WBCS (Mains) Exam. Paper-IV – Practice Set

Answers with Explanation

1. (a) Phenol is also known as Carbolic Acid It's other names are-Phenylic acid, Hydroxybenzene and Phenic acid It's chemical formula is C_6H_5OH and is a weak acid. It is produced by Cumene process which is also known as Hock Process. Phenol derivatives have been used in the preparation of cosmetics including sunscreens, hair colorings, skin lightening preparations. অ্যাচিভার্স
2. (a) The Ministry of Textiles is currently under Piyush Goyal. It is responsible for the formulation of policy, planning, development, promotion and regulation of the textile industry in India. It includes all natural, artificial, and cellulosic fibers that go into the making of textiles, clothing and Handicrafts. Piyush Goyal is also the current Minister of Commerce and Industry and Minister of Consumer Affairs, Food and Public Distribution. He is the current Leader of the House in Rajya Sabha Mukhtar Abbas Naqvi is the current minister of Minority affairs. অ্যাচিভার্স
3. (c) The largest floating solar farm of the world is being built in Singapore. It is expected to produce an estimated 6 million kW-hours of energy per year. It is being built by Sembcorp Industries. It will also help us to reduce the issue of climate change and to cut the greenhouse gas emission. Singapore is one of the smallest countries in the world China is the world's largest solar energy producing country.
4. (d) Kambhampati Hari Babu is the current Governor of Mizoram. He is appointed as 22nd Governor of Mizoram and assumed office on 19 July 2021. Mizoram is located in the northeastern part of the country. The capital of Mizoram is Aizawl and the official languages are Mizo and English. It is the 2nd least populous state in the country. It has the highest concentration of tribal people. P. S. Sreedharan Pillai is the current governor of Goa. অ্যাচিভার্স
5. (b) Baijayant Panda authored the book 'Lutyens' Maverick. He is national vice president and spokesperson of BJP. The book deals with socio political crisis, solutions and future road of Indian politics and policy making. Panda is a member of the Citizens' Alliance against Malnutrition, a high level advocacy group composed of young parliamentarians.
6. (c) Prof. Shailesh Ganpule from IIT Roorkee has received the 'NSG Counter-IED & Counter-Terrorism Innovator Award 2021'. He has been awarded for his design of a blast-resistant helmet. He is a faculty in the Department of Mechanical and Industrial Engineering of IIT Roorkee. The 'Blast-Resistant Helmet', designed by Prof. Shailesh Ganpule, is an advanced version of conventional helmets to protect military personnel from IED-induced blast waves with a technology readiness of 4. The 'NSG Counter-IED & Counter-Terrorism Innovator Award' is instituted by National Security Guard for deserving innovators who have made an outstanding contribution towards innovation in Counter IED and Counter-Terrorism fields to safeguard national security.
7. (a) The Indian Institute of Technology, Ropar has developed a first-of-its-kind Oxygen Rationing Device called "AMLEX". It has been developed by PhD students of Biomedical Engineering Department of the institution - Mohit Kumar, Ravinder Kumar and Amanpreet Chander under the guidance of Dr. Ashish Sahani, Assistant Professor, Department of Biomedical Engineering. AMLEX is a system developed specifically for oxygen cylinders. It synchronises the flow of oxygen with the inhalation and exhalation of a patient. The device can operate on both portable power supply (battery) as well as line supply (220V-50Hz) অ্যাচিভার্স
8. (c) Max Verstappen (Red Bull - Netherlands) won the Emilia Romagna F1 Grand Prix 2021. Lewis Hamilton finished second in this race.
9. (a) DN.A is known as "Blue Print of Life". DNA is the basic coding that every organism must have in order to get created. It contains the instructions needed for an organism to grow, develop, survive and reproduce. অ্যাচিভার্স
10. (d) An Assembler is used to convert mnemonic code to machine code. An assembler is a program that takes basic computer instructions and converts them into a pattern of bits that the computer's processor can use to perform

its basic operations. Debugging is the routine process of locating and removing computer program bugs, errors or abnormalities. * FORTAN and C++ are computer languages.

11. (c) Sapphire consists of Aluminium Oxide and it typically blue in colour. * Sapphire and Ruby are two gem varieties of Corundum which is basically a crystalline form of Aluminium Oxide. * A pinkish orange variety of sapphire is called padparadscha * A star sapphire is a type of sapphire that exhibits a star-like phenomenon known as asterism. অ্যাচিভার্স
12. (d) May flower 400 is the world's first Artificial Intelligence ship. It is a completely autonomous ship. It is powered by Artificial Intelligence and the Sun energy via solar panels. It will track aquatic mammals, analyze plastic in the water and study marine pollution. It is also installed with six high-tech cameras and radars to help the ship learn during its course. It is trained to handle fifty meters high waves. It can also listen to whales with a self-activating hydrophone.
13. (a) With increase in one degree Celsius of temperature the speed of sound increases by 0.61 m/sec. The relation between sound velocity and temperature is as follows- V=332 + 0.61t. অ্যাচিভার্স
Similarly the density of dry air is more than density of moist air and hence the value of speed of sound in moist air is more than dry air. Also note that if medium is speeded up then the speed of sound also increases in same direction of the medium direction.
14. (c) The Bhabha Atomic Research Centre (BARC) is India's premier nuclear research center. It is headquartered in Trombay, Mumbai, Maharashtra. It is a multi-disciplinary research centre with extensive infrastructure for advanced research and development covering the entire spectrum of nuclear science, engineering and related areas. It was formed on 3rd January 1954. It was founded by Homi Jahangir Bhabha. অ্যাচিভার্স
15. (a) The Marathi film "Puglya" has won the Best Foreign Language Feature award at Moscow International Film Festival, 2021. This Marathi film has been directed and produced by Vinod Sam Peter under the banner Abraham Films. The 43rd edition of Moscow International Film Festival was held from April 22nd to 29th, 2021. It was held in Moscow, Russia Moscow International Film Festival (MIFF) is one of the oldest world film forums (the second after the Venice Film Festival). The Moscow International Film Festival was established in 1935. অ্যাচিভার্স
16. (c) The famous novels 'Swami and Friends' and 'The Guide' are written by RK Narayan. His other novels are- Waiting for the Mahatma, Mr, Sampath, The Dark Room, The Financial Expert, Talkative Man, etc.
17. (c) The Ramanathaswamy Temple is located in the island of Rameshwaram, Tamil Nadu. It is dedicated to Lord Shiva. It gained this name because here Lord Rama worshipped Lord Shiva, when he returned from Sri Lanka. It is believed to have been established and worshiped by Rama. It is also one of the twelve Jyotirlinga temples. The temple has the longest corridor among all Hindu temples in India. It is a major pilgrimage destination for Hindus and is a part of the "Char Dham" pilgrimages. The temple in its current structure was built during the 12th century by Pandya Dynasty.
18. (c) EVMs were used on an experimental basis for the first time in elections to 16 Assembly constituencies in Madhya Pradesh (5), Rajasthan (5) and Delhi (6) held in November 1998. The 2004 Lok Sabha election was conducted entirely on EVMs. EVMs stands for Electronic Voting Machine which was first used in India in 1982 Kerala Assembly by-elections. But re-election was ordered by SC because the Representation of People Act 1951 didn't have provision for its use.
19. (c) Widal test is done to detect Typhoid Typhoid is caused by the bacteria Salmonella Typhi. Mantoux test is done for TB Sputum test for diphtheria. অ্যাচিভার্স
20. (c) The Chairman and members of NHRC are appointed by President of India. The appointment of Chairman and member of NHRC are recommended to President by a high power committee headed by PM. This high power committee consists of-Prime Minister, Home Minister, Leader of Opposition LS, Leader of Opposition RS, Speaker of LS and Deputy Chairman of RS.
21. (c) Pressure exerted in liquid acts in all direction. When the pressure in a fluid increases, the particles bump together more frequently. This

increases the pressure on objects in the fluid. The pressure a fluid exerts on an object in the fluid is applied in all directions. That is because the particles that make up the fluid can move in any direction. অ্যাচিভার্স

22. (a) Virus is the causative microorganism for Hepatitis (B). It attacks the liver and is transmitted mainly through water. It mostly spread from mother to child at birth or through exchange of blood and other body fluids. WHO recommends the use of oral treatments - tenofovir or entecavir- as the most potent drugs to suppress hepatitis B virus. 28 July is recognised as World's Hepatitis Day.
23. (b) Hydrogen gas is used in manufacture of Vanaspati Ghee, Alcohol and Ammonia Vanaspati ghee is manufactured from vegetable or seed oil by a process called 'hydrogenation'. For quick and easy hydrogenation, catalyst like Ni, Pt etc. are used Argon is the third most abundant gas in earths atmosphere. Generally about 55% of the hydrogen produced around the world is used for ammonia synthesis, 25% in refineries and about 10% for methanol production. অ্যাচিভার্স
24. (d) In India, the National Girl Child Day is celebrated on 24 January. The National Girl Child Day was instituted by the Ministry of Women and Child Development and the Government of India in 2008. The National Girl Child Day focuses on creating awareness about the importance of girl education, nutrition, and health.
25. (c) Indra is not a Research Centre of India in Antarctica Till now, India has established three research centres in Antarctica which are - Dakshin Gangotri, Maitri and Bharti. Dakshin Gangotri was the first India research centre established on Antarctica in year 1983- 84.
26. (b) According to 'Inclusive Internet Index', India ranks 49th in terms of Internet penetration and gender equality in Internet access. Along with India, Thailand also ranks 49th. The Inclusive Internet Index was released by the Economist Intelligence Unit and Facebook in April 2021. In this Index, Sweden ranked first, followed by the United States and Spain. অ্যাচিভার্স
27. (b) Pneumonia is an infection that inflames air sacs in one or both lungs, which may fill with fluid Diphtheria is a bacterial infection that affects the mucous membranes of the nose and throat. Tetanus causes painful muscle contractions in the jaw and neck.
28. (a) Barren Island is located in Andaman Islands archipelago. Barren Island is the only active volcano in South Asia. It belongs to North and Middle Andaman administrative district of Andaman and Nicobar Islands. Narcondam Volcano is also situated in Andaman and Nicobar Islands but it is a dormant volcano. The volcano here was dormant for a long time, but in the year 1991, it experienced an explosion which was quite major and it again erupted in 2017. অ্যাচিভার্স
29. (a) Exothermic reactions are reactions or processes that release energy, usually in the form of heat or light. In an exothermic reaction, energy is released because the total energy of the products is less than the total energy of the reactants. For this reason, the change in enthalpy, for an exothermic reaction will always be negative. In the presence of water, a strong acid will dissociate quickly and release heat, so it is an exothermic reaction. Endothermic reactions are reactions that require external energy, usually in the form of heat, for the reaction to proceed. Since endothermic reactions draw in heat from their surroundings, they tend to cause their environments to cool down. They are also generally non-spontaneous, since endothermic reactions yield products that are higher in energy than the reactants. As such, the change in enthalpy for an endothermic reaction is always positive. In order to melt the ice cube, heat is required, so the process is endothermic.
30. (a) Even infinite no. Of electrons can't be summed up to 1 Coulomb, what you actually mean is –1 Coulomb. We know that, Charge on 1 electron = -1.6×10^{-19} Coulomb, Now, simple application of unitary method, No. Of electrons on –1 Coulomb of charge = $1/(1.6\times10^{-19}) = 0.625 \times 10^{19} = 6.25 \times 10^{18}$ So, 6.25×10^{18} electrons make up a total of -1 Coulomb of charge. অ্যাচিভার্স
31. (b) Different plant hormones help to coordinate growth, development and responses to the environment. They are synthesised at places away from where they act and simply diffuse to the area of action.
When growing plants detect light, a hormone called Auxin, synthesised at the shoot tip, helps the cells to grow longer.

Another example of plant hormones are Gibberellins which, help in the growth of the stem. অ্যাচিভার্স

Cytokinins promote cell division, and it is natural that they are present in greater concentration in areas of rapid cell division, such as in fruits and seeds. These are examples of plant hormones that help in promoting growth.

But plants also need signals to stop growing. Abscisic acid is one example of a hormone which inhibits growth. Its effects include wilting of leaves.

32. (a) Adrenaline is secreted directly into the blood and carried to different parts of the body and is known as "fight or flight" Hormone. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in supply of more oxygen to our muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our skeletal muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. Testosterone and estrogen are the reproductive hormones such animal hormones are part of the endocrine system which constitutes a second way of control and coordination in our body. অ্যাচিভার্স

33. (b) In the year 1817, Johann Wolfgang Döbereiner, a German chemist, tried to arrange the elements with similar properties into groups. He identified some groups having three elements each. So he called these groups 'triads'. In 1866, John Newlands, an English scientist arranged the then known elements in the order of increasing atomic masses. He compared the table to the octaves found in music. Therefore, he called it the 'Law of Octaves'. The main credit for classifying elements goes to Dmitri Ivanovich Mendeléev, a Russian chemist. He was the most important contributor to the early development of a Periodic Table of elements wherein the elements were arranged on the basis of their fundamental property, the atomic mass, and also on the similarity of chemical properties. In 1913, Henry Moseley showed that the atomic number of an element is a more fundamental property than its atomic mass as described below. Accordingly, Mendeléev's Periodic Law was modified and atomic number was adopted as the basis of Modern Periodic Table.

34. (b) Bathing foam forms an insoluble substance (scum), this is caused by the reaction of soap with the calcium and magnesium salts, which cause the hardness of water. This problem is overcome by using another class of compounds called detergents as cleansing agents. Detergents are generally ammonium or sulphonate salts of long chain carboxylic acids. The charged ends of these compounds do not form insoluble precipitates with the calcium and magnesium ions in hard water. Thus, they remain effective in hard water. Detergents are usually used to make shampoos and products for cleaning clothes. অ্যাচিভার্স

35. (c) Baking soda is also known as sodium hydrogen carbonate ($NaHCO_3$), sodium bicarbonate, sweet soda and food soda. It is also an ingredient of antacids. Due to its alkaline nature, it relieves the depression of excessive acid in the stomach. It is also used in soda-acid fire extinguishers.

36. (d) An alloy is a homogeneous mixture of two or more metals, or a metal and a non-metal. It is prepared by first melting the primary metal, and then, dissolving the other elements in it in definite proportions. It is then cooled to room temperature. If one of the metals is mercury, then the alloy is known as an amalgam. The electrical conductivity and melting point of an alloy is less than that of pure metals. For example, brass, an alloy of copper and zinc (Cu and Zn), and bronze, an alloy of copper and tin (Cu and Sn), are not good conductors of electricity whereas copper is used for making electrical circuits. Solder, an alloy of lead and tin (Pb and Sn), has a low melting point and is used for welding electrical wires together. অ্যাচিভার্স

37. (a) Nitrogen fixation is the essential biological process and the initial stage of the nitrogen cycle. In this process, nitrogen in the atmosphere is converted into ammonia (another form of nitrogen) by certain bacterial species like Rhizobium, Azotobacter, etc. and by other natural phenomena. Plants are the main of the sources of food. The nutrients obtained from plants are synthesized by plants using various elements which they obtain from the atmosphere as well as from the soil. This group

of elements includes nitrogen as well. Plants obtain nitrogen from the soil through the process of protein synthesis. Unlike carbon dioxide and oxygen, atmospheric nitrogen cannot be obtained through stomata of leaves. Because the concentration of nitrogen gas present in the atmosphere cannot be directly used by plants and also the concentration of the usable form of nitrogen in the atmosphere is very less. There are certain bacteria and some natural phenomenon which help in Nitrogen fixation. অ্যাচিভার্স

38. (a) The major components of the air are: Nitrogen - 78% Oxygen - 20% Argon - 0.93% Carbon dioxide - 0.031%. Other gases such as Neon, Helium, Hydrogen etc, are present in trace amounts. The increasing order of the boiling points of the above gases is: Nitrogen (lowest), Argon, Oxygen, Carbon dioxide.
39. (b) Airborne Transmission: Some infectious agents remain suspended in the air for a long period of time. These pathogens might attack the immune system of a person in contact. For e.g. if you enter a room that was initially occupied by a patient of measles, you too might catch the infection. অ্যাচিভার্স
40. (b) A vector is an organism that does not cause disease itself but that transmits infection by conveying pathogens from one host to another. Vectors may be mechanical or biological.
41. (a) Congenital refers to a condition or disease which is present at birth. The condition can be inherited (genetic) or caused by environmental factors. Some maternal infections, such as HIV, can be passed onto the child and cause a congenital condition. Maternal factors such as alcohol or drug consumption, nutritional intake and placental health can all cause congenital problems. Examples-Congenital heart defects are those which affect the structure of the heart and the way blood flows through it. Ranging from minor-with no symptoms-to life-threatening, these are the most common type of birth defect. Cleft lip and palate, which affect the development of the roof of the mouth and upper lip. A cleft lip can be caused by genes passed down from the parents, environmental toxins, viruses or may occur in concert with other birth defects. Neural tube defects such as spina bifida Down Syndrome caused by an extra chromosome.
42. (c) Pitch is that characteristic of sound which distinguishes a sharp or shrill sound from a grave or dull sound. It depends upon frequency. Higher the frequency higher will be the pitch and shriller will be the sound and vice versa.
43. (b) Due to refraction, sound is heard at longer distances in nights than in day.
44. (d) The sensation of a sound perceived in a ear is measured by another term called loudness which depends on intensity of sound and sensitiveness of the ear. Unit of loudness is bel. A practical unit of loudness is decibel (dB) which is 1/10th of bel. Another unit of loudness is phon. অ্যাচিভার্স
45. (d) Microphone? Sound energy into electrical energy. Speaker? Electrical energy into sound energy. Reeds of a harmonium? Mechanical energy into sound energy. Sails of a ship? Wind energy into mechanical energy.
46. (d) The amount of work done depends on the amount of the force applied and the distance object moves along with the angle between force and displacement. অ্যাচিভার্স
47. (d) The term potential energy was introduced by the 19th-century Scottish engineer and physicist William Rankine. There are several types of potential energy, each associated with a distinct type of force. It is the energy by virtue of an object's position relative to other objects. We can define potential energy as: The energy held by an object because of its position relative to other objects, stresses within itself, its electric charge, or other factors. Similarly, in the case of a spring, when it is displaced from its equilibrium position, it gains some amount of energy which we observe in the form of stress we feel in our hand upon stretching it. We can define potential energy as a form of energy that results from the alteration of its position or state. অ্যাচিভার্স
48. (b) Gravitational attraction is caused by the mass of an object. Since Earth is far more massive than the Moon, the gravitational force exerted on the Moon is far greater than that of the Moon on the Earth. An example of the difference: while the Moon causes tides on the Earth, the Earth has the Moon locked so that the same face (minus some wobbling) is always visible from the Earth.
49. (b) The difference between the specific gravity and density is that at room temperature and

pressure is 1gram per 1 cubic cm is the density of water this density is treated as a standard and density of any other material (usually liquids) is calculated relative to the , this is called relative density or specific gravity. Hence, specific gravity is the ratio of the mass of a substance to that of a reference substance, let's consider the density of honey is approx. 1.42 grams/cm^3, so its specific gravity would be 1.42/1 = 1.42. Notice that specific gravity is a ratio, therefore specific gravity does not have a unit, and hence specific gravity is a dimensionless physical quantity. The specific gravity of a substance will let us know if it will float or sink, it gives us the idea about relative mass or relative density. If the specific gravity of a substance is below 1 then it will float and if it is greater than 1 it will sink. Relative density is the ratio of density of a substance to the density of a given reference material. Thus, it is a unit less quantity.

50. (b) As we know that pressure is inversely proportional to area, so an increase in area means decrease in pressure. School bags are provided with broad straps to increase the surface area in contact with the shoulders and reduce pressure on the shoulders. If thin straps would be used, then surface area in contact with the shoulders would decrease which will lead to increase in pressure on shoulders.

51. (c) Explanation: The President of Romania, Klaus Iohannis nominated former army general Nicolae Ciuca as the new Prime Minister (PM) of the country. অ্যাচিভার্স

About Romania :
President- Klaus Iohannis
Capital- Bucharest
Currency- Romanian leu

52. (a) The Government of India, the Government of Andhra Pradesh, and the World Bank signed a loan agreement worth $250 million for a Learning Transformation Project to improve education quality for Schools & Anganwadi Worker of Andhra Pradesh.

53. (c) The National Aeronautics and Space Administration (NASA) launched the world's first planetary defense mission, the Double Asteroid Redirection Test (DART) to intentionally smash a spacecraft into an asteroid Didymos at 15,000 miles per hour.

54. (a) Kuwait reappointed Sheikh Sabah Al-Khalid Al-Sabah as the Prime Minister (PM) of the country, he has already been the PM since 2019. He was reappointed by an Emiri order (Head of the State) issued by Crown Prince Sheikh Meshal alAhmad al-Sabah. অ্যাচিভার্স

55. (c) The Prime Minister of India, Narendra Modi laid the foundation stone of Noida International Airport (NIA) or Jewar Airport at Jewar, Uttar Pradesh (UP). It will be India's first net zero emissions airport. It has earmarked dedicated land to be developed as a forest park using trees from the project site.

56. (d) The Kulgam district administration and the Department of Tourism, Jammu & Kashmir (J & K) organised the 1st ever Aharbal Festival at Kulgam, J & K to promote tourism in Kashmir, particularly at the Aharbal waterfall. Aharbal falls, also known as "Niagara Falls" of Kashmir, is a hill station in the south-western part of Kashmir Valley in the Jammu and Kashmir (J & K). অ্যাচিভার্স

57. (c) India was elected to the world heritage committee of the United Nations Educational Scientific and Cultural Organization (UNESCO) with 142 votes for a four-year term from 2021-2025. India is one among the 12 new members to the World Heritage Committee elected at the 23rd General Assembly of state parties to the World Heritage Convention held at UNESCO.

58. (b) Varanasi, a city in Uttar Pradesh (UP) is set to become the first Indian city to start ropeway service as a mode of public transport in order to ease the traffic congestion. The proposed ropeway will be constructed between Cantt Railway Station (Varanasi Junction) to Church Square (Godauliya) covering an aerial distance of 3.45km. India will be the third country in the world after Bolivia and Mexico to use a ropeway for public transport. অ্যাচিভার্স

59. (b) Vivek Johri was appointed as the Chairman of the Central Board of Indirect Taxes and Customs (CBIC) & the appointment was announced by the Appointments Committee of the cabinet. Vivek Johri appointed as chairman of CBIC by succeeding M Ajit Kumar.

60. (d) Petr Fiala was appointed as the new Prime Minister (PM) of the Czech Republic. He succeeded incumbent PM Andrej Babis. Petr Fiala was appointed by Milos Zeman, the President of Czech Republic. Petr Fiala had

written a book 'Theory of Political Parties' along with Maxmilián Strmiska. অ্যাচিভার্স

61. (b) Author M Mukundan won the Rs 25-lakh-JCB Prize for Literature 2021 for his novel 'Delhi: A Soliloquy', translated from Malayalam into English by Fathima E V and Nandakumar K.

62. (d) Australia defeated New Zealand in the finals of the 2021 International Cricket Council (ICC) T20 World Cup tournament that was held at Dubai International Stadium, UAE.
Player of the Match - Mitchell Marsh for his 77-run knock in the finals Mitchell Marsh recorded the fastest fifty in ICC Men's T20 World Cup final's history, by reaching the 50-runs mark in just 31 balls.
ICC released the official anthem for Men's T20 World Cup 2021, called "Live the Game", which was composed by renowned Indian Music Director 'Amit Trivedi'. অ্যাচিভার্স

63. (d) Israel successfully test-fired its "C-Dome or Protective Dome" naval defence system based on Iron Dome which was tested against rockets, cruise missiles and Unmanned Aerial Vehicles (UAV). The C-Dome was successfully tested for the first time from Saar-6 Corvette INS Magen, Israel's Naval Warship.
About The "C-Dome or Protective Dome" Missiles:
i. The C-Dome is a multilayer missile defence system, alongside the Arrow and David's Sling systems which is capable of intercepting everything from long-range missiles to short-range rockets.
ii. Rafael developed the Iron Dome, a mobile all-weather air defence system.
iii. The C-Dome has a speed of Mach 2.2 (2716.56 kmph). অ্যাচিভার্স

64. (b) Indian Grandmaster (GM) R Praggnanandhaa defeated World Number 1 Magnus Carlsen (Norway) in the 8th round of the Airthings Masters, an online rapid chess tournament.
i. With this victory, R Praggnanandhaa became the third Indian, after Viswanathan Anand and P
Harikrishna, to accomplish the rare feat of defeating Magnus Carlsen. অ্যাচিভার্স
ii. He became India's youngest and world's second youngest Grandmaster in 2018.

65. (d) Japan International Cooperation Agency (JICA) approved the tender for cleaning up rivers Mula, Mutha and Mula-Mutha (confluence of both rivers) of Pune Municipal Corporation (PMC) are(a) The project will cost around Rs 1,000 Crore for pollution abatement of rivers.
Objective : To improve the water quality by augmenting sewage collection systems, sewage treatment facilities and improving sanitation in Pune Municipal Corporation (PMC) area.

66. (a) The International Air Transport Association (IATA) joins hands with the Global banking group 'Standard Chartered Bank' to launch its new payment platform "IATA Pay" for the Indian airline industry to enable instant airline payment.
i. IATA Pay in India is based on Standard Chartered's Straight2Bank Pay.
About Standard Chartered Bank : অ্যাচিভার্স
CEO- Zarin Daruwala
Headquarters - Mumbai, Maharashtra

67. (c) The World Health Organization (WHO) launched the 'Quit Tobacco App' to help people quit tobacco use in all forms including smokeless and other related products.
i. It is a first-of-its-kind app which helps users identify the triggers, set their targets, manage cravings, and stay focused on quitting tobacco.
ii. The 'WHO Quit Tobacco App' is the first such initiative of the WHO. It was launched during WHO's year-long 'Commit to quit' tobacco control campaign.

68. (b) India's 1st water taxi service to enable faster connectivity between Mumbai and Navi Mumbai in Maharashtra was inaugurated by the Union Minister Sarbananda Sonowal, Ministry of Ports, Shipping and Waterways.
i. Maharashtra Chief Minister (CM) Uddhav Thackeray also inaugurated the newly constructed Belapur jetty. অ্যাচিভার্স
ii. About India's 1st water taxi service: The services will commence at the Domestic Cruise Terminal (DCT) and will connect the nearby locations at Nerul, Belapur, Elephanta island and Jawaharlal Nehru Port Trust (JNPT).
iii. About Belapur jetty : It is built at a cost of Rs. 8.37 crore. It was funded in the 50-50 model under the Sagarmala scheme of the Ministry of Ports, Shipping and Waterways.

69. (b) A biography of Tokyo Olympics Gold medalist, Neeraj Chopra titled 'Golden Boy Neeraj Chopra' authored by Navdeep Singh Gill released at

Punjabi Bhawan in Ludhiana, Punjab.
i. The book was released by the Chairperson of Punjab Kala Parishad, Surjit Patar and president of
Punjabi Sahit Akademi, Lakhwinder Singh Johal.

70. (d) The Incumbent President of Germany, Frank Walter Steinmeier, was re-elected by the parliamentary assembly for the next five years (2022-2027).
i. He has been serving as President of Germany since 19 March 2017.
About Germany :
Capital- Berlin
Currency- Euro
Chancellor- Olaf Scholz

71. (d) Indian Space Research Organisation's (ISROs) Polar Satellite Launch Vehicle (PSLV-C52) successfully injected Earth Observation Satellite (EOS-04), with 2 rideshare satellites viz, INSPIREsat-1 & INS-2TD into a sun-synchronous polar orbit of 529 km altitude from Satish Dhawan Space Centre (SDSC), Sriharikota Range (SHAR), Andhra Pradesh.
i. EOS-04 satellite weighs about 1,710 kg, generating 2,280 Watt power with a mission life of 10 years.
ii. INSPIREsat-1 satellite is around 8.1-kilogram with 1-year mission life.
iii. INS-2TD, satellite weighs around 17.5 kilograms with 6 months operational lifetime and it.

72. (d) Padma Bhushan Rahul Bajaj, Indian Industrialist & former chairman of Bajaj Group has passed away in Pune, Maharashtra.
i. The government of India honoured him with the Padma Bhushan, the third-highest civilian award of India in 2001 for Trade and Industries.
ii. He has served as the President of the Confederation of Indian Industry (CII) from 1979 to 1980 and served a 2nd term as President of CII from 1999-2000.
iii. From 2006 to 2010 he served as a member of the Rajya Sabha (from Maharashtra), the upper house of the Parliament.

73. (a) Like charges repel each other, while unlike charges attract each other. Charge is generated by rubbing objects against each other. It is a convention to call the charge acquired by a glass rod when it is rubbed with silk as positive. The other kind of charge is called negative. When charge moves, electricity is generated. The process of sending the extra charge from a charged object is called Earthing.

74. (a) Avogadro's number, or Avogadro's constant, is the number of particles found in one mole of a substance. It is the number of atoms in exactly 12 grams of carbon-12. This experimentally determined value is approximately 6.0221×10^{23} particles per mole. Avogadro's number may be designated using the symbol L or N_A Note that Avogadro's number, on its own, is a dimensionless quantity. In chemistry and physics, Avogadro's number usually refers to a number of atoms, molecules, or ions, but it can be applied to any "particle." For example, 6.02×10^{23} elephants are the number of elephants in one mole of them! Atoms, molecules, and ions are much less massive than elephants, so there needed to be a large number to refer to a uniform quantity of them so that they could be compared relative to each other in chemical equations and reactions.

75. (b) The chemical properties of an element are determined by the configuration of its electrons in orbit around its nucleus. The number of electrons in orbit is equal to the number of protons in the nucleus (each proton has an electrical charge of plus one, while each electron has the same charge only negative one). Since all atoms (of all element are electrically neutral), the number of electrons in orbit around the nucleus equals the number of protons in those nuclei, so the electrical charges balance each other. It is the way that these electrons orbit the nucleus (according to definite laws) that determines each element's chemical properties. See a Periodic Table of the Elements. The number of protons in the nucleus of an atom is its Atomic Number.

76. (c) The atomic structure of an element refers to the constitution of its nucleus and the arrangement of the electrons around it. Primarily, the atomic structure of matter is made up of protons, electrons, and neutrons. The protons and neutrons make up the nucleus of the atom, which is surrounded by the electrons belonging to the atom. The atomic number of an element describes the total number of protons in its nucleus. Neutral atoms have equal numbers of protons and electrons.

However, atoms may gain or lose electrons in order to increase their stability, and the resulting charged entity is called an ion. Atoms of different elements have different atomic structures because they contain different numbers of protons and electrons. This is the reason for the unique characteristics of different elements. অ্যাচিভার্স

77. (c) A nanometer (also "nanometre") is a unit of measurement used to measure length. One nanometer is one billionth of a meter, so nanometers are certainly not used to measure long distances. Instead, they serve to measure extremely small objects, such as atomic structures or transistors found in modern CPUs. A single nanometer is one million times smaller than a millimeter. If you take one thousandth of a millimeter, you have one micrometer, or a single micron. If you divide that micron by 1,000, you have a nanometer. Needless to say, a nanometer is extremely small. Since integrated circuits, such as computer processors, contain microscopic components, nanometers are useful for measuring their size. In fact, different eras of processors are defined in nanometers, in which the number defines the distance between transistors and other components within the CPU. The smaller the number, the more transistors that can be placed within the same area, allowing for faster, more efficient processor designs. অ্যাচিভার্স

78. (b) Graphite does not leave any residue when burnt in air because:- Graphite is completely made up of carbon, and when we burn it in ample amount of oxygen it does not leave any residue behind. Graphite is non-flammable but can be burnt only in high temperatures. Graphite needs around 400 degrees to get burnt. It reduces when combined with air. It acts as a reducing agent.

79. (d) A substance in solid state has high intermolecular forces and hence has the least intermolecular spaces. So if compression is done here, then there is little or negligible amount of space for the molecules to come further closer. Hence, they are the least compressible. অ্যাচিভার্স

80. (d) Carbon dioxide, Nitrous Oxide, Methane and Water vapour, all are greenhouse gases. These gases trap the heat energy and keep the atmosphere warm. This is called the Greenhouse effect. Without them, life would not be possible on the earth, but excessive greenhouse effect has become a problem.

81. (c) Gravitation is not the property of only Earth. In reality, all the objects of the universe, apply force on each other, regardless of their size. Gravitational force is responsible for the water in rivers to flow downstream. অ্যাচিভার্স

82. (b) Magnetic force, electrostatic force and gravitational force are examples of non-contact forces. This force can act on objects, despite of not being in contact with the same. Friction and muscular forces are examples of contact forces. These forces need to be in contact with the objects to act on them. অ্যাচিভার্স

83. (c) Endocrine glands release hormones directly into the bloodstream, and hence are also called ductless glands. Sex hormones are also secreted through endocrine/ductless glands. Estrogen and testosterone are sex hormones which are responsible for secondary sexual characters. Estrogen is the female hormone and testosterone is the male hormone, secreted by ovary in females and testes in males respectively. This sex hormone is responsible for the development of facial hair, enlargement of voice box (larynx, Adam's apple) etc in males. Due to an enlarged voice box, boys have a deeper voice and girls have a high pitched voice. Secondary sexual characters like development of breasts and mammary glands in females is caused by estrogen. The secretion of these sex hormones is regulated by a separate hormone, secreted by the pituitary. It regulates the maturation of egg/ovum in the ovary and sperms in the testes.

84. (b) There are many types of cells in the human body, which differ in shape and labour. The function of receiving messages and transmitting is performed by nerve cells. These cells are long and branched. Similarly, blood cells are circular and muscle cells are spindle shaped. In case of plant cells, amoeba is a cell which has an irregular shape. The irregular shape of amoeba results in the formation of pseudopodia, which provides it motion and helps in capturing food. অ্যাচিভার্স

85. (d) Various components of the cell have a boundary, which is known as plasma membrane or cell membrane. This membrane separates one cell from another and also from the

surrounding medium. It is porous and allows various substances t enter the cell. This membrane provides structure to the plant and animal cells. Cytoplasm is a jelly like substance, which is found between the cell membrane and nucleus. The other components of the cell (mitochondria, golgi complex, ribosomes, etc) are found in the cytoplasm itself. Nuclei are circular in shape and present in the central region of the cytoplasm. The nuclear membrane separates the nucleus from the cytoplasm. This nuclear membrane is also porous ad regulates the incoming and outgoing of materials between the cytoplasm and the nucleus. This nuclear membrane is absent in the bacterial cells. Nucleolus and chromosomes are present within the nucleus. Chromosomes are present within the nucleus. Chromosomes carry genes and can be seen only when the cell divides. These help in inheritance or transfer of characters from the parents to the offsprings. অ্যাচিভার্স

86. (d) An organism comprising of one cell is called unicellular. Amoeba, paramecium, hen's egg and White Blood Cells are all examples of unicellular organisms. Organisms made up of more than one cell are called multicellular. In unicellular organisms, the single cell itself performs all the activities that multicellular organisms do, like respiration, growth, excretion, reproduction, etc; which are performed by groups of tissues in multicellular organisms.

87. (d) Cloning is the production of an exact copy of a cell, any other living part, or a complete organism. Cloning of an animal was successfully performed for the first time by Ian Wilmut and his colleagues at the Roslin Institute in Edinburgh, Scotland. During the process of cloning Dolly, a cell was collected from the mammary gland of a female Finn Dorset sheep. Simultaneously, an egg was obtained from a Scottish blackface ewe. The nucleus was removed from the egg. Then, the nucleus of the mammary gland cell from the Finn Dorset sheep was inserted into the egg of the Scottish blackface ewe whose nucleus had been removed. The egg thus produced was implanted into the Scottish blackface ewe. Development of this egg followed normally and finally Dolly was born. অ্যাচিভার্স

88. (a) Fertilization occurring outside the body, artificially, is called in vitro fertilization. If the sperms are unable to reach the egg, due to blockage in the oviduct, the doctor collects fresh sperms and eggs; and fertilizes them in appropriate media for several hours, to bring about IVF or In vitro fertilization. If fertilization occurs, the zygote is allowed to develop for around a week, following which, it is transferred to the mother's uterus. The test tube baby is born like any other baby and its complete development takes place in the uterus. A baby born through this technique is called a test tube baby. This is misleading because babies do not grow in a test tube. অ্যাচিভার্স

89. (c) The plants and animals found in a particular area are termed as flora and fauna of that are(a) Endemic species are those species of plants and animals which are found exclusively in a particular are(a) They are not naturally found anywhere else.

90. (c) The substances which vapourise on combustion, produce flame. The flame produced during the combustion of candle has three parts: non luminous zone, luminous zone and noncombustible zone. Unburnt carbon particles are present in the luminous zone of the flame. The non-luminous zone of the candle flame has the highest temperature. It is the outermost region of the flame, which is blue in colour. অ্যাচিভার্স

91. (b) Naphthalene balls are obtained from coal tar. Coke, coal tar and goal gas are all obtained from coal. Natural gas is stored under high pressure as compressed natural gas (CNG). India has vast reserves of natural gas. Natural gas has been found in Tripura, Rajasthan, Maharashtra and in the Krishna (Godavari delta).

92. (d) Some of the most common properties of Aluminium are good thermal conductivity, malleability, light weight and high melting point which make it useful for making cooking utensils. অ্যাচিভার্স

93. (c) Karma dance is a traditional dance of central and Eastern India annually performed during the karma festival. It is performed in State of Chhattisgarh, Jharkhand, Bihar, Madhya Pradesh, Odisha and West Bengal. This folk dance is performed during the worship of the god of fate which is known as Karam Devta.

94. (d) The brain cells have least regenerative power in human body. While the brain has a limited capacity for regeneration, endogenous neural stem cells, as well as numerous pro-

regenerative molecules, can participate in replacing and repairing damaged or diseased neurons and glial cells. অ্যাচিভার্স

95. (d) China successfully launched the Earth observation satellite, 'Gaofen-5 02' on September 7, 2021. It is the 24th satellite of the 'Gaofen' series. The satellite was launched from the Taiyuan Satellite Launch Center in Shanxi province on a Long March 4C carrier rocket. It is a hyperspectral satellite. It will be used for comprehensive environmental monitoring, aiming to improve the country's hyperspectral observation capacity of the atmosphere, water and land. The satellite and carrier rocket were developed by the Shanghai Academy of Spaceflight Technology under the China Aerospace Science and Technology Corporation. The first of the 'Gaofen' series satellites, 'Gaofen- 1' was launched in 2013.

96. (b) The World Book of Records United Kingdom (UK) has officially certified Atal Tunnel as the World's Longest Highway Tunnel above 10,000 Feet (~3048 Meters) from the Mean Sea Level (MSL). অ্যাচিভার্স

About Atal Tunnel :

Constructed by Border Roads Organization (BRO) connecting Manali, Himachal Pradesh (HP) to the Lahaul-Spiti Valley in HP, this 9.02 kilometer long tunnel is worth Rs 3300 crores.

i. It is built in Pir Panjal Range of Himalayas.
ii. It is also the world's longest and highest motorable tunnel running across the 13,050 ft high Rohtang Pass.

97. (b) In accordance with the "Global Entrepreneur ship Monitor 2021/2022 Global Report : Opportunity Amid Disruption", unveiled at the Dubai Expo, India is among the top five easiest places to start a new business & low-income economies.

i. Easy to start a business category India placed 4th globally. It was topped by Saudi Arabia and followed by Netherlands & Sweden. অ্যাচিভার্স
ii. There are good opportunities to start a business in their area As per this, India secured 2nd place globally Saudi Arabia Topped in this Category.

98. (b) Paisabazaar.com, a digital platform for consumer credit, has partnered with RBL Bank Limited to offer 'Paisa on Demand' (PoD), a credit card that will be exclusively available on the Paisabazaar platform.

Aim - To build products that offer integrated services for the large under-served segments across India. অ্যাচিভার্স

99. (c) Indian biologist Shailendra Singh won the 16th Behler Turtle Conservation Award in September 2021. Shailendra Singh was named to lead the Turtle Survival Alliance (TSA)/Wildlife Conservation Society (WCS) India turtle programme in 2008. He has been awarded for bringing three critically endangered turtle conservation species back from the brink of extinction. The Behler Turtle Conservation Award was established in 2006. The award is widely considered the "Nobel Prize" of turtle conservation and biology.

100.(c) India's largest open-air fernery was inaugurated at Ranikhet in Uttarakhand's Almora district on September 12, 2021. The fernery was inaugurated by Dr Nilambar Kunetha, a well-known pteridophyte. It has been developed by the research wing of the Uttarakhand Forest Department over a period of three years, under the Central government's Compensatory Afforestation Fund Management scheme.

———★★★———