

1st Prelim - Model Answer Paper Red 1

Time : 2 Hrs.

Science and Technology (Part 2)

Marks : 40

A.1.	(A) Write the correct alternative.	
1.	Asexual reproduction in Hydra is referred to as budding .	1
2.	<i>Streptomyces</i> has the capacity to decompose rubber from garbage.	1
3.	Transcription uses antisense DNA strand as template strand.	1
4.	Wind power has geographical limitations.	1
5.	Bat is included in Mammalia class.	1
A.1.	(B) Answer the following question.	
1.	Wisdom teeth : Vestigial organs : : Lungfish : Connecting Link .	1
2.	Vitamin - B. All other Vitamins are fat soluble, but Vitamin - B is water soluble.	1
3.	True.	1
4.	(1 - b)	1
5.	ADDICTION	1
A.2.	(A) Give scientific reasons.	
1.	i. <i>Balanoglossus</i> is an organism which is structurally intermediate between two different groups - Non-chordates and chordates.	2
	ii. Non-chordates do not have notochord whereas, chordates have either notochord or vertebral column in their body.	
	iii. In <i>Balanoglossus</i> , notochord is present in proboscis region and only half notochord is present. Hence, it is called as Hemichordata.	
	iv. Since, it belongs to Phylum Hemichordata, it shows the characters of both the groups chordata and non-chordata.	
	v. Hence, <i>Balanoglossus</i> is a connecting link between non - chordates and chordates.	
2.	i. Nuclear fission is the process in which heavy nucleus is broken down into smaller nuclei with the release of energy and neutrons.	2
	ii. Nuclear fission is unnatural and produces high temperature.	
	iii. In nuclear power plants, a controlled chain reaction results in release of thermal energy, which is used for electric energy generation.	

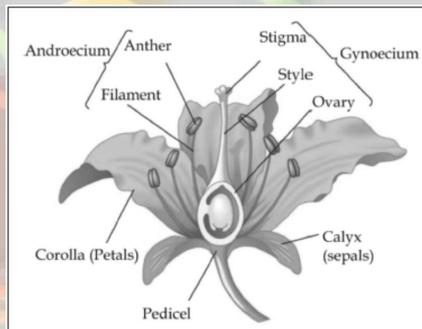
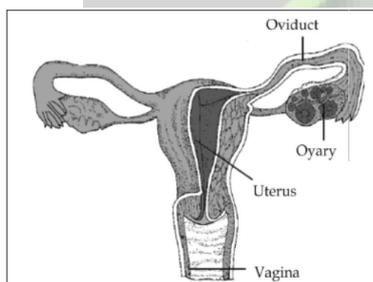
	<p>iv. But, if the nuclear fission reaction turns uncontrollable, it causes fission of these uranium atoms and it may cause several accidents and can be very fatal.</p> <p>v. Hence, it is necessary to control the fission reaction in nuclear power plants.</p>	
3.	<p>i. Due to the property of cell division, a new organism is formed from the existing one.</p> <p>ii. Cell division also helps in growth and development.</p> <p>iii. A multicellular organism grows up and emaciated body can be restored.</p> <p>iv. Formation of gametes for sexual reproduction also occurs in cell division.</p> <p>v. Hence, cell division is considered as one of the very important property of cells and organisms.</p>	2
A.2.	(B) Answer the following questions:	2
1.	<p>(a) To reduce pollution</p> <p>(b) To prevent extinction of plants and animals</p> <p>(c) To preserve the planet for future generation</p> <p>(d) To preserve biodiversity</p>	
2.	I would first explain my friend the hazards of snapping selfies. I will show how to stop the habit by involving himself/herself in some constructive work.	2
3.	<p>a. Terrorism - Man-made disaster</p> <p>b. Soil erosion - Geophysical disaster</p> <p>c. Hepatitis - Biological disaster</p> <p>d. Forest fire - Biological disaster</p>	2
4.	Fuels obtained by microbial processes are:	2
	<p>i. Gaseous fuel: Methane can be obtained by microbial anaerobic decomposition of urban agriculture and industrial waste.</p> <p>ii. Ethanol (alcohol) is a clean (smokeless) fuel obtained during fermentation of molasses by the yeast - Saccharomyces.</p> <p>iii. Hydrogen gas is considered to be the fuel of future. Hydrogen gas is released during biophotolysis of water in which bacteria perform the photo reduction.</p> <p>iv. It is necessary to increase the use of microbial fuel because, of the following reason:</p> <p>a. They are clean and eco-friendly.</p> <p>b. The energy production is from renewable resource such as waste</p>	

	<p>water, urban agriculture and industrial waste and from organic waste.</p> <p>c. These fuels are inexhaustible.</p>									
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A.3.	<p>Attempt the following questions.</p> <p>1. a. nasal cavity b. oral cavity c. pharynx d. bronchi e. diaphragm f. alveoli g. larynx h. lung</p> <p>2. i. Vaccine is the 'antigen' containing material given to acquire either permanent or temporary immunity against a specific pathogen or disease. ii. Proteins which act as antigen are injected in pure form instead of injecting the killed or semi-killed pathogens. iii. These proteins keep the person away from diseases, by maintaining their immune system active. iv. Thus, injecting the antigens is the safest way in vaccination. v. Vaccines produced with the help of biotechnology are more thermostable and they remain active for longer duration. Eg. Vaccines of polio, hepatitis, etc.</p> <p>3. (a) <i>Lactobacillus brevis</i> (b) Separating seeds from fruits (c) <i>Saccharomyces cerevisiae</i> (d) Wine (e) <i>Saccharomyces cerevisiae</i> (f) Cider</p> <p>4. i. Basic functional unit used to study the ecology is called as ecosystem. ii. Environment consists of many ecosystems. iii. A small pond is an ecosystem whereas, the Earth is largest ecosystem.</p>	3 3 3 3								

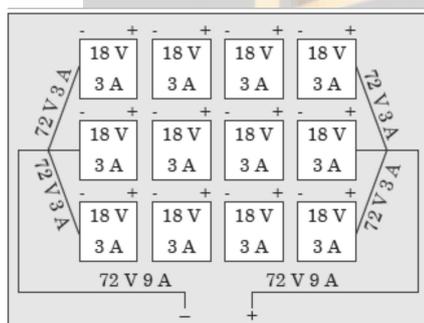
	<p>iv. Basically, environment consists of two basic factors – a. Biotic factors, b. Abiotic factors</p> <p>v. In brief, biotic and abiotic factors occupying a definite geographical area and their interactions collectively constitute the ecosystem.</p> <p>vi. Biotic components include living organisms such as micro-organisms, plants, animals, and human beings.</p> <p>vii. Abiotic components includes air, water, soil, temperature, sun, humidity, etc.</p> <p>viii. The science that deals with the study of interactions between these biotic and abiotic factors of the environment is called as ecology.</p> <p>5. i. Unified Movement against Tobacco - This movement has been started by 45 different well-known organizations like WHO, Tata trust. etc. This movement is active for controlling the tobacco consumption and providing guidance to activists against tobacco.</p> <p>ii. Salaam Mumbai Foundation - This organization runs programs in various schools in Mumbai to empower the children living in slum area in the field of education, sports, arts and business. This organization encourages the children to take education by helping them to improve their health and lifestyle.</p> <p>iii. Helplines - Phone number / helpline numbers are published in newspaper to help the children in distress or facing any type of problem. Children contact the helpline to narrate their problems. Proper help and guidelines are offered to children.</p> <p>6. A. Earthquakes: During earthquakes, people die due to the collapse of the buildings. Thus, it is advised to leave the building and occupy an open area when earthquake happens. If in building/house, one should cover their head or should hide underneath a table. Switch off any power supply. Be calm, use torch if necessary, stay in vehicle if in journey.</p> <p>B. Fire: If fire happens in a building, keep the doorways, corridors and paths clear and unobstructed, so people may escape without any obstructions. Try to extinguish fire. Call for immediate help.</p> <p>C. Snake bite: In the case of snake bite, immediate call should be made for medical help. A loose and a sterile a bandage should be applied over the wound and the person should be calm until the medical help arrives. Do not apply a tourniquet, cut the wound or attempt to suck the venom out.</p> <p>7. i. Degenerated or underdeveloped useless organs of organisms are called as vestigial organs.</p>	<p>3</p> <p>3</p> <p>3</p>
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<p>8.</p>	<p>ii. In living organisms, sudden development of new tissues or organs for living in changing environment is not possible. Instead, existing organs undergo gradual changes.</p> <p>iii. Mostly, a specific structure in the body is useful under certain situations, however same structure under different situation may become useless or even harmful.</p> <p>iv. Such organs begin to degenerate as per the principle of natural selection.</p> <p>v. These organs though non-functional in certain organism; may be functional in other organisms.</p> <p>vi. These organs indicate similarities in two different organisms, providing evidences to evolution.</p> <p>Examples of vestigial organs are appendix, tail-bone, wisdom teeth, etc. Muscles of ear pinna, which are useless to humans, are useful in monkeys for movement of ear pinna. Appendix which is useless to human beings is useful and a fully functional organ in ruminants.</p> <table border="1" data-bbox="319 1008 1300 1467"> <thead> <tr> <th data-bbox="319 1008 805 1052">Platyhelminthes</th> <th data-bbox="805 1008 1300 1052">Aschelminthes</th> </tr> </thead> <tbody> <tr> <td data-bbox="319 1052 805 1131">i. They are called as 'flat worms'.</td> <td data-bbox="805 1052 1300 1131">i. They are called as 'round worms'.</td> </tr> <tr> <td data-bbox="319 1131 805 1209">ii. Body of these animals is slender and flat like a leaf or a strip.</td> <td data-bbox="805 1131 1300 1209">ii. Body of these animals is long thread-like or cylindrical.</td> </tr> <tr> <td data-bbox="319 1209 805 1265">iii. Body is acoelomate.</td> <td data-bbox="805 1209 1300 1265">iii. Body is pseudocoelomate.</td> </tr> <tr> <td data-bbox="319 1265 805 1467">iv. These animals are hermaphrodite, i.e. male and female reproductive systems are present in the same animal body.</td> <td data-bbox="805 1265 1300 1467">iv. These animals are unisexual i.e. sexes are separate animal body.</td> </tr> </tbody> </table> <p>Similarities: Animals belonging to both the phyla are:</p> <p>i. Helminthes (worms).</p> <p>ii. Mostly endoparasites.</p> <p>iii. Triploblastic and bilaterally symmetrical.</p> <p>A.4. Answer the following questions.</p> <p>1. i. 1. The main difference between the two is that, 1. Flowering plants can produce lots of offspring but humans can produce only limited number of offsprings.</p> <p>2. In plants, the male part is known as androecium and it consist of anther and filament. Whereas in humans, male part is penis and testes.</p>	Platyhelminthes	Aschelminthes	i. They are called as 'flat worms'.	i. They are called as 'round worms'.	ii. Body of these animals is slender and flat like a leaf or a strip.	ii. Body of these animals is long thread-like or cylindrical.	iii. Body is acoelomate.	iii. Body is pseudocoelomate.	iv. These animals are hermaphrodite, i.e. male and female reproductive systems are present in the same animal body.	iv. These animals are unisexual i.e. sexes are separate animal body.	<p>3</p> <p>5</p>
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3. The female part in plants is stigma and ovary, and in humans it is ovary, uterus and the oviduct.
- ii. The above figures show reproductive system of human (female) and plants respectively.
 1. All organs of the female reproductive system are in abdominal cavity. It includes a pair of ovaries, a pair of oviducts, single uterus, and a vagina. Besides, a pair of Bartholin gland is also present.
 2. Flower is structural unit of sexual reproduction in plants. It consists of four floral whorls as calyx, corolla, androecium and gynoecium; arranged in sequence from outside to inside. Androecium and gynoecium are the essential whorls which help in reproduction, whereas; calyx and corolla are accessory whorls which help in the protection of inner whorls.



2.



- i. Solar panels are connected in series and in parallel to generate required current and potential differences.
- ii. Here potential differences is 18 V and current is 3 A
- iii. To obtain a potential difference of 72 V, the given 4 panels are connected in series. ($V = V_1 + V_2 + V_3 + V_4 = 18 + 18 + 18 + 18 = 72 \text{ V}$)
- iv. To obtain a current of 9A, the given 3 panels are connected in parallel. ($I = I_1 + I_2 + I_3 = 3 + 3 + 3 = 9 \text{ A}$)

