and these words can be used as synonyms to one another while Enmity doesn't describe togetherness and bonding.

71. Ans. C.

The first, third and the fifth letters are each moved one step backwards, while the second, fourth and the sixth letters are each moved one step forward to get the corresponding letters of the code. Therefore, the answer is EMNXDS.

72. Ans. D.

Given condition is:



M is the brother of N, and also B is the brother of N.

Therefore, M is the brother of B

73. Ans. A.

Let us denote the five friends by the first letter of their names, namely Sachin(S), Kunal(K), Mohit(M), Amit(A) and Sohan(So). Then, So < S < K < M and S < A < K. So< S < A < K < M.

In order of the increasing heights, i.e. shortest to tallest, Amit is third.

74. Ans. C.

The aim of the 1985 Vienna Convention is to conserve human health and to secure the environment from any harmful impacts of the depletion of the ozone layer. The aim of the 1987 Montreal Protocol is to preserve the ozone layer throughout the worldwide control, reduction and ultimately elimination of the production and consumption of the ozone-depleting substances. The recent extension of the Montreal Protocol in 2016 – the Kigali Amendment – controls hydrofluorocarbons as well. These chemicals are presently in use as a substitute for the ozone-depleting substances but are themselves potent greenhouse gases.

• The Vienna Convention supports and encourages research activities, cooperation and the exchange of information between the states, and national legislative measures, without however determining any concrete measures.

o Adoption: 1985

o Entry into force in Switzerland: 22 Sept. 1988

• As many of the substitute chemicals (HFCs) are potent greenhouse gases with an impact more than a thousand times stronger than that of CO2 and thus contribute to the global warming, the Parties to the Montreal Protocol resolved in the October 2016 in Kigali (Rwanda), to expand the Montreal Protocol to HFCs (Kigali Amendment), and to decline the production and consumption of these chemicals by 85 percent in the medium term. These provisions will came into force from 1 Jan. 2019.

o Adoption of the Protocol: 1987, and of its amendments: London: 1990; Copenhagen: 1992; Montreal: 1997; Beijing: 1999; Kigali, 2016



o Ratification by Switzerland of the Protocol: 1988 and of its amendments: London: 1992; Copenhagen: 1996; Montreal and Beijing: 2002

o Worldwide ratification (Montreal Protocol and its first four amendments): 2014

75. Ans. C.

The Palk Strait: It is a strait between the India state of Tamil Nadu and to the Jaffna District which is a part of the Northern Province connecting the island nation of Sri Lanka. It provides connectivity with the Bay of Bengal in the northeast with that of Palk Bay in the southwest. The strait is 53-82 kilometres (33-51 mi) wide. Various rivers flow into it, comprising the Vaigai River of Tamil Nadu. The strait is named after Robert Palk, who was a governor of Madras (from 1755–1763) during the Company Raj period. The distinctive feature around Palk Strait is that the waves surrounding it, to its north and south, are of high contrast. To the north, the waves of the Bay of Bengal have majority swelled waves while that on the south, in Palk Bay, are majorly the sea waves.

Palk Bay: It is covered at its southern end with a chain of low islands and reef shoals that are combinedly called Adam's Bridge; it has historically been recognised in the Hindu Mythology as the "Ram Setu," i.e. The Bridge of Rama. This chain expands between the Dhanushkodi on Pamban Island (also called as Rameswaram Island) in Tamil Nadu and Mannar Island in Sri Lanka. The island of Rameswaram is connected to the Indian mainland by that with the Pamban Bridge. Despite being a sea dominated area, the enormous wave heights in Palk Bay regions are comparatively low. The average significant wave height in the Palk Bay, near to the Adam's Bridge is approx. 0.5m.

Situated on the southeastern tip of the subcontinent, the Gulf of Mannar is considered to harbour over 3,600 species of the flora and fauna, making it one of the richest coastal regions in Asia. One hundred seventeen hard coral species have been recorded/documented in the Gulf of Mannar. Sea turtles are repeat visitors to the gulf as are sharks, dugongs, and dolphins. However, the combined impacts of 47 villages, with a total population of around 50,000 has conveyed that overharvesting of marine species has resulted in a problem. The dropdown of the fish populations has been accompanied by the reducing numbers of pearl oyster, gorgonian coral, and of acorn worm.

76. Ans. C.

On 13 April 1919, a group of Indians had gathered to peacefully protest against the Rowlatt Act and the arrest of 2 leaders. They were unarmed and had women, children, and pilgrims who had come to Amritsar to



celebrate Baisakhi. Colonel Dyer arrived with his troops and opened fire. Many died due to fire or due to the stampede. Some of the Britishers celebrated the act while others such as Churchill condemned it and called it a monstrous act. The government of India formed a Hunter commission to look into this matter. Dyer appeared before the Commission but said that he does not regret his action. He was relieved of his command and was prohibited from being appointed in India ever again.

77. Ans. D.

Ishwar Chandra Vidyasagar was born on 26 September 1820. He studied at Sanskrit College in Calcutta. He was a bright scholar of Bengali, Hindi, Sanskrit, and English. His writings significantly helped to develop the Bengali language, especially the manner in which the language is taught and written. He received the title 'Vidyasagar' from Presidency College, Kolkata. He was enthusiastic about the spread of women's education. He opposed the orthodox ways of imposing restrictions on widows. The widows lived a distressed life. They were required to wear white and shave their heads. The young girls were often married to old men. He used ancient Hindu scriptures to prove that widow remarriage was sanctioned. He pressed the Britishers to pass the Hindu Widow Remarriage Act 1856.

78. Ans. D.

Bhagat Singh was born in a Sikh family in 1904 in the current day Pakistan. He was drawn towards the fight for independence from a very young age as his family members were involved in the freedom struggle. Initially, he supported Gandhiji in his noncooperation movement, but after the Chauri Chaura incident, he withdrew his support and turned to Revolutionary nationalism. In 1926, he founded the Naujawan Bharat Sabha as an organisation to encourage revolution against the British by rallying in the present and workers. In 1928, he established the Hindustan Socialist Republican Association. He was deeply influenced by socialist ideas. On 8 April 1929, he launched a bomb in the Central Assembly at Delhi from the visitor's gallery. The main intention was never to cause physical harm to anyone but to spread the message of revolution.

79. Ans. D.

Kakori Conspiracy Case refers to the armed robbery that took place on a train in Central Uttar Pradesh on August 9, 1925. It occurred at the town of Kakori about 16 kilometres from Lucknow where the train was headed. It was raided by the members of the Hindustan Republican Association whose mission was to liberate India from the British rule through armed rebellion. They wanted to get money for HRA by taking the money from the British Administration by force. They also wanted to create a positive



image of the association among the Indians by attacking the high profile British government with minimum Collateral Damage. The robbery was planned by Ram Prasad Bismil and Ashfaq Ulla Khan. It was executed by Bismil, khan, Chandrashekhar Azad, Rajendra Lahiri, and many others. They wanted to take away the money from the guard cabin, which was to be deposited at Lucknow. They did not target any passenger, but one passenger named Ahmed Ali was killed in the crossfire between the Guards and the revolutionaries.

80. Ans. C.

Interest per year is 24%

Rate of inflation is 10%

Real interest rate = Interest per year - Rate of inflation

= 24-10

= 14%

81. Ans. A.

Zero price elasticity of demand means whatever the change in price, there is absolutely no change in demand. The demand is perfectly inelastic. The demand curve is zero.

82. Ans. B.

a) The Average Revenue and Marginal Revenue curves of a perfectly competitive firm are perfectly elastic. The average revenue is perfectly elastic due to a large number of buyers and sellers in a market who can switch to another firm to buy the goods at the original firm if the firm that they purchased the goods from earlier decides to raise the price of its goods. The firm raising the price will gain no revenue. The marginal revenue curve is perfectly elastic because the increase in the revenue from producing an additional unit of output is equal to the price of the good.

b) In the long-run, a competitive firm earns only normal profits. It can also vary the factors of production and attract new firms by making an abnormal profit. The new firms can easily enter due to the free entry and exit of firms. This will increase the industry supply, which in turn will decrease the industry price. Once the existing firms start making zero economic profit, the new firms will not enter. Also, in the long run, if the firm is making losses, the existing firms will exit the market as they will not be able to compete with them. The industry supply will fall, and



industry prices will increase. Firms will continue to exist until the remaining ones make a normal profit.

c) In equilibrium, the Marginal Cost Curve of the monopoly firm may be rising, falling, or constant. In the case of decreasing returns to scale, the equilibrium level of output, the slope of MR exceeds the slope of the MR curve. In the case of constant returns to scale, the MC curve is zero, the slope of the MR curve is negative. In the case of increasing returns to scale, the slope of the MR curve is negative, but that of the MC curve is positive.

d) The Marginal Revenue curve of the monopoly firm is below its Average Revenue curve. This is because a monopolist is the sole price maker. He can sell an additional unit of his output only by reducing the price. So, the marginal revenue on the additional unit sold is less than the price or the average revenue.

83. Ans. C.

According to the Law of Diminishing Returns, in a production function when more and more units of the variable factor are used, holding the quantities of a fixed factor constant, a point is reached beyond which the marginal product will diminish.

It is based on the following assumptions:

a) No change in the technology used.

b) It is applicable in the short run only.

c) The output is measured in physical units or tonnes only.

d) All units of variable factors of production are homogenous.

84. Ans. B.

The features of the three lists are given below:

UNION LIST

a) It has 100 subjects.

b) The Centre has the power to make laws on these subjects.

c) It includes all the matters of national importance.

d) It includes many decisions such as Citizenship, naturalization, and aliens, defence, army, ports, railways, economy, etc.



STATE LIST

a) It has 61 subjects.

b) The State has the power to make laws on these subjects.

c) It includes all the matters of regional importance.

d) It includes many decisions such as Public health and sanitation, public order, police, hospitals, etc.

CONCURRENT LIST

a) It has 52 subjects.

b) Both the Centre and the State have the power to make laws on these subjects.

c) It includes all the matters for which uniformity of legislation is required but not necessary.

d) It includes decisions related to legal, medical, and other professions, education, forest, trade union, marriage, adoption, etc.

85. Ans. B.

The 10th schedule of the Constitution of India was added by the 52nd Amendment 1985 to the Constitution. It is also called the Anti-Defection Law. It means to abandon a position or association often to join an opposing group. It was done to ensure that any party does not violate the mandate of the party and if he does, he will lose the membership of the House. It is also to avoid the switching of parties by the members of the House. The ground for disqualification are:

a) The schedule lays down that elected members may be disqualified on the grounds of defection.

b) Cases of the dispute are decided by the Speaker or Chairman of the House concerned.

c) The Supreme Court of India is the final arbiter in cases that remain unresolved.

d) If an elected member gives up his membership of a political party voluntarily.

e) If he votes or does not vote in the House, contrary to any direction issued by his political party.



f) If any member who is independently elected joins a party.

g) If any nominated member joins any political party after 6 months.

h) All the defection matters are referred to as the Speaker or the Chairman of the House and his/her decision is final.

i) All these proceedings are considered to be the proceedings of the Parliament or the Legislature of a state.

The exemptions to this law are:

a) Disqualification on grounds of defection does not apply in cases of a merger with another political party.

b) Any person elected as Chairman or speaker can resign from his party and rejoin the party.

86. Ans. D.

Short notice questions in Parliament are explained in the following points:

1) A member of the legislature may give notice of question on a matter of public importance and urgent character and can be asked for an oral answer at a notice less than 10 days.

2) This is called the minimum period of notice for asking the question.

3) This duration is less than the ordinary course of asking questions.

4) They are asked either after the question hour or as the first item on the agenda when there is no question hour.

5) It is answered orally by the concerned minister followed by supplementary questions.

6) They are admissible only after the Secretary approves it. An inquiry is made from the concerned minister if he/she is in a position to answer it. If he agrees, a suitable date is mutually decided for the discussion.

87. Ans. D.

According to Article 76 of the Indian Constitution, the Attorney General of India has the power of the highest law officer of the country.

He is appointed by the President of India assuming he has the following three qualifications –



a) He is an Indian citizen.

b) He must have either completed 5 years in the high court of any Indian state as a judge or ten years in the high court as an advocate.

c) He must be an eminent jurist.

There is no specified duration of tenure, and there is any procedure mentioned in the Constitution for his removal. However, he can be removed by the President at any time. He can also quit by submitting his resignation only to the President. Since he is appointed by the President on the advice of the Council of Ministers, he will be removed automatically when the Council is dissolved or replaced.

His powers are explained below:

1) He shall have the right to speak in the Houses of Parliament

2) He shall have a right of audience in all Courts in the territory of India in the performance of his official duties

3) He must have the same qualifications as are required to be a Judge of the Supreme Court.

4) In any legal case related to the Government of India, he has to appear in the Supreme Court on its behalf.

5) He enjoys all the powers related to the amenities and privileges as a member of the Parliament

The limitations to his power are given below:

a) He should not advise or hold a brief against the Government of India or in cases in which he is called to advise or appear on behalf of the Government of India.

b) He should not defend the accused person in criminal prosecution without the permission of the Government of India.

c) He has no voting power in the Indian Parliament.

88. Ans. A.

Soda-acid fire extinguisher contains a solution of sodium hydrogen carbonate and sulfuric acid. The following reaction takes place:

 $2NaHCO_3 + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O + 2CO_2$ Sodium bicarbonate Sulphuric acid Sodium sulphate Water Carbon dioxide



This increases the percentage of carbon dioxide in the air. Due to this, the supply of air is cut off, and the fire is extinguished.

Soda-acid fire extinguishers comprise sodium bicarbonate and sulphuric acid.

• It is the most effective house-hold fire extinguisher.

• It comprises of a strong iron vessel with a side discharge nozzle. The iron vessel is filled with the sodium bicarbonate solution.

• A small glass bottle, which is filled with the sulphuric acid, is supported inside the iron vessel. A knob gets fixed just above this bottle.

• On striking of the knob, the acid bottle breaks open into the sodium bicarbonate solution. The sulphuric acid reacts with sodium bicarbonate to form sodium sulphate, water and carbon dioxide.

89. Ans. D.

Ascorbic acid is an organic compound with chemical formula C6H8O6 or HC6H7O6. Hence, it does not contain any carboxylic acid functional group.

Ascorbic acid, known initially as hexuronic acid. It is a white solid, however impure samples may appear yellowish. It dissolves well in water to give a mildly acidic solutions. It is a mild reducing agent.

The functional group COOH corresponds to a carboxylic acid.

• The chemical formula of Lactic acid is C3H6O3 or CH3CHOHCOOH. Hence, it also contains a carboxylic acid functional group.

• The chemical formula of Tartaric acid is C4H6O6 or COOH(CHOH)2COOH. Hence, it also contains a carboxylic acid functional group.

• The chemical formula of Citric acid is C6H8O7 or CH2COOH-C(OH)COOH-CH2COOH. Hence, it also contains a carboxylic acid functional group.

90. Ans. A.

Aluminium is extracted from Bauxite.

Iron is extracted from Magnetite.

Copper is extracted from Malachite.



Zinc is extracted from Calamine.

Here are some valuable ores of Aluminum, Iron, Copper and Zinc:

Aluminium: Bauxite, Corundum, Feldspar, Cryolite

Iron: Magnetite, Siderite, Haematite

Copper: Cuprite, Copper glance, Copper pyrites, Chalcocite, Malachite

Zinc: Zinc blende, Zinkite, Calamine, Ferulinite

91. Ans. D.

<u>Gases can get liquefied at low temperature and at high pressure</u>. It is because, at low temperature, the kinetic energy of the molecules of the gases are minimum and the high pressure increases the intermolecular forces of attraction between the molecules.

The following are the conditions which are favourable for liquefaction of gas:

T<Tc and P>Pc

The temperature is less than the critical temperature, and the pressure is more than the critical pressure. A gas may be liquefied by the cooling or by the application of high pressure or by the combined effect of both. A gas can be liquefied by pressure if it is at or below its critical temperature.

For example:

When high pressure is applied to a gas, it gets compressed, and when we lower it's the temperature, it gets cooled.

Ammonia gas can be liquefied by applying high pressure and lowering the temperature.

92. Ans. B.

<u>Lime juice does not show Tyndall effect</u> because lime juice is a true solution. Their particle size is extremely small to scatter light. So they do not show the Tyndall effect. Whereas Starch solution, few drops of milk mixed with water and Chalk powder freshly mixed with water are colloids and will show the Tyndall effect.

A colloid is the kind of solution in which the size of solute particles is intermediate between those in true solutions and those in suspensions. A colloid is not a true solution. The scattering of light by the colloidal particle is known as the Tyndall effect. The scattering of light by the



colloidal solutions tells us that the colloidal particles are much bigger than the particles of a true solution. The true solution doesn't scatter a beam of light passing through it, but a colloidal solutions scatters a beam of light passing through it. Colloids are heterogeneous in nature though they appear to be homogeneous.

93. Ans. A.

Methanol, also known as methyl alcohol, wood naphtha, wood alcohol, methyl hydrate, or wood spirits, is a chemical with the formula CH₃OH. Methanol acquired the name wood alcohol as it was once produced chiefly by the destructive distillation of wood. Methanol is simple alcohol, CH3OH, that is used commonly commercially in antifreeze, as a fuel, or as a solvent. It is highly toxic and flammable. It is a colourless liquid at room temperature.

94. Ans. D.

We know,

Coefficient of price elasticity, **Ep = (change in quantity/original <u>quantity) * 100</u>**

(change in price/original price) * 100

Therefore, we have

 $\Delta q = 240 - 160 = 80$

 $\Delta p = 110-90 = 20$

Where q is quantity, p is price and Δ is the change.

Hence,

Ep = 80/20 * 80/160

= 4 * 0.5

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= 2
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Therefore, the Coefficient of price elasticity, Ep = 2

95. Ans. D.

Pollen grains are produced by male organs, anthers or stamens.



The formation of a pollen grain begins within the male part of a flower known as the anther, within specific tissue called sporogenic tissue. Here, the developing pollen receives nutrition and a coat of cellulose, which is a very strong plant protein. Firstly, large pollen mother cells are produced, which eventually break into individual pollen grains through a cell division. At this point, the pollen grain gets its outer coat, known as the exine, which is made from another tough plant protein. The exine protects the delicate genetic material within the pollen grain from water loss, and damage caused by Ultra Violet (UV) radiation and other environmental causes. In some plants, the pollen grain even gets a sticky outer layer to help it adhere to the female part of another plant, called the stigma. The final step involves another cell division, which forms two cells within one pollen grain. After that, the pollen grains move to a drying-out phase, after which they take on their dusty appearance and are now ready to go out into the world.

96. Ans. D.

Vacuoles full of cell sap provide the much-needed turgidity and rigidity in the plant cells.

The vacuole is a cell organelle that is bound by membranes and consist of water and organic and inorganic matter. When water is absorbed by the plant cell, the vacuoles imbibe it and extends and provide rigidity and eventually helps the plant to become turgid as well. For healthy plants, turgidity and rigidity are essential as these enable the plants to maintain its posture and remain upright.

It has three major functions, such as:

- Contribute to the rigidity of the plant by using water to develop hydrostatic pressure.
- Store nutrient & non-nutrient chemicals.
- Break down of complex molecules.

97. Ans. C.

The meristem which is responsible for the increase in the length of roots is called apical meristem.

Apical meristem is a meristem at the tip of the plant shoot or root that produces auxin and results in the shoot or root to increase in length. Growth which gets originates in the apical meristem is known as primary growth. Due to cambial activity, lateral meristem and cork cambium, the width of a plant will increase. Apical meristem is the undifferentiated meristem. Apical meristem is present at the tip of the shoot. This apical



meristem is responsible for the growth of the plant right from seedling stages. It is also present at the root tips.

Intercalary meristems are present in stems at the base of nodes and leaf blades. Cells of such meristems can divide and form new cells.

Lateral meristems are vascular cambium and cork cambium. They are responsible for the secondary growth of the plant. They increase plant diameter.

98. Ans. D.

Rough endoplasmic reticulum (RER) looks rough when seen under the microscope because of the presence of ribosomes, i.e. they are present as nodules on the outer membrane of the rough endoplasmic reticulum.

Ribosomes are the organelles that convert mRNA into proteins. These proteins are initially long strings of the amino acids. This string has to be folded in the right way to make a functional protein. The Rough endoplasmic reticulum (RER) helps with the folding of these amino acidstrings and at the same time prevents their degradation by enzymes in the cell. Because of this cooperation, the ribosomes can be attached to the ER. The ribosomes can then synthesize the amino acid string straight into the ER, making the process safer and more efficient.

99. Ans. A.

Osmosis: Osmosis is the process of movement of water from its high concentration region to its low concentration region via the semi-permeable membrane.

Different types of solutions exhibiting osmosis are:

• **Hypotonic Solution:** It is the solution in which, <u>If the medium</u> <u>surrounding the cell has a higher water concentration than the cell, i.e., if</u> <u>the solution is a very dilute solution, then the cell will gain water</u> by osmosis. Such dilute solution is known as the Hypotonic solution.

• **Isotonic Solution:** It is the solution in which, If the medium surrounding the cell is of exactly the same water concentration as inside the cell, there will be no net movement of water across membrane resulting in no change in the size of the cell. Such kind of solution is known as the Isotonic solution.

• **Hypertonic solution:** It is the solution in which, If the medium surrounding the cell has a lower water concentration than inside the cell, i.e., if the solution is highly concentrated, then the cell will lose water



through osmosis. Such a concentrated solution is known as the Hypertonic solution.

100. Ans. A.

Some of the Differences among the Bacteria and Viruses are as follows:

Characteristics	Bacteria	Viruses
Size	Larger (1000 nm)	Smaller (20-400 nm)
Cell Wall	Peptidoglycan or Lipopolysaccharide	No cell wall. Protein coat present instead.
Ribosomes	Present	Absent
DNA & RNA	DNA & RNA is floating freely in the cytoplasm.	DNA or RNA enclosed inside the coat of protein.
Reproduce	Able to reproduce by itself	Need a living cell to reproduce
Duration of illness	A bacterial illness commonly will last longer than 10 days.	Most viral illnesses last 2-10 days.
Under Microscope	Visible under Light Microscope.	Visible only under an Electron Microscope.
Treatment	Antibiotics	The virus does not respond to antibiotics.
Examples	Staphylococcus aureus, Vibrio cholera etc.	HIV, Hepatitis A virus, Rhino Virus etc.
Diseases/Infections	Food poisoning, gastritis and ulcers, meningitis, pneumonia, etc	AIDS, common cold, influenza, chickenpox etc.

101. Ans. C.

A climate emergency declaration or declaring of a climate emergency is an action which is taken by the governments and scientists to acknowledge the humanity is in a climate emergency. The first such type of declaration was made in December 2016. From then over 1,400 local governments in twenty eight countries have made climate emergency declarations (as of April 2020). The term "climate emergency" has been encouraged by climate the activists and pro-climate action politicians to add a feeling of urgency for responding to a long-term problem. The term climate emergency doesn't only describe the formal decisions, but also comprises actions to avert climate breakdown. This is expected to justify and focus them. The specific term "emergency" is used to assign the priority to the topic, and to generate a mindset of urgency.



The UK (United Kingdom), Ireland, Canada and France have all declared the climate emergencies. <u>The UK (United Kingdom), which was the first</u> <u>country in the world who had declare a climate emergency</u> following declarations by the Scotland and Wales, spent an annual average of \$11 billion in fossil fuel subsidies between 2015-2016, according to data from the Overseas Development Institute (ODI).

102. Ans. D.

The Indian Air Force (IAF) has obtained its first Apache Guardian helicopter from Boeing during the ceremony at the company's production facility in the Mesa, Arizona, US. The aircraft is a part of the 22 Apache helicopters that India had agreed to buy from the firm under the contract signed in September 2015.

AH-64E (I) is the personalized version of the Apache helicopter. Some Modifications were made to suit the IAF's (Indian Airforces) future requirements. The helicopter is designed to offer efficient capability in the mountainous terrain. The service can use the chopper to regulate the precision attacks at standoff ranges and operate in hostile airspace with threats from the ground. Also in addition to this, these helicopters have the ability to 'transmit and to receive the battlefield picture, to and from the weapon systems via the data networking', the Indian Ministry of Defence (MoD) stated.

103. Ans. B.

On 06th May 2019, a illustrious era of INS Ranjit being the frontline missile destroyer of the Indian Navy is going to end. INS Ranjit, the third among the five Kashin-class destroyers built by the erstwhile USSR was commissioned in the year 1983 and has rendered yeoman service to the Indian Navy for over 36 years. The ship got decommissioned at a solemn ceremony at the Naval Dockyard, Visakhapatnam. INS Ranjit was constructed as by the name Yard 2203 in the 61 Communards shipyard in the town of Nikolev in modern day Ukraine. The ship was got commissioned as INS Ranjit on 15th September 1983 with Captain Vishnu Bhagwat at the helm.

Over the 36 years, the ship has attained the distinction of helping in both Western and Eastern seaboard which has been Flag Ship of both the Western and Eastern Fleets. With the motto of Sada Rane Jayate or Ever Victorious in Battle, INS Ranjit has been at the frontline in keeping the nation secure. In her illustrious service to the nation, the ship has groomed and raised by many admirals who also went on to become the Chiefs of Naval Staff. The Ship has been manned by 27 commissions with the last commission taking charge of the ship on 06 June 2017. As the sun sets on 06th May 19, the Naval Ensign and the Commissioning



pennant got lowered for the final time onboard INS Ranjit, denoting the end of the Ranjit era in the Indian Navy.

104. Ans. C.

After sustained pressure from both the civil society and from the courts over the past few years, the Indian government had launched the National Clean Air Programme (NCAP) in January 2019. The NCAP aimed as a long-term, time-bound, national-level strategy to tackle the air pollution problem across the India in a comprehensive manner, with targets 20-30 percent reduction in Particulate Matter 10 (PM 10) and PM 2.5 concentrations by 2024, keeping 2017 as the base year for the comparison of concentration.

Under NCAP, total of 102 non-attainment cities have been identified based on the ambient air quality data for the period 2011 to 2015 and from WHO (World Health Organisation) report 2014 to 2018. The cityspecific action plans which constitutes measures for strengthening the monitoring network, decreasing the vehicular or industrial emissions, raising public awareness, etc. have been approved and prepared for the ground implementation for each 102 non-attainment cities. The Nonattainment cities are those which were found to be continuously violating the National Ambient Air Quality Standards (NAAQS) during the 2011 to 2015 period.

105. Ans. B.

Vande Bharat Express , also called as Train 18, is an Indian semi-high speed intercity electric multiple unit. It was built and designed by the Integral Coach Factory (ICF) at Perambur, in Chennai below the Indian government Make in India initiative over a period of 18 months. The unit cost of the initial rake was given as ₹1 billion (US\$14 million), though the unit cost is expected decline with succeeding production. At the original price, it is evaluated to be 40 percent cheaper than a similar train imported from Europe. The train was launched on 15th February 2019, by which date a second unit will have been produced and readied for service. The service was named the 'Vande Bharat Express' on 27th January 2019.

Train 18's Vande Bharat Express external appearance consists of aerodynamic narrowing at every ends of the train. It has a driver coach at all ends of the train, allowing for faster turnaround at each end of the line. The train has sixteen passenger cars, with a seating capacity of 1,128 passengers. Two of the center compartments are the first class compartments that seat 52 each, with the rest being coach compartments seating 78 each. The train's seats, its braking system, doors, and transformers are the only elements of the train to be outsourced, with



plans to make them domestically on the production of the next unit. Train 18 employs a regenerative braking system.

106. Ans. C.

Sikkim, state of India, situated in the northeastern part of the country, in the eastern Himalayas. Sikkim is one among the smallest states in India. It is bordered by the Tibet Autonomous Region of China to the north and northeast direction, by Bhutan to the southeast direction, by the Indian state of West Bengal to the south direction, and by Nepal to the west direction. The capital is Gangtok, in the southeastern part of the state.

107. Ans. C.

The term "Satvahana" got originated from the Prakrit which signifies " driven by seven" which is an indication of the Sun God's chariot that is driven by the seven horses as per the Hindu mythology. The dynasty of Sungas's came to an end in approx. 73 BC when their leader Devabhuti was killed by the Vasudeva Kanva. The Kanva dynasty then continued ruled over Magadha for about forty five years. Around this period, another powerful dynasty, the Satavahanas came into power in the Deccan area.

* The first king of the huge Satvahana dynasty was Simuka.

* The Satavahana rule is having faith to started around the 3rd century BC, in 235 BC and lasted til the 2nd century AD.

* Some experts also believe their rule started in the first century BC only.

* They are regarded to as Andhras in the Puranas.

* The Satavahana kingdom mainly comprised of modern-day Andhra Pradesh, Telangana and Maharashtra. At times, their rule even included parts of Karnataka, Gujarat and Madhya Pradesh.

Administration at the time of Satvahana dynasty

The administration of the Satvahana dynasty was completely based on the Shastras which has the following structure given below:

* The king or Rajan who was the ruler

* The Princes or Rajas who had their names inscribed on the coins

* Maharathis, who possess the power of granting villages and even had the privilege of maintaining the marital relations with the ruling family.

* Mahasenapati



* Mahatalavara

The inscription of the ruler Guatamipurna Satakrni also threw some light on the bureaucratic structure of the administration. However, transparency on the detailed structure is still awaited by the historians.

Economy at that time

Agriculture was the mainstay/backbone of the economy during the period of the rule of Satvahana kings. They also depend on the trade and production of many commodities within and outside India.

Religion & Language at that time

The Satvahanas were accorded to Hindu religion and Brahmanical caste. But, the interesting fact is their liberality towards other caste and religion which is obvioust from the donations made by the Satvahanas towards the Buddhist monasteries. Several Buddhist monasteries were got constructed during the period of the rule of the Satvahana dynasty.

108. Ans. A.

The term satyagraha was formulated and developed by Mahatma Gandhi. <u>He used satyagraha in the</u> Indian independence movement <u>and also</u> <u>during his earlier struggles in</u> South Africa <u>for Indian rights</u>. Satyagraha theory was influenced by Martin Luther King Jr.'s and James Bevel's campaigns during the time of Civil Rights Movement in the United States, and several other social justice and similar movements. Satya is obtained from the word "sat", which means "being". Nothing is or exists in reality except the Truth. In the context of the satyagraha, Truth therefore constitutes: a) Truth in speech, as opposed to the falsehood, b) what is real, as opposed to nonexistent (asat) and c) good as opposed to evil, or bad. For Gandhi, satyagraha went far beyond the mere "passive resistance" and became strength in practising non-violent methods.

Gandhi visualized satyagraha as not only a tactic which to be used in acute political struggle, but as a universal solvent for the injustice and harm. He established the Sabarmati Ashram to teach satyagraha. He also asked satyagrahis to follow the following principles (Yamas described in Yoga Sutra):

* Nonviolence (i.e. ahimsa)

* Truth – this constitutes honesty, but proceed beyond it to mean living completely in accord with and in devotion to that which is right

- * Non-possession (not the same as poverty)
- * Body-labour or the bread-labour

^{*} Not to steal



Gandhi also proposed a series of rules for satyagrahis to follow in a resistance campaign:

* One should harbour no anger.

* One should suffer the anger of the opponent.

* <u>One should never retaliate to assaults or punishment; but also do not</u> <u>submit, out of fear of the punishment or assault, to an order given in an</u> <u>anger</u>.

* One should not curse or swear.

* One should not insult the opponent.

* One shpuld neither salute nor insult the flag of your opponent or your opponent's leaders.

* <u>If anyone tries to insult or assault your opponent, defend your opponent</u> (non-violently) with your life.

* As a prisoner, one should behave courteously and obey prison regulations (except any that are contrary to self-respect).

The Champaran Satyagraha of the year 1917 was the

first Satyagraha movement led by Gandhi in India and is considered a historically significant revolt in the Indian Independence Movement. It was the farmer's uprising that took place in the Champaran district of Bihar, in India, during the British colonial period. The farmers were protesting against as they have to grow indigo with barely any payment for it. Champaran Satyagraha was the first famous satyagraha movement.

109. Ans. B.

Arya Samaj (in English means "Noble Society") is

a monotheistic Indian Hindu reform movement that promotes the values and practices which is based on the belief in the infallible authority of the Vedas. The samaj was established by the sannyasi (ascetic) Dayanand Saraswati on 10th April 1875. Members of the Arya Samaj have faith in one God and rejects the worship of the idols. Arya Samaj was the 1st Hindu organization to initiate the proselytization in Hinduism.

Members of the Arya Samaj have faith in one almighty creator referred to with the syllable Aum as described in the Yajur Veda (40:17). They believe in the Vedas is an infallible authority. The Arya Samaj members rejects other Hindu religious texts as they are not "revealed" works. For example, they believe in books like the Ramayana and the Mahabharata as these books are legends of the historical figures, and rejects them as reference to the supreme beings and avatars. <u>They had a very strong support base amongst the trading castes.</u> The members of Arya Samaj also reject other scriptural works such as the Puranas, The Upanishads, the Bible, and the Quran. <u>The moderates in the Arya Samaj were lead by Hans Raj and Lajpat Rai and set up a chain of Dayanand Anglo-Vedic</u>



<u>colleges</u>. They even reject the worship of idols. <u>The Arya Samaj has much</u> <u>more members as compared to that of Brahmo Samaj</u>. The Arya Samaj encourages the equality of all human beings and the empowerment of women. <u>They introduced 'shuddhi' or mass purification movement</u>.

The core beliefs of Arya Samaj are given below:

* The primordial cause of all genuine knowledge and all that is recognize by the means of knowledge is God.

* The Vedas are the repositories of all of the true knowledge. It is a paramount duty of all Aryas to teach and study and to propound the Veda.

* one should be always ready to imbibe the truth and forsake untruth.

* All acts must be done in accordance with the Dharma, i.e. after deliberating upon what is truth and what is untruth.

* The main object of the Arya Samaj is to do good to the entire world, i.e. to achieve physical, spiritual and the social prosperity for all.

110. Ans. D.

Here, 1 and 2 results as 12

Similarly, 4 and 8 results as 48

111. Ans. B.

- 1+8=9
- 9+8=17
- 17+16=33
- 33+16=49
- 49+24=73
- 73+24=97
- 112. Ans. C.
- 2[3] 4 = 14 can be obtained from

 \Rightarrow [(4+3) * 2] * [4 - 3]



```
\Rightarrow [7 * 2] * 1

\Rightarrow 14

Similarly, 3 [4] 6 = 60 can be obtained from

\Rightarrow [(6 + 4) * 3] * [6 - 4]

\Rightarrow [10 * 3] * [2]

\Rightarrow 60

Hence, we analyzed that if:

a [b] c is given it's answer can be obtained by solving

\Rightarrow [(c + b) * a] * [c - b]

So, the answer of 4 [5] 7 is:

\Rightarrow [(7 + 5) * 4] * [7 - 5]

\Rightarrow [12 * 4] * 2

\Rightarrow 48 * 2
```

⇒ 96

113. Ans. D.

The Penner (also known as Pennar, Penna, Penneru and uttara pinakini is a river of southern India. The Penna get rises in the Nandi Hills in the Chikballapur District of the Karnataka state, and runs north and east along the states of the Karnataka and Andhra Pradesh to empty into the Bay of Bengal. It is almost 597 kilometres (371 mi) long, with a drainage basin covering about 55,213 km2. 6,937 km2 area in Karnataka and 48,276 km2 area in Andhra Pradesh.

The Vaigai is the river in the Tamil Nadu state of the southern India; it get passes through the towns of Theni, Andipatti & Madurai. It get originates in the Varusanadu Hills, the Periyar Plateau of the Western Ghats range, and flows northeast along the Kambam Valley, which lies linking the Palni Hills to the north and the Varushanad Hills to the south. The Vattaparai Falls are situated on this river. As it orbits the eastern corner of the Varushanad Hills, the river turns towards southeast, running along the region of Pandya Nadu. Madurai, the largest among all cities in the Pandya Nadu portion and its ancient capital, which lies on the Vaigai.



The Cauvery (also called as Kaveri, the anglicized name), is an Indian river which is flowing through the states of Karnataka and of Tamil Nadu. The Kaveri river arises at Talakaveri on the Brahmagiri range in the parts of the Western Ghats, Kodagu district of the state of the Karnataka, at an elevation of 1341meter above mean sea level and flows for about 800 kilometers before it gets outfall into the Bay of Bengal. It is the 3rd largest river – after the Godavari and Krishna – in the South India and the largest in state of Tamil Nadu which, on its route, divides the state into North and South.

The Krishna River is the fourth biggest river in terms of the water inflows and of the river basin area in India, after the Ganga, Godavari and Brahmaputra. The river is approx. 1,400 kilometres (870 mi) long. The river is also known as Krishnaveni. It is one of the major sources of irrigation for the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh.

114. Ans. A.

<u>Loess</u>: It is an unstratified, geologically recent deposit of the silty or loamy material that is generally buff or yellowish brown in colour and is mainly deposited by the wind. Loess is a sedimentary deposit comprises largely of the silt-size grains that are loosely cemented by calcium carbonate. It is generally homogeneous and highly porous and is traversed by the vertical capillaries that permit the sediment to fracture and form the vertical bluffs.

<u>Tombolo:</u> A tombolo, sometimes interpreted as ayre, is a deposition landform in which an island get attached to the mainland by a narrow portion of land like a spit or bar. Once attached, the island is then called as a tied island. A tombolo is the sandy isthmus. Several islands combined together by bars which rises above the water level are known as a tombolo cluster. Two or more tombolos may form an enclosure (known as a lagoon) that can eventually fill with sediment.

<u>Point bars:</u> A point bar is a depositional feature formed of alluvium that accumulates on the inside bend of the streams and rivers below the slipoff slope. Point bars are situated in the abundance in mature or meandering streams. They are crescent-shaped and found on the inside of a stream bend, being very similar to, though even smaller than, towheads, or river islands. A point bar is an part of deposition whereas a cut bank is an area of erosion. Point bars are made as the secondary flow of the stream sweeps and rolls sand, gravel and small stones laterally across the floor of the stream and up to the shallow sloping floor of the point bar.

<u>Moraines:</u> A moraine is any kind of glacially formed accumulation of unconsolidated glacial debris (regolith and rock) that happens in both the



currently and formerly in the glaciated regions on Earth (i.e. a past glacial maximum), by the geomorphological processes. Moraines are formed from the debris previously carried along by a glacier, and generally consists of somewhat rounded particles ranging in size from the large boulders to minute glacial flour. Lateral moraines are made at the side of the ice flow and terminal moraines at the foot, labeling the maximum advance of the glacier.

115. Ans. B.

In our Solar System, astronomers often split the planets into 2 groups the inner planets and the outer planets. The inner planets are nearer to the Sun and are smaller and rockier. The outer planets are farther away, larger and made up mainly of gas. The inner planets (in order of their distance from the sun, from closest to furthest) are Mercury, Venus, Earth and Mars. Than an asteroid belt comes after that the outer planets, Jupiter, Saturn, Uranus and Neptune.

* The four inner planets are known as terrestrial planets because their surfaces are solid (and, as the name signifies, somewhat similar to that of the Earth — although the term can be misleading because each of the four has mostly different environments). They were made up mostly of heavy metals such as iron and nickel, and consists of either no moons or few moons.

* The outer planets (sometimes known as Jovian planets or gas giants) are big planets swaddled in gas. They all possess rings and all of majority of moons each. Despite of their size, only 2 of them are visible without the telescopes: Jupiter and Saturn. Uranus and Neptune were the first among the planets which got discovered since antiquity, and displayed astronomers the solar system was bigger than they previously thought.

116. Ans. D.

<u>National Liberation Federation</u>: When the Montagu report of the year 1918 was made in public, there was a split in the Congress over it. The moderates greeted it while the extremists opposed it. This results to a schism in the Congress with the moderate leaders forming the "Indian National Liberal Federation" in the year 1919. The party (INLF) was established by the Surendra Nath Banarjea and few of its eminent leaders were the Tej Bahadur Sapru, V. S. Srinivasa Sastri and M. R. Jayakar. Tej Bahadur Sapru emerged as the most significant leader among the Liberals. During the trouble against the Simon Commission, he introduced the idea of an all-parties conference in India to prepare an agreed constitutional scheme. This resulted in the "Nehru Report" which proposed a constitution and persuaded the new Labour government in the Britain to offer India a Round Table Conference.



Jamiat-ul Ulama-I Hind: The founders of the Jamiat in the year 1919 were the scholars Sheikh ul Hind Maulana Mehmood Hasan, Mufti Kifayatullah Dehlavi, Maulana Syed Husain Ahmad Madani, Mufti Muhammad Naeem Ludhianvi, Maulana Ahmed Saeed Dehlvi, Maulana Ahmed Ali Lahori, Maulana Bashir Ahmad Bhatta, Abdul Haq Akorwi, Maulana Noor u Din Bihari, Maulana Abdul Haleem Siddiqui, Maulana Anwar Shah Kashmiri and Maulana Abdul Bari Firangi Mahali

<u>Congress Democratic Party</u>: The Democratic Swarajya Party was a political party in the British India. It was established in the Bombay Province in October in the year 1933 with the aim of attaining Purna Swaraj (Total Independence) through constitutional means. The first Democratic Swarajya Party was founded by Bal Gangadhar Tilak in 1920 within the Indian National Congress. After his death, his supporters such as N. C. Kelkar, Bhaskar Bhopatkar, M. R. Jayakar and Karandikar became members of the Swaraj Party inside the Congress and contested elections for the legislative councils.

<u>Congress Socialist Party:</u> The Congress Socialist Party (CSP) was a socialist meeting within the Indian National Congress. It was established in 1934 by the Congress members who refuseed what they saw as the anti-rational mysticism of Gandhi as well as that of the sectarian attitude of the Communist Party of India towards the Congress. Also Influenced by Fabianism as well as Marxism-Leninism, the CSP constitutes advocates of armed struggle (such as Yusuf Meherally, Jai Prakash Narayan, and even Basawon Singh (Sinha) as well as those who hold on upon ahimsa or nonviolent resistance (such as Acharya Narendra Deva).

117. Ans. A.

Kanpur Conspiracy Case was against the newbie communists which were despised by the British Government. Some newly converted communists named M N Roy, Muzaffar Ahamed, S A Dange, Shaukat Usmani, Singaravelu Chettiar, Nalini Gupta, Ghulam Hussain were caught by the Government and were followed for conspiring against the Government. The Charge on confer them was "to deprive the King Emperor of his sovereignty of the British India, by making complete separation of India from the imperialistic Britain by peforming a violent revolution."

* But in this case, brought the communists in the publicity. The newspapers covered the events exhaustively and this was for the first time ever the people of India could recognize the communist doctrine in full details.

* It is because of this case was responsible for the introduction of the Communism to the Indian Public.



* It is in this case, M N Roy was charged in with absentia, so he was not got arrested. Ghulam Hussain converted a British informer and was pardoned. Rest all the people were arrested and sent to jail for four years.

118. Ans. A.

Kashf-ul-Mahjoob also known as Kashf-ul-Mahjub; is one of the most ancient and admired Persian treatise on Sufism which includes a complete system of Sufism with its practices and doctrines. The author himself a famous Sufi saint who takes an expository approach. Mystical controversies and current opinions are exemplified where many are clarified by presenting his own experiences. <u>The book with its Persian</u> flavour of philosophical speculation is itself a portion of the identity of <u>Abu'l Hasan</u> Ali Hujwiri also known as Data Ganj Baksh.

The book has obeyed as a 'vaseela', medium of spiritual elevation towards the divinity for various Sufi saints both many of whom were quite famous all over the world. It is because of this reason why Moinuddin Chishti Ajmeri, a chief saint of the Chishti order, once stated that the aspiring murid (disciple) one who doesn't (yet) have a murshid (spiritual master), must read Ali Hujwiri's book Kashf ul-Mahjoob, as that would (temporarily) guide him spiritually.

119. Ans. A.

* Baiju Bawra (also known as "Baiju the Insane"), was a dhrupad musician from the medieval India. Nearly all the information on Baiju Bawra came from the legends, and lacks historical authenticity. According to the most popular legends, Baiju lived in the Mughal period during the period of 15th and 16th centuries<u>. Baiju was one of the</u> <u>court musicians of the</u> Man Singh Tomar <u>of Gwalher (now</u> Gwalior<u>)</u>. According to a story, which was mentioned by Susheela Misra in few immortals of Hindustani music, Baiju Bawra was born as a Baijnath Mishra in a poor Brahmin family in the Champaner, Gujarat Sultanate. After the death of his father, his mother, a devotee of Krishna, went to the Vrindavan. There, he met his teacher Swami Haridas, and was trained in a gurukula.

* Some medieval narratives, introduced in works such as Mirat-i-Sikandari (17th century), narrate an incident about a Gujarati singer known as Bacchu (also called as Bakshu or Manjhu). According to a narrative, <u>Bacchu was a musician in the court of</u> Sultan Bahadur Shah of the Gujarat. When the Mughal emperor Humayun attacked the Bahadur Shah's contingent in Mandu, Bacchu fell in the hands of a Mughal soldier. Bacchu is also identified with Baiju by a section of scholars. Howevers, others believe that the Bacchu and Baiju were two distinct persons.

120. Ans. C.



The 1951, Finance Commission (Miscellaneous Provisions) Act, was proceed to give a structured format to the finance commission and to lead it to par with the world standards, by laying down rules for the qualification and for disqualification of members of the commission, and also for their appointment, term, eligibility and powers.

Members Qualifications

The Finance Commission Chairman is selected from the people with experience of the public affairs. The other 4 members are selected from the people who:

- * Are, or have been, or are even qualified, as the judges of a high court
- * Have a knowledge of government finances or accounts, or
- * Have a had experience in administration and financial expertise; or
- * Have a special knowledge of economics

Disqualification from being the member of the commission

A member may get disqualified if:

- * He/She is mentally unsound;
- * He/She is an undischarged insolvent;
- * He/She has been convicted of an immoral offence;

* His/Her financial and other interests are such that it obstucts the smooth functioning of the commission.

Terms for office of members and eligibility for their reappointment

Every member shall be in office for the time period as specified in the order of the President, but is also eligible for reappointment provided he has, by means of the letter addressed to the president, resigned his office.

Salaries and allowances of the members

The members of the commission will provide full-time/part-time service to the commission, as the President describes in his order. The members will be paid salaries and allowances as per the provisions made by the Central Government.

121. Ans. A.



Case 1: 5 + 4 + 7 + 2 = 1818 = 1 + 8 = 95472 = 9Case 2: 7 + 5 + 8 + 4 = 2424 = 2 + 4 = 67584 = 6<u>Case 3:</u> 6 + 3 + 4 + 2 = 1515 = 1 + 5 = 66342 = 6Similarly, from the above, 9 + 2 + 3 + 6 = 2020 = 2 + 0 = 29236 = 2 122. Ans. B.

The sum of such two-digit numbers could be 5 or 7 or 9 or 11 or 13 or 15.

Let the first digit of the two-digit number be `x' and the second digit be `y'.

Therefore,

The two-digit no. = (10x + y)

On reversing, the two-digit number becomes = (10y + x)

According to the equation we can write the equation as,

(10x + y) + 27 = (10y + x)



Or, 10y - y - 10x - x = 27Or, 9y - 9x = 27Or, y - x = 27/9 = 3Or, y - x = 3 (i) For the above equation (i) above let's assume some value of x so that the we can calculate the value for y and obtain the final outcome we get as a two-digit number. <u>Case 1: x=1</u> :: y - 1 = 3or, y = 4Therefore, two-digit no. = 14Case 2: x=2:: y - 2 = 3or, y = 5Therefore, two-digit no. = 25Case 3: x=3 :: y - 3 = 3

or, y = 6

Therefore, two-digit no. = 36

Case 4: x=4

∴y – 4 = 3

or, y = 7

Therefore, two-digit no. = 47

Case 5: x=5

∴y – 5 = 3



or, y = 8

Therefore, two-digit no. = 58

Case 6: x=6

 $\therefore y - 6 = 3$

or, y = 9

Therefore, two-digit no. = 69

From each of the above cases, we could have the two-digits as 14 or 25 or 36 or 47 or 58 or 69.

And, the sum of the digits of each of the two-digit number that we will get

14+25+36+47+58+69 = 249

123. Ans. B.

If we factorize the number 2940 we get

2940= 2×2×3×5×7×7

Now, we can see that 2 & 7 forms a pair, but 3 & 5 are left unpaired.

So, if we multiply it by 3 & 5. The pair will get completed and it will become a perfect square.

So,

 $2940 \times 3 \times 5 = 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 7 \times 7$

It is a perfect square.

Hence, the number by which 2940 should be multiplied to get a perfect square is $3 \times 5 = 15$.

124. Ans. A.

The next sequence in the given series should be "NOLM" as per the given condition.

125. Ans. C.

Given,



Selling price of an article = 2700

Loss percentage = 10%

Therefore, cost price of an article

= 2700*100 / (100-10) = 3000

So, the required gain percent is

(3600-3000) / 3000 = 0.2

So in percentage = 0.2*100 = 20%

Therefore, the gain percent is 20%

