

## WBCS (Main) Exam Paper – IV Practice Set

### Answers with Explanation

1. (a) The density of dry air is more than that of moist air (when moisture is removed from air, its density increases). The speed of sound in a medium is inversely proportional to the square root of its density. Therefore, the speed of sound in moist air is more than that in dry air.
2. (c) An oven that uses micro radiation waves as a source of heat in order to cook food as opposed to a fire source. Conceptualized in 1946, Dr. Perry Spencer allegedly discovered the heating properties of microwaves while studying the magnetron. A microwave oven, often colloquially shortened to microwave, is a kitchen appliance that heats food by dielectric heating accomplished with radiation used to heat polarized molecules in food. Microwave ovens heat foods quickly and efficiently because excitation is fairly uniform in the outer 25–38 mm of a dense (high water content) food item; food is more evenly heated throughout (except in thick, dense objects) than generally occurs in other cooking techniques. A microwave oven works by passing non-ionizing microwave radiation, usually at a frequency of 2.45 gigahertz (GHz)—a wavelength of 122 millimetres (4.80 in)—through the food. Microwave radiation is between common radio and infrared frequencies. শ্রীচিভর্ষ
3. (d) When heated from 0° to 10°C volume of a given mass of water will first decrease and then increase. If the word “ice” or “solid” is not mentioned, the word “water” means liquid water. Water vapor can be produced from the evaporation or boiling of liquid water. So the volume first decreases and then increases again when water droplets form from the vapours due to stoppage of heat. শ্রীচিভর্ষ
4. (c) Cloudless nights are colder because the nights that have clouds provide a blanket for the earth and trap some of the hot day air where as the cloudless nights have no protection so all the hot air rises up into the sky. radiation is a process in which energetic particles or energetic waves travel through vacuum, or through matter-containing media that are not required for their propagation. Waves of a massive medium itself, such as water waves or sound waves, are usually not considered to be forms of “radiation” in this sense. By contrast, gravitational waves, which are waves of space-time itself, qualify as a type of radiation. শ্রীচিভর্ষ
5. (d) The time period ‘T’ of a simple pendulum is given by  $T = 2\pi\sqrt{\frac{l}{g}}$  where l is the length and g is the acceleration due to gravity. Let us suppose g be to be a constant, then  $T = 2\pi\sqrt{l}$ . So the time period of a pendulum is directly proportional to the square root of its length. So, if the length increases, its time period also increase. It means that it takes longer to complete one oscillation. So when its length is halved, its time period is decreased by a factor of  $\sqrt{2}$ . শ্রীচিভর্ষ
6. (b) In summer, when the barometer falls suddenly, a thunderstorm can be expected, and if it does not rise again upon its cessation, the weather will probably continue unsettled for several days. In summer, when a thunderstorm happens, there is little or no depression of the barometer.
7. (c) A type of glass that contains cerium and other rare earths and has a high absorption of ultraviolet radiation is used in sunglasses. Sunglasses or sun glasses are a form of protective eyewear designed primarily to prevent bright sunlight and high-energy visible light from damaging or discomforting the eyes. They can sometimes also function as a visual aid, as variously termed spectacles or glasses exist, featuring lenses that are coloured, polarized or darkened. In the early 20th century they were also known as sun cheaters. The colour of the lens can vary depending on style, fashion, and purpose, but for general use, red, grey, green, or brown are recommended to avoid or minimize colour distortion, which could affect safety when, for instance, driving a car or a school bus. শ্রীচিভর্ষ
8. (b) Voltages and currents for AC circuits are generally expressed as rms (root mean square) values. For a sine wave, the relationship

between the peak and the rms average is: rms value = 0.707 peak value.

শ্রীচিড়াক্স

9. (d) Graphite has a tendency to behave very much like a metal because the carbon molecules arrange themselves into a lattice structure. The crystal lattice is the same orientation that metal forms, and it allows the free-movement of electrons, making it a good electrical conductor. The characteristics possessed by the graphite for conduction is far better than the dry air paper and kerosene and that's what makes it a good conductor.
10. (b) In photosynthesis, solar energy is converted to chemical energy. The chemical energy is stored in the form of glucose (sugar). Carbon dioxide, water, and sunlight are used to produce glucose, oxygen, and water. Photosynthesis is a process used by plants and other organisms to convert the light energy captured from the sun into chemical energy that can be used to fuel the organism's activities. Photosynthesis occurs in plants, algae, and many species of bacteria, but not in archaea. Photosynthetic organisms are called photo-autotrophs, since they can create their own food. In plants, algae, and cyanobacteria, photosynthesis uses carbon dioxide and water, releasing oxygen as a waste product. Photosynthesis is vital for all aerobic life on Earth.
11. (b) The visible spectrum is the portion of the electromagnetic spectrum that is visible to (can be detected by) the human eye. Electromagnetic radiation in this range of wavelengths is called visible light or simply light. A typical human eye will respond to wavelengths from about 390 to 750 nm in terms of angstrom it is in between  $3900 \text{ \AA} - 7600 \text{ \AA}$ . In terms of frequency, this corresponds to a band in the vicinity of 400–790 THz. A light-adapted eye generally has its maximum sensitivity at around 555 nm (540 THz), in the green region of the optical spectrum (luminosity function). The spectrum does not, however, contain all the colours that the human eyes and brain can distinguish. Unsaturated colours such as pink, or purple variations such as magenta, are absent, for example, because they can be made only by a mix of multiple wavelengths.
12. (c) In this case the given equation shows that the velocity is linear with time and therefore the particle is moving with constant acceleration

because for a particle to acquire constant acceleration the graph of the velocity time graph should be in linear with the time function.

13. (a) An electrostatic precipitator (ESP), or electrostatic air cleaner is a particulate collection device that removes particles from a flowing gas (such as air) using the force of an induced electrostatic charge. An electrostatic precipitator (ESP) or electrostatic air cleaner is a particulate collection device that removes particles from a flowing gas (such as air) using the force of an induced electrostatic charge. Electrostatic precipitators are highly efficient filtration devices that minimally impede the flow of gases through the device, and can easily remove fine particulate matter such as dust and smoke from the air stream. In contrast to wet scrubbers which apply energy directly to the flowing fluid medium, an ESP applies energy only to the particulate matter being collected and therefore is very efficient in its consumption of energy (in the form of electricity).
14. (c) The spectrum of the Sun's solar radiation is close to that of a black body with a temperature of about 5,800K. The Sun emits Electromagnetic radiation across most of the electromagnetic spectrum. Although the Sun produces Gamma rays as a result of the nuclear fusion process, these super high energy photons are converted to lower energy photons before they reach the Sun's surface and are emitted out into space. nuclear fusion is a nuclear reaction in which two or more atomic nuclei join together, or "fuse", to form a single heavier nucleus. During this process, matter is not conserved because some of the mass of the fusing nuclei is converted to energy which is released. Fusion is the process that powers active stars. The fusion of two nuclei with lower masses than iron (which, along with nickel, has the largest binding energy per nucleon) generally releases energy, while the fusion of nuclei heavier than iron absorbs energy.
15. (d) It is because of the capillary action phenomenon because of which oil rise up the wick in a lamp. Capillary action, or capillarity, is the ability of a liquid to flow in narrow spaces without the assistance of, and in opposition to external forces like gravity. The effect can be seen in the drawing up of liquids between the hairs of a paint-brush, in a thin

tube, in porous materials such as paper, in some non-porous materials such as liquefied carbon fiber, or in a cell. It occurs because of inter-molecular attractive forces between the liquid and solid surrounding surfaces.

16. (a) Most of the ultraviolet radiation in sunlight is absorbed by oxygen in Earth's atmosphere, which forms the ozone layer of the lower stratosphere. UV light is found in sunlight (where it constitutes about 10% of the energy in vacuum) and is emitted by electric arcs and specialized lights such as black lights. It can cause chemical reactions, and causes many substances to glow or fluoresce. Most ultraviolet is classified as non-ionizing radiation. The higher energies of the ultraviolet spectrum from wavelengths about 10 nm to 120 nm ('extreme' ultraviolet) are ionizing, but this type of ultraviolet in sunlight is blocked by normal di-oxygen in air, and does not reach the ground. In addition to short wave UV blocked by oxygen, a great deal (>97%) of mid-range ultraviolet (almost all UV above 280 nm and most above 315 nm) is blocked by the ozone layer, and like ionizing short wave UV, would cause much damage to living organisms if it penetrated the atmosphere. **অ্যাচিভর্স**
17. (b) Car head lights have concave mirrors because it collects and focuses as much as possible of the light from the bulb and send it out as a fairly tight beam in one direction only. The bulb of the head light is placed at the focal point. The reflected light is parallel and gives more visibility to the driver at night.
18. (c) Galileo is often credited with being the first scientist to try to determine the speed of light. Galileo's experiment was carried out by the Accademia del Cimento of Florence, Italy, in 1667, with the lanterns separated by about one mile, but no delay was observed. The actual delay in this experiment would have been about 11 microseconds. The first quantitative estimate of the speed of light was made in 1676 by Romer. From the observation that the periods of Jupiter's innermost moon Io appeared to be shorter when the Earth was approaching Jupiter than when receding from it, he concluded that light travels at a finite speed, and estimated that it takes light 22 minutes to cross the diameter of Earth's orbit. **অ্যাচিভর্স**
19. (c) The atmosphere of Earth is a layer of gases surrounding the planet Earth that is retained

by Earth's gravity. The atmosphere protects life on Earth by absorbing ultraviolet solar radiation, warming the surface through heat retention (greenhouse effect), and reducing temperature extremes between day and night (the diurnal temperature variations). Air is the name given to the atmosphere used in breathing and photosynthesis. Dry air contains roughly (by volume) 78.09% nitrogen, 20.95% oxygen, 0.93% argon, 0.039% carbon dioxide, and small amounts of other gases. Air also contains a variable amount of water vapor, on average around 1%. While air content and atmospheric pressure vary at different layers, air suitable for the survival of terrestrial plants and terrestrial animals is currently only known to be found in Earth's troposphere and artificial atmospheres. Air is mainly composed of nitrogen, oxygen, and argon, which together constitute the major gases of the atmosphere. The remaining gases are often referred to as trace gases, among which are the greenhouse gases such as water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Filtered air includes trace amounts of many other chemical compounds. **অ্যাচিভর্স**

20. (a) Liquid hydrogen (LH<sub>2</sub>) is the liquid state of the element hydrogen. Hydrogen is found naturally in the molecular H<sub>2</sub> form. To exist as a liquid, H<sub>2</sub> must be cooled below hydrogen's critical point of 33 K. However, for hydrogen to be in a full liquid state without evaporating at atmospheric pressure, it needs to be cooled to 20.28 K (-423.17°F/-252.87°C). One common method of obtaining liquid hydrogen involves a compressor resembling a jet engine in both appearance and principle. Liquid hydrogen is typically used as a concentrated form of hydrogen storage. **অ্যাচিভর্স**
21. (c) Because of the Archimedes' principle, a lifting gas is required for aerostats to create buoyancy. Its density is lower than that of air (about 1.29 kg/m<sup>3</sup>, 1.29 g/L). Only certain lighter than air gases are suitable as lifting gases. Hydrogen and helium are the most commonly used lift gases. Although helium is twice as heavy as (diatomic) hydrogen, they are both so much lighter than air that this difference is inconsequential. Both provide about 9.8 N of lift (1 Newton is the force required to accelerate 1 kg at 1 m/sec<sup>2</sup>) per cubic meter of gas at STP. Helium is the second lightest

gas. For that reason, it is an attractive gas for lifting as well. A major advantage is that this gas is noncombustible. Today helium is used instead of hydrogen, since it is inert so non-flammable which makes things a lot safer. Hydrogen can ignite very easily when mixed with the oxygen of the surrounding air.

22. (a) There is no lead in pencils. Rather, the core is made up of non-toxic mineral called graphite. The common name “pencil lead” is due to an historic association with the stylus made of lead in ancient Roman times. Most pencil cores are made of graphite mixed with a clay binder, leaving grey or black marks that can be easily erased. Graphite pencils are used for both writing and drawing, and the result is durable: although writing can usually be removed with an eraser, it is resistant to moisture, most chemicals, ultraviolet radiation and natural aging. Other types of pencil core are less widely used. Charcoal pencils are mainly used by artists for drawing and sketching. Coloured pencils are sometimes used by teachers or editors to correct submitted texts but are more usually regarded as art supplies, especially those with waxy core binders that tend to smear on paper instead of erasing. Grease pencils have a softer crayon-like waxy core that can leave marks on smooth surfaces such as glass or porcelain. শ্রেণিভিত্তিক
23. (c) A nuclear reactor is a device to initiate and control a sustained nuclear chain reaction. Most commonly they are used for generating electricity and for the propulsion of ships. Usually heat from nuclear fission is passed to a working fluid (water or gas), which runs through turbines that power either ship’s propellers or generators. Some produce isotopes for medical and industrial use, and some are run only for research. In nuclear engineering, a neutron moderator is a medium that reduces the speed of fast neutrons, thereby turning them into thermal neutrons capable of sustaining a nuclear chain reaction involving uranium-235. Commonly used moderators include regular (light) water (roughly 75% of the world’s reactors), solid graphite (20% of reactors) and heavy water (5% of reactors). Beryllium has also been used in some experimental types, and hydrocarbons have been suggested as another possibility.
24. (c) Railway tracks are banked on curves so that necessary centripetal force may be obtained

from the horizontal component of the weight of the train. It helps the train to stay on the track as it negotiates the curve. The raised track provides required centripetal force to enable it to move round the curve. শ্রেণিভিত্তিক

25. (b) The greenhouse effect is a process by which thermal radiation from a planetary surface is absorbed by atmospheric greenhouse gases, and is re-radiated in all directions. Since part of this re-radiation is back towards the surface and the lower atmosphere, it results in an elevation of the average surface temperature above what it would be in the absence of the gases. The environmental effects of carbon dioxide are of significant interest. In the earth’s atmosphere, it acts as a greenhouse gas which plays a major role in global warming and anthropogenic climate change. Also a major source of ocean acidification is  $\text{CO}_2$  which dissolves in water forming carbonic acid, which is a weak acid, because  $\text{CO}_2$  molecule ionization in water is incomplete. শ্রেণিভিত্তিক
26. (b) Formic acid is the simplest carboxylic acid. Its chemical formula is  $\text{HCOOH}$  or  $\text{HCO}_2\text{H}$ . It is an important intermediate in chemical synthesis and occurs naturally, most notably in the venom of bee and ant stings. Citric acid is a weak organic acid. It is a natural preservative/conservative and is also used to add an acidic, or sour, taste to foods and soft drinks. Citric acid exists in greater than trace amounts in a variety of fruits and vegetables, most notably citrus fruits. Lemons and limes have particularly high concentrations of the acid; it can constitute as much as 8% of the dry weight of these fruits. Tartaric acid is a white crystalline diprotic organic acid. It occurs naturally in many plants, particularly grapes, bananas, and tamarinds, is commonly combined with baking soda to function as an antioxidant.
27. (d) A flue-gas stack is a type of chimney, a vertical pipe, channel or similar structure through which combustion product gases called flue gases are exhausted to the outside air. Flue gases are produced when coal, oil, natural gas, wood or any other fuel is combusted in an industrial furnace, a power plant’s steam-generating boiler, or other large combustion device. Flue gas is usually composed of carbon dioxide ( $\text{CO}_2$ ) and water vapor as well as nitrogen and excess oxygen remaining from the intake combustion air. It also contains a small

percentage of pollutants such as particulate matter, carbon monoxide, nitrogen oxides and sulfur oxides. The flue gas stacks are often quite tall, up to 400 metres (1300 feet) or more, so as to disperse the exhaust pollutants over a greater area and thereby reduce the concentration of the pollutants to the levels required by governmental environmental policy and environmental regulation.

প্র্যাচিভার্স

28. (d) The composition of the human body can be looked at from the point of view of either mass composition, or atomic composition. To illustrate both views, the human body is 70% water, and water is 11% hydrogen by mass but 67% hydrogen by atomic percent. Thus, most of the mass of the human body is oxygen, but most of the atoms in the human body are hydrogen atoms. Almost 99% of the mass of the human body is made up of the six elements oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus. Only about 0.85% is composed of another five elements: potassium, sulfur, sodium, chlorine, and magnesium. All are necessary to life. The remaining elements are trace elements, of which more than a dozen are thought to be necessary for life, or play an active role in health (e.g., fluorine, which hardens dental enamel but seems to have no other function).
29. (b) Biogas typically refers to a gas produced by breakdown of organic matter in the absence of oxygen. Organic waste such as dead plant and animal material, animal feces, and kitchen waste can be converted into a gaseous fuel called biogas. Biogas originates from biogenic material and is a type of bio fuel. Biogas is produced by the anaerobic digestion or fermentation of biodegradable materials such as biomass, manure, sewage, municipal waste, green waste, plant material, and crops. Biogas comprises primarily methane ( $\text{CH}_4$ ) and carbon dioxide ( $\text{CO}_2$ ) and may have small amounts of hydrogen sulphide ( $\text{H}_2\text{S}$ ), moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide ( $\text{CO}$ ) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel. Biogas can be used as a fuel in any country for any heating purpose, such as cooking.
30. (a) Aqua regia or nitro-hydrochloric acid is a highly corrosive mixture of acids, a fuming yellow or red solution. The mixture is formed by

freshly mixing concentrated nitric acid and hydrochloric acid, usually in a volume ratio of 1:3. It was named so because it can dissolve the so-called royal or noble metals, gold and platinum. However, titanium, iridium, ruthenium, tantalum, osmium, rhodium and a few other metals are capable of withstanding its corrosive properties. Aqua regia is also used in etching and in specific analytic procedures. It is also used in some laboratories to clean glassware of organic compounds and metal particles. This method is preferred over the “traditional” chromic acid bath for cleaning NMR tubes, because no traces of paramagnetic chromium can remain to later spoil acquired spectra.

প্র্যাচিভার্স

31. (a) Our bones and teeth are generally made up of Tricalcium Phosphate. Tricalcium phosphate is a calcium salt of phosphoric acid with the chemical formula  $\text{Ca}_3(\text{PO}_4)_2$ . It is also known as tribasic calcium phosphate and bone phosphate of lime, BPL. Calcium phosphate is one of the main combustion products of bone. The skeletons and teeth of vertebrate animals are composed of calcium phosphate.
32. (a) Angora wool refers to the downy coat produced by the Angora rabbit. Angora is known for its softness, thin fibres, and what knitters refer to as a halo (fluffiness). It is also known for its silky texture. It is much warmer and lighter than wool due to the hollow core, Angora rabbits produce coats in a variety of colours, from white through tan, gray, and brown to black.
33. (b) An onion has a modified form of stem called a bulb, or more specifically a tunicate bulb. In this type of modified stems, the stem is enclosed by a covering of leaves and it is underground. The bulb contains a few outside layers that are dry and membranous that encircle the bulb, which is where tunicate comes from. Nutrients for the plant are stored within the bulb.
34. (c) As the intestine is a soft tissue structure, it is not usually seen on a plain X-ray. By using barium to coat the inner lining of this area the Radiologist can see the bowel clearly on the X-ray screen, and can watch the way it functions during this study. A small lubricated plastic tube will be inserted through your nostril or mouth and down into your stomach by the Doctor or Nurse. This can be a little uncomfortable, but a

- combination of anaesthetic jelly and spray minimizes the discomfort. শ্রীচিড়াক্স
35. (d) Cone cells, or cones, are photoreceptor cells in the retina of the eye that are responsible for color vision, they function best in relatively bright light, as opposed to rod cells that work better in dim light. Cone cells are densely packed in the fovea, but quickly reduce in number towards the periphery of the retina. It allow the perception of colour. শ্রীচিড়াক্স
36. (c) Prior of the implantation of the blastocyst the uterus of the recipient mother should be made ready to receive the embryo. This is usually done with the hormonal treatment. The blastocyst is introduced into the uterus by one of the two methods-by using a catheter through the vagina and cervical canal to the womb or directly into the uterus through a cut made in the wall of the uterus. The womb of the mother under the influence of the hormones develops the endometrium and the blastocyst gets implanted and the normal process of pregnancy continues. শ্রীচিড়াক্স
37. (a) Breathing sixteen times every minute an average volume of air amounting to 30 cubic inches, we find that the expired air amounts to no less than 17 cubic feet per hour. This contaminated air contains only 16 per cent of oxygen, and 4.5 per cent of carbonic acid gas, and is sufficient to vitiate no less than 3,000 cubic feet of fresh air. Pure fresh air contains from 0.03 to 0.04 per cent of carbonic acid gas, or at the most, .4 volumes per thousand volumes of air. Careful investigation shows that when further carbonic acid gas has been added raising the amount to more than .6 volumes per 1000 of fresh air that an unpleasant odour rapidly becomes perceptible and the air gets to be "close," musty, or foul. According to these figures a person in a room ten feet square by ten feet high containing a 1000 cubic feet of air requires to have this air completely replaced twice during the hour so as to furnish 3,000 cubic feet of fresh air hourly in order to prevent the carbonic acid gas exceeding .06 per cent.
38. (a) AIDS viruses have single stranded RNA. It is composed of two copies of positive single-stranded RNA that codes for the virus's nine genes enclosed by a conical capsid composed of 2,000 copies of the viral protein. The single-stranded RNA is tightly bound to nucleocapsid proteins.
39. (d) If we look at the dermis, the layer on the skin beneath the epidermis (outer layer), and a certain type of cell within this layer, called a fibroblast, we find that the fibroblasts in the soles and palms secrete higher levels of a protein known as dickkopf 1, or DKK1, than the fibroblasts in the dermis at other body sites. It is believed that the rich source of DKK1 in these areas affects the epidermal layer above it and creates the physical characteristics of thickened, paler skin. DKK1 thickens the epidermis by increasing the number of skin cells and their density. Three genes affected by DKK1 – keratin 9,  $\alpha$ KLEIP and  $\beta$ -catenin – have been found to cause this thickening. Keratin 9 reinforces the skin against physical impact,  $\alpha$ KLEIP aids in cell division (multiplying) and makes cells smaller and, finally, a reduction in  $\beta$ -catenin is also possibly involved in cell contraction (making the cells more compact). শ্রীচিড়াক্স
40. (a) The main constituent of alcohol is Ethanol and the concentration of ethanol in a sample can be determined by back titration with acidified potassium dichromate. Reacting the sample with an excess of potassium dichromate, all ethanol is oxidized to acetic acid. One major application for this reaction is in old police breathalyzer tests. When alcohol vapor makes contact with the yellow dichromate-coated crystals, the color changes from yellow to green. The degree of the color change is directly related to the level of alcohol in the suspect's breath. শ্রীচিড়াক্স
41. (d) Camels, in ideal conditions, can go 6-7 months without water but as the temperature rises they have to drink water more often. Camels are well known for their humps. They do not, however, literally store water in them as is commonly believed, though they do serve this purpose through roundabout means. Their humps are a reservoir of fatty tissue, while water is stored in their blood. However, when this tissue is metabolised, it is not only a source of energy, but yields through reaction with oxygen from the air 1111 g of water per 1000 g of fat. This allows them to survive without water for about two weeks, and without food for up to a month. Camels are able to withstand changes in body temperature and water consumption that would kill most other animals. Their temperature ranges from 34°C

at night and up to 40°C during the day. Camels rarely sweat, even when ambient temperatures reach 49°C. Any sweat that does occur evaporates at the skin level rather than at the surface of their coat, and the heat of vaporization therefore comes from body heat rather than ambient heat. Camels can withstand losing 25% of their body weight to sweating (most mammals can withstand only about 12–14% dehydration before cardiac failure results from circulatory disturbance). A feature of their nostrils is large amounts of water vapor in their exhalations is trapped and returned to their body fluids, thereby reducing the amount of water lost through respiration. The kidneys and intestines of a camel are very efficient at retaining water.

প্র্যাচিডার্স

42. (b) Severe acute respiratory syndrome (SARS) is a serious form of pneumonia. It is caused by a virus that was first identified in 2003. Infection with the SARS virus causes acute respiratory distress (severe breathing difficulty) and sometimes death. SARS is a dramatic example of how quickly world travel can spread a disease. It is also an example of how quickly a connected health system can respond to a new health threat. SARS is caused by a member of the coronavirus family of viruses (the same family that can cause the common cold). It is believed the 2003 epidemic started when the virus spread from small mammals in China.

প্র্যাচিডার্স

43. (c) The body needs access to iron to produce red blood cells. A lack of iron can lead to anaemia. Vitamin A has an essential role in vision (especially night vision), normal bone growth, reproduction and the health of skin and mucous membranes. It also acts as an antioxidant, protecting the body from harmful free radicals - this may help to reduce the risk of certain forms of cancer. Vitamin C is needed for normal growth and development, growth and repair of tissues within the body, formation of collagen, cartilage, bones and teeth, and wound healing. A deficiency can result in scurvy. This causes muscle weakness, joint pain and problems with wound healing. It can also lead to loose teeth, bleeding and swollen gums, easily bruised skin and fatigue, and sometimes depression. Having too little calcium in the diet increases risk of a hormone condition that can cause bone fractures and kidney stones.

Primary hyperparathyroidism (PHPT) affects around one in 800 people during their lifetime and is most common in post-menopausal women.

প্র্যাচিডার্স

44. (b) Green House Effect is a process by which thermal radiation from a planetary surface is absorbed by atmospheric greenhouse gases and is re-radiated in all directions.

45. (a) Biomagnification is the sequence of processes in an ecosystem by which higher concentrations of a particular chemical such as the pesticide DDT, are reached in organisms higher up the food chain.

46. (d) The daily salt intake of camels is eight times that of a typical cow or sheep. Yet, surprisingly, they do not develop high blood pressure. Similarly, their blood sugar levels are twice those of other cudchewing animals; still they do not develop diabetes.

প্র্যাচিডার্স

47. (b) According to the noise pollution rules, the permissible noise level during the day is 50dB in silence zones, 55dB in residential areas, 65 dB in commercial areas and 75 dB in industrial areas. The night time permissible levels for silence zones, residential areas, commercial areas and industrial areas are respectively 40 dB, 45 dB, 55 dB and 70 dB.

48. (d) A limnic eruption, also referred to as a lake overturn, is a rare type of natural disaster in which dissolved carbon dioxide (CO<sub>2</sub>) suddenly erupts from deep lake water, suffocating wildlife, livestock and humans. Such an eruption may also cause tsunamis in the lake as the rising CO<sub>2</sub> displaces water.

প্র্যাচিডার্স

49. (d) Fine particles known as PM-10 and PM-2.5 can penetrate deep into the lungs, creating health problems. People with heart or lung diseases, older adults, and children are most likely to have problems because of contact with particle pollution. Short-term exposure to PM among pregnant women has been associated with prematurity and growth retardation.

50. (a) The conference was held in Stockholm, the capital of Sweden, in 1972. The conference is widely recognized as the beginning of modern political and public awareness of global environmental problems.

প্র্যাচিডার্স

51. (b) Yeast are eukaryotic, single-celled microorganisms classified as members of the fungus kingdom. They are estimated to constitute 1% of all described fungal species. Yeasts, such as *Candida albicans*, are opportunistic

- pathogens and can cause infections in humans.
52. (c) Arson is the crime of intentionally and maliciously setting fire to buildings, wild land areas, vehicles or other property with the intent to cause damage. Distinct from spontaneous combustion and natural wildfires, it is considered to be a man-made disaster which is socially induced. শ্রীচিড়াক্ষ
53. (c) The first programming languages predate the modern computer. At first, the languages were codes. The first modern programming language was FORTRAN (1955), the “FORMULA TRANSLATOR”, invented by John Backus, then COBOL,(1959) the Common Business Oriented Language, was used. Then PASCAL and BASIC came into existence.
54. (d) A computer virus is a computer programme that can replicate itself and spread from one computer to another. The term “virus” is also commonly, but erroneously, used to refer to other types of malware, including but not limited to adware and spyware programs that do not have a reproductive ability. Malware includes computer viruses, computer worms, Trojan horses, most rootkits, spyware, dishonest adware and other malicious or unwanted software, including true viruses.
55. (b) Euclid, also known as Euclid of Alexandria, was a Greek mathematician, often referred to as the “Father of Geometry”. He was active in Alexandria during the reign of Ptolemy I (323–283 BC). Euclid deduced the principles of what is now called Euclidean geometry from a small set of axioms. Euclid also wrote works on perspective, conic sections, spherical geometry, number theory and rigor. Although many of the results in Elements originated with earlier mathematicians, one of Euclid’s accomplishments was to present them in a single, logically coherent framework, making it easy to use and easy to reference, including a system of rigorous mathematical proofs that remains the basis of mathematics 23 centuries later. শ্রীচিড়াক্ষ
56. (b) An optical fiber (or optical fibre) is a flexible, transparent fiber made of glass (silica) or plastic, slightly thicker than a human hair. It functions as a waveguide, or “light pipe”, to transmit light between the two ends of the fiber. The field of applied science and engineering concerned with the design and application of optical fibers is known as fiber optics. Optical fibers are widely used in fiber-optic communications, which permits transmission over longer distances and at higher bandwidths (data rates) than other forms of communication. Narinder Singh Kapany (born 31 October 1926 in Moga, Punjab, India) is an Indian born American physicist invented optical fibre. শ্রীচিড়াক্ষ
57. (b) A videotape is a recording of images and sounds on to magnetic tape as opposed to film stock used in film making or random access digital media. Videotapes are also used for storing scientific or medical data, such as the data produced by an electrocardiogram. Charles P. Ginsburg invented the videotape. He worked for Ampex, and was inspired by the reel-to-reel machines used for recording sound.
58. (b) The Mars Orbiter Mission, also called Mangalyaan, is India’s first interplanetary mission. Launched by the Indian Space Research Organisation (ISRO) on 5 November 2013, it is a space probe orbiting Mars since 24 September 2014. With Mangalyaan’s success, India became first Asian nation to reach Mars orbit, and the first nation in the world to do so in its first attempt. শ্রীচিড়াক্ষ
59. (a) Dakshin Gangotri was the first scientific base station of India situated in Antarctica, part of the Indian Antarctic Program. It is located at a distance of 2,500 kilometres from the South Pole. It was abandoned in 1988-1989 after it was submerged in ice. It was succeeded by the Maitri. শ্রীচিড়াক্ষ
60. (a) The engineless airplanes, called gliders, depend totally on wind energy for their flight. Special surfaces on the wings of the planes can be manipulated by the pilot to change the way air flows around the wings, thereby controlling the lifts and the altitude of the plane.
61. (b) G. Sankara Kurup better known as Mahakavi G (The Great Poet G), was the first winner of the Jnanpith Award, India’s highest literary award. He won the prize in 1965 for his collection of poems in Malayalam Odakkuzhal (The bamboo flute, 1950). With part of the prize money he established the literary award Odakkuzhal in 1968. He was also the recipient of the Soviet Land Nehru Award, in 1967, and the Padma Bhushan in 1968. শ্রীচিড়াক্ষ
- Note : The first recipient of the award was the Malayalam writer G. Sankara Kurup who received the award in 1965 for his collection



of poems, *Odakkuzhal* (The Bamboo Flute), published in 1950. In 1976, Bengali novelist Ashapoorna Devi became the first woman to win the award for novel *Pratham Pratisruti* (The First Promise). The most recent 52nd Jnanpith Award recipient of the award is Bengali poet and critic Shankha Ghosh who was awarded for the year 2016.

প্র্যাচিভর্স

62. (a) Electrical engineer, Jack Kilby invented the integrated circuit aka the microchip. By definition the intergrated circuit or microchip is a set of interconnected electronic components such as transistors and resistors, that are etched or imprinted on a onto a tiny chip of a semiconducting material, such as silicon or germanium. The microchip shrunk the size and cost of making electronics and impacted the future designs of all computers and other electronics. The first successful demonstration of the microchip was on September 12, 1958.

প্র্যাচিভর্স

63. (c) *The Gin Drinkers* has been authored by Sagarika Ghose who is an Indian journalist, news anchor and author. The book was published in 1998. Her other famous book is *Blind Faith* (2006).

64. (d) *Worshipping False Gods* is a book by Arun Shourie. In this book, he criticized B.R. Ambedkar, the leader of Dalits, for alleged complicity with the British and lust for power and wealth. In Pune, his face was blackened by Dalit peoples for criticizing Ambedkar in his book.

প্র্যাচিভর্স

65. (d) Human Rights Day is celebrated annually across the world on 10 December. The date was chosen to honour the United Nations General Assembly's adoption and proclamation, on 10 December 1948, of the Universal Declaration of Human Rights (UDHR), the first global enunciation of human rights.

66. (a) International Women's Day is celebrated on March 8 every year. Though the first International Women's Day event was run on 19 March in 1911, for the United Nations, the Day has been observed on 8 March since 1975. The official United Nations theme for International Women's Day 2015 is "Empowering Women - Empowering Humanity: Picture It!"

প্র্যাচিভর্স

67. (b) The United Nations Security Council (UNSC) is one of the principal organs of the United Nations and is charged with the maintenance

of international peace and security. Its powers, outlined in the United Nations Charter, include the establishment of peacekeeping operations, the establishment of international sanctions, and the authorization of military action. Its powers are exercised through United Nations Security Council resolutions. The Security Council held its first session on 17 January 1946 at Church House, Westminster, London. Since its first meeting, the Council, which exists in continuous session, has travelled widely, holding meetings in many cities, such as Paris and Addis Ababa, as well as at its current permanent home at the United Nations Headquarters in New York City. There are 15 members of the Security Council, consisting of five veto-wielding permanent members—China, France, Russia, the United Kingdom, and the United States—based on the great powers that were the victors of World Wa, and 10 elected non-permanent members with twoyear terms.

68. (d) Batting Crease or Popping Crease is drawn parallel to the bowling crease at a distance of 4 feet or 121.92 cms. A run is completed each time the two batsmen cross this crease at their opposite ends. As mentioned above for a Bowling Crease, if a bowler oversteps this crease in his delivery stride then the delivery is declared as a no-ball. This crease comes into picture during the ruling of run outs and stump outs. A batsman has a choice of standing outside the batting crease. He can be stumped out by the wicket keeper if he is out of this crease or on it after playing a delivery as long as the ball is in play.

প্র্যাচিভর্স

69. (c) In 1928, the team won its first Olympic gold medal and until 1956, the Indian men's team remained unbeaten in the Olympics, winning six gold medals in a row. In total, the Indian field hockey team has won eight Olympics gold medals — the highest among all national teams. India won the last Gold Medal in this event in 1980 in Moscow when they defeated Spain 4-3 in the medal match.

প্র্যাচিভর্স

70. (d) The butterfly (colloquially among swimmers known as fly) is a swimming stroke swum on the breast, with both arms moving simultaneously, accompanied by the butterfly kick (also known as the "dolphin kick"). While other styles like the breaststroke, front crawl, or backstroke can be swum adequately by beginners, the butterfly is a more difficult

- stroke that requires good technique as well as strong muscles. It is the newest swimming style swum in competition, first swum in 1933 and originating out of breaststroke. অ্যাচিভার্স
71. (d) The Khadi and Village Industries Commission has appointed Sunil Sethi as its Advisor. Sunil Sethi is the Chairman of the Fashion Design Council of India. He has been appointed for a period of one year.
72. (c) Government of India has approved the name of Former Foreign Service officer, Yashvardhan Kumar Sinha as the new Chief Information Commissioner.
73. (d) Computer scientist Russell Kirsch who invented the “pixel” and scanned the world’s first digital photograph, passed away. অ্যাচিভার্স
74. (d) Fino Payments Bank has launched an Aadhaar Authentication based digital savings account “Jan BachatKhata” which will provide new age digital banking experience to customers.
75. (c) ICICI Bank has launched a new product named iStartup 2.0, to cater to the banking needs of startups and entrepreneurs.
76. (d) Former Lok Sabha MP and Bollywood actor, Paresh Rawal have been appointed as the new chief of National School of Drama by President Ram Nath Kovind. অ্যাচিভার্স
77. (b) Hubballi Railway Station in Karnataka will now be known as ‘Shree Siddharoodha Swamiji Railway Station. Union government has approved long-pending demand of Hubballians of renaming the Hubballi railway station.
78. (d) FICCI Ladies Organization (FLO) has appointed Assam-based entrepreneur Jahnabi Phookan as its National President.
79. (d) The Norwegian Nobel Committee has decided to award the Nobel Peace Prize for 2020 to the World Food Programme (WFP).
80. (b) The Uttar Pradesh government has signed a concession agreement with representatives of Zurich Airport International for designing, building and operating Noida International Airport at Jewar for a period of 40 years. The airport will be developed as a Public-Private Partnership (PPP) and is scheduled to open in 2024. অ্যাচিভার্স
81. (d) Indian Administrative Services (IAS) officer, Rajiv Jalota has been appointed as the chairman of Mumbai Port Trust (MbPT)
82. (d) The Nobel Prize in Literature for 2020 is awarded to the American poet Louise Glück “for her unmistakable poetic voice that with austere beauty makes individual existence universal”. অ্যাচিভার্স
83. (c) Using data from the Stratospheric Observatory for Infrared Astronomy (SOFIA) Airborne Telescope, researchers scanned the lunar surface at a more precise wavelength than had been used before — six microns instead of three. This allowed them to distinguish the spectral fingerprint of molecular water.
84. (d) The Indian Institute of Technology, Kanpur (IIT-K) and the Archaeological Survey of India have signed an agreement with two institutions from Italy, seeking restoration and protection of historical monuments. অ্যাচিভার্স
85. (d) In Shooting, the world number one Elavenil Valarivan of India won gold worth USD 1000 in women’s event of the 2020 Sheikh Russel International Air Rifle Championship.
86. (d) Railway Protection Force (RPF), Visakhapatnam has started implementing ‘Meri Saheli’ initiative in AP Express (Visakhapatnam to New Delhi), in order to provide proactive security to women passengers.
87. (a) India has invited Australia to participate in its trilateral naval exercise “Malabar-2020” which is scheduled to be held in November 2020, in the Bay of Bengal and the Arabian Sea. It is held annually between US-India-Japan.
88. (d) The International Chefs Day is observed every year on 20 October. The theme of International Chefs Day 2020 campaign is Healthy Food for the Future. অ্যাচিভার্স
89. (d) Senior IPS officer, M A Ganapathy has been appointed as the Director-General of Bureau of Civil Aviation Security (BCAS).
90. (a) Sanjay Bhatia was appointed as Lokayukta of Maharashtra.
91. (c) West Indies batsman Marlon Samuels has announced his retirement from all forms of professional cricket. অ্যাচিভার্স
92. (d) A new book titled “Till We Win” by AIIMS Director Randeep Guleria and two other doctors will give a definitive account of India’s fight against Covid-19 and how to deal with the pandemic in the days to come.
93. (b) A K Gupta, the new Managing Director and CEO of ONGC Videsh Limited (OVL) took charge.
94. (c) A two-day joint coastal security exercise, “Sagar Kavach” was launched at Paradip Coast, Odisha. The exercise is being carried out by a joint effort of the state of Odisha and West Bengal governments.

95. (d) Manipur's Gyanendro Ningombam was elected unopposed as the President of Hockey India, while former President Mohd Mushtaque Ahmad is back in the Hockey India Executive Board after being Elected Unopposed for the Senior Vice President post. শ্রীমুখার্জি
96. (a) Andaman and Nicobar Command (ANC) has conducted a three-day Tri-Service Combat Exercise code-named "Bull Strike" at Teresa Island in Nicobar Group of Islands.
97. (b) Government of Australia has appointed former cricketer, Matthew Hayden and Indian-origin politician Lisa Singh as trade envoys for advancing business ties with India.
98. (d) Small Industries Development Bank of India has launched one-stop knowledge portal "MSMESaksham" in association with TransUnion CIBIL. The platform has been launched for micro, small and medium enterprises. শ্রীমুখার্জি
99. (a) Flipkart has signed an MoU with IIT Patna to encourage industry focused applied research in the areas of Artificial Intelligence, Natural Language Processing and Machine Learning.
100. (b) Vinod Kumar Singh, the Minister for Backward and Extremely Backward Classes in Bihar has passed away after being infected with COVID-19.

