

# SAMPLE PAPER

## 2019 NEET

### BIOLOGY

SET-1

Roll No.

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## ANSWER AND SOLUTION

- (b)  
The UN conference of parties on climate change in the year 2011 from 28<sup>th</sup> November to 1<sup>st</sup> December was held at Durban South Africa.
- (c)  
High noise pollution levels cause cardiovascular, neurological effects on the human body. If one person is exposed to such condition for a longer period of time, he will suffer from stress and anxiety disorders.
- (d)  
DDT is banned because, it shows deleterious effects on organisms and is found in considerably high toxic amount in all trophic level organisms. It is degraded biologically and has long residual effects on almost all living organisms due to the high concentration of accumulation in higher trophic levels, i.e. biomagnification.
- (c)  
The management of National Park is controlled by United Nations. National parks are large areas of native land set a site or designed for the conversations purposes of plants and animals.  
The largest national park is world meeting the International Union of Conservation of Nation (IUCN) is the North-East Greenland National Park.



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5. (c)  
Joint Forest Management (JFM) is introduced as to work closely with the local communities for protecting and managing forests.
6. (b)  
Shifting cultivation results into deforestation. Botanical gardens have collection of living plants for reference. Seed banks store seeds as a source for planting in case seed reserves elsewhere are destroyed. Field gene banks are a type of biorepository, which preserve genetic material.
7. (a)  
The given figure shows spindle-shaped pyramid of number in single tree ecosystem. Here, a single large sized tree provides food to large number of herbivores which support a few carnivores and the later are eaten by small number of top carnivores. So, here PP is used for producer, i.e. single tree, PC is Primary Consumer, i.e. large number of insects, SC is Secondary Consumers, i.e. small insectivorous birds and TC is Top consumers, which may be eagles or falcon, etc.
8. (d)  
All animals depend on plants directly or indirectly for their food needs. They are hence, called consumers and also heterotrophs. If they feed on the producer, the plants (belonging to the first trophic level), they are called primary consumers. Obviously the primary consumers will be herbivores. Some common herbivores are insects, birds and mammals in terrestrial ecosystem and molluscs in aquatic system. Thus, primary consumers belong to the second trophic level.
9. (b)  
Pyramid of energy is graphic representation of energy per unit area sequence-wise in various rising trophic levels with producers at the base and top carnivores at the apex. Pyramid of energy is upright in all cases.
10. (a)  
 $r$ -selected are the species having the ability to produce large number of progenies (offsprings) with small size. The population growth of these species is a function of biotic potential. Hence, option (a) is correct.
11. (c)  
*Parthenium hysterophorus* (carrot grass) is an alien species introduced inadvertently for some economic use, turned invasive causing decline or extinction of the indigenous species.



12. (c)  
In symbiosis, both the organisms in association are benefitted and this association is obligatory. The blue-green alga *Anabaena* reside in coralloid roots of *Cycas* for nitrogen fixation.
13. (a)  
RAPD stand for Random Amplified Polymorphic DNA. It is a type of PCR reaction, but the segments of DNA that are amplified are random. Often, PCR is used to amplify a known DNA sequence.
14. (b)  
*Bacillus thuringiensis* is the bacterium which produces Bt toxin. The gene encoding for Bt toxin, i.e. cry gene is widely cloned and expressed in plants to provide resistance to insects without the need of insecticides. This bacterium produces a protein that kills certain insects such as *Lepidopterans*, *Coleopterans* and *Dipterans*.
15. (d)  
Ori represents the site of origin of replication, *rop* represents the proteins that take part in the replication of plasmid. *Hind* III, *Eco* RI are the recognition sites of restriction endonucleases and *amp*<sup>R</sup> and *tet*<sup>R</sup> are the antibiotic resistant genes.
16. (b)  
Plasmids replicate autonomously. These carry a signal situated at their replication origin, which determines how many copies are to be made and this number can be artificially increased for cloning a given gene.
17. (a)  
*Agrobacterium tumefaciens* (updated scientific name : *Rhizobium radiobacter*) is the casual agent of crown gall disease (the formation of tumour) in over 140 species of dicot. It is a rod-shaped, Gram negative soil bacterium (Smith, *et. al*, 1907). Symptoms are caused by the insertion of a small segment of DNA, known as T-DNA (transfer DNA) into the plant cell, which is incorporated at a semi-random location into the plant genome.
18. (b)  
*Rhizobium leguminosarum* is a symbiotic bacteria found in root nodules of legume. This bacterium has nitrogen *Nif* gene and fixing N<sub>2</sub>. Soybean is a legume. Thus, *Rhizobium* is used as a biofertiliser for raising soybean crop.
19. (c)  
During sewage treatment, biogas includes mixture of gases such as methane, hydrogen sulphide and carbon dioxide.

20. (c)  
Fowl cholera and infectious coryza are bacterial disease of poultry Ranikhet is a viral disease. Aflatoxicosis is a fungal disease. Marek's disease, coccidiosis and scaly legs are other diseases found in poultry.
21. (b)  
Fishes selected for culture practices should have a fast growth rate, high nutrition value, disease resistance and ability to mature early.
22. (d)  
Hisardale is across breed resulting out due to a cross between Bikaneri ewes and Marino Rams.
23. (a)  
Cholera and tetanus are diseases caused by bacteria. Cholera is caused by a bacterium *Vibrio cholerae* and tetanus is caused by a bacterium *Clostridium tetani*. Mumps, influenza, herpes and smallpox are viral diseases. Typhoid is a bacterial disease but, it is not paired with a bacterial disease. Hence, option (a) is correct.
24. (b)  
Colostrum is the first mother's milk which oozes out of the mammary glands of females body after parturition. It acts as natural defense system for a newborn baby as it provides naturally acquired passive immunity to the newborn baby.
25. (a)  
The genetic drift is a drastic change in allele frequency when population size is very small. Its effects are more marked in a small isolated population.
26. (b)  
Allopatric speciation is initiated by the appearance of a geographical isolation when two different species will be formed after long time when species formation takes place in same habitat then this mode of speciation is known as sympatric speciation parapatric speciation occurs in geographically adjacent areas.
27. (b)  
Endemic species are species which are restricted geographically in a particular area at a given time.  
Sibling species are species produced from same parents but they are reproductively isolated from each other.  
Allopatric species are species, which share different geographical area, i.e. these are geographically separated from one another.  
Sympatric species are species, which share the same geographical area.



28. (b)

In RNA, thymine binds with Adenine.

Adenine	....	Uracil
Guanine	....	Cytosine
Cytosine	....	Guanine

So sequence will be UAGAC.

29. (a)

Nucleosomes are beads on a string which consists of 4 types of histone (2 molecules each) on which DNA is wrapped.

30. (a)

Pea flower consists of total of 10 stamens and there is 9 + 1 arrangement of stamens in a pea plant. The filament of a stamen will be joined through much of its length to form a staminal tube and it is this staminal tube which will be surrounding the 10<sup>th</sup> stamen will be free.

31. (d)

Law of dominance states every character is controlled by discrete units called factors. These factors occur in pairs.

When these factors are dissimilar, one will be expressed and it is called the dominant factor and the other called the recessive factor and illustrated by crossing homozygous tall and pure away.

32. (a)

Hysterectomy is surgical removal of the uterus.

33. (b)

Ectopic pregnancy also called tubal pregnancy where implantation of embryo at the site other than uterus.

34. (b)

The ovarian follicle gets transformed into corpus luteum which is acted upon by luteinizing hormone. Now this will cause release of mainly progesterone from the corpus luteum.

35. (a)

The signals for parturition originate from the fully developed fetus and the placenta which induce mild uterine contractions called foetal ejection reflex. This triggers release of oxytocin (birth hormone) from the maternal pituitary gland.



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36. (c)  
Cleistogamous flowers are self pollinators and these are having both anthers and stigma at same level. Basically resort to self pollination both the stigma and anthers mature at same time.
37. (a)  
Normal embryo sac arrangement consists of three antipodal cell, two polar nuclei which later on fuse to form diploid secondary nucleus and one egg cell, two synergids. So arrangement will be  $3 + 2 + 3$ .
38. (c)  
The eyes are the depression which has nodes and internodes. These nodes represent axillary buds.
39. (d)  
Vivipary is the germination of seed on the plant that is why seed cannot be stored under normal conditions for next season.
40. (c)  
The adrenal medulla secretes the epinephrine and nor epinephrine which are responsible for flight and flight reactions. They also increase blood flow to the coronary artery (heart) they will also bring about bronchial dilation.
41. (d)  
Cortisol and testosterone are the hormones which are lipid soluble which can cross the membrane and then will bind to the receptors on the inner aspects.
42. (b)  
Oxytocin produced from posterior pituitary will be bringing about uterine contraction and vaginal stretching thus the foetal ejection reflex occur. It also brings about contraction of myoepithelial cells of mammary gland thus producing milk.
43. (c)  
The vestibular apparatus lies above the cochlea and has receptors called as macula and cristae which play an important role in maintaining the posture and balance.
44. (c)  
The retina of the eye has two types of photoreceptors such as rods and cones. Rods contain rhodopsin which is also called as visual purple - derivative of vitamin A.
45. (a)  
The hypothalamus is a part of the forebrain and responsible for controlling the temperature of the body thus also called as the thermostat of the body. It also controls eating and drinking.



46. (b)

Number of bone in hind limb

Femur	= 1
Tibia fibula	= 2
Patella	= 1
Tarsal	= 7
Meta tarsal	= 5
Phalanges	= 14

47. (a)

Upper jaw in human called Maxillae and lower jaw called Mandibles.

48. (d)

There are 12 pairs of ribs in our body first seven are true ribs which are attached to sternum. 8, 9, 10<sup>th</sup> ribs are false ribs attached by cartilage to sternum 11<sup>th</sup> and 12 floating ribs.

49. (b)

The function of henle's loop is to absorb water from glomerular filtrate and makes the urine concentrated so if Henle's loop were absent then urine will be more dilute.

50. (b)

Since the person is fasting hence the fast break down will start taking place, hence there will be formation of ketone bodies like acetoacetate, beta-hydroxybutyrate.

51. (b)

Arteries have thick wall, narrow lumen but no valve. Endothelium is present in both arteries and veins.

52. (d)

Plant growth and development the stored food in the aleurone layer is mobilised by the hormone gibberellin and acted upon by enzyme like lipase and amylase.

53. (a)

The pigment that control the activities concerned with light and phytochrome pigments like  $p_r$  (phytochrome red) and  $p_{fr}$  (phytochrome far red) both are interconvertible.

54. (b)

Klinostat is an instrument help in study of horizontal growth of plant without being affected by gravity.



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55. (b)  
Planaria posses high capacity of regeneration it can regenerate lost and injured part by proliferation of new cell. The cells from which lost organ or injured tissue is replaced is called the neoblast cell.
56. (b)  
*Pheretima* derive nourishment from the organic matter, decaying fallen leaves etc. these will take in the nutrients in combination with the soil.
57. (b)  
In case of human is biconcave shape and they are enucleated but in case of lama and camel RBC has nucleus. But in case of frog RBC is biconvex and has nucleus.
58. (b)  
Chlorella is employed as a food for human beings as it is highly proteinaceous. It contain 40% protein, 20% carbohydarte, 40% fats and 5% minerals.
59. (b)  
Cyanobacteria (blue green algea) are having chlorophyll and hence they are phototrophs but in the coralloid roots of cycas where they are also found, these exhibit chemo heterotropism and they live in symbiotic relationship.
60. (c)  
In oomycetes the female gamet is larger and non motile while the male gamet in smaller and motile.
61. (b)  
Adipose tissue is a type of loose connective tissue.
62. (b)  
Collagen is major fibrous protein of connective tissue occuring as white fibre produced by fibroblast.
63. (a)  
Transitional epithelium has the capacity of expansion so it is present in uterus and urinary bladder.
64. (a)  
Depending upon the number of protoxylem elements, the roots are monarch (having single protoxylem group) diarch, triarch, tetrach, epntarch hexarch and polyarch. The dicot roots show mono to hexarch condition, whereas the monocot roots are hexarch to polyarch.  
When the protoxylem elements lie towards the centre and metaxylem at the periphery, the condition is said to be endarch, e.g. stem.





65. (d)  
Vascular bundles of monocot stem are conjoint, closed and phloem parenchyma is absent in them. Therefore, no secondary growth is observed in monocot stem, except for few exceptions.
66. (d)  
In dicot stem, central part is pith. Protoxylem is towards the centre, then come the metaxylem, cambium, phloem, pericycle, endodermis, parenchyma, collenchyma and then lastly epidermis.
67. (a)  
Spring wood contains vessels with wider lumen and are formed in spring season. It is light in colour and of lower density.  
Autumn wood contains vessels with narrow lumen and formed in autumn season. It is darker with a higher density.
68. (a)  
The archaeobacteria and eubacteria can tolerate harsh environmental condition such as high range of temperature conditions, salinity and highly acidic condition.
69. (a)  
Interferon are antiviral glycoproteins that are non antigenic and are produced in tissues infected cell. Which produce enzyme that will fight against the action of viruses.
70. (a)  
Cyanobacteria provide good example of the adoptability of life to extreme of the environment (high temperature of hot springs). It is due to the gelatinous sheath that can with stand long precis of dessication. The compactness of protein molecule and the bond in protoplasm also help to face the same.
71. (b)  
Imbricate aestivation is the arrangement five petals being arranged in such a way that one petal is completely external and being other petal. Completely internal while the there petals are partially external and partially internal e.g. cassia, callistemon.
72. (a)  
Actinomorphic can be divided into 3 or more identical sectors, which are related to one another by rotation about the centre of the flower e.g. China rose, zygomorphic flower can be divided by only single plane into too minor images egerchids valvate aestivation the sepal or petal in whose just touch one another at the margin e.g. catastrophes.  
Twisted aestivation – one margin of the appendages overlap that of the next one e.g. China rose, imbricate aestivation the margin of sepal and petal overlap but not necessarily in the specific direction e.g. cassia.



73. (d)

Lemon or citrus, tomato, China rose have axile placentation. It occurs in multicarpellary syncarpous ovary. Inward growth of margins of carpels form a multi carpellary condition which contains axis in the centre which bears ovules.

74. (d)

Photorespiration is a light dependent process which occurs in  $C_3$ -plants. It is opposite of photosynthesis because during this process uptake of  $O_2$  and release of  $CO_2$  take place. Due to presence of Kranz anatomy  $C_4$  plants do not show photorespiration.

75. (b)

PAR (Photosynthetically Active Radiation) designates the spectral range of the solar radiation from 400 to 700 nm that photosynthetic organisms are able to use in the process of photosynthesis. Of the total incident solar radiation the proportion of PAR is less than 50%.

76. (b)

The natural insecticide in neem (*Azadirachta indica*) is azadirachtin. It provides the indigenous way to kill wide variety of insects and pests and serves as broad spectrum pesticide for fruit, vegetables and other agricultural crops. The best part is insects cannot develop resistance against it and remains completely safe for non-targeted insects and human beings.

77. (a)

Cellular pool consists of both organic and inorganic compounds. The relative percentage of each of these is as follows

Water	- 80%
Protein	- 12%
Lipids	- 3.0%
Nucleic acid	- 2.0%
Carbohydrates	- 1.0%
Inorganic salt	- 1.0%

78. (c)

In metaphase of mitosis, spindle fibres attach to kinetochores of chromosomes. Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles.

79. (c)

In general, a gamete contains ' $n$ ' number of chromosomes (haploid) and ' $x$ ' amount of DNA. In comparison to the gamete, a (diploid) somatic cell usually has  $2n$  number of chromosomes and  $2x$  amount of DNA.

But after the cell enters and completes the S-phase of its cell cycle, the DNA content of the cell becomes double (due to its duplication). However, the number of



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chromosomes remains the same.

Hence, the somatic cell that has undergone and completed its S-phase of cell cycle will have twice the number of chromosomes and four times the DNA content. *It can be explained as*

	<b>Chromosome number</b>	<b>DNA content</b>
Gamete	$n$	$x$
Somatic cell (diploid)	$2n$	$2x$
Somatic cell (after S-phase)	$2n$	$4x$

80. (b)

Replication of DNA takes place at S-phase of cell cycle. The number of chromosomes reduced only in meiosis. So, the number remain 14, 14 and 14 in  $G_1$ , after S and after M-phase.

81. (c)

Some photosynthetic bacteria such as Rhodospseudomonas can prepare carbohydrates. But during this type of food synthesis  $O_2$  is not evolved because, in this case hydrogen donor is other than  $H_2O$ . Algae (green and blue-green) and all green plant cells prepare their food (carbohydrate) through photosynthesis. Here, hydrogen ions are donated by water molecules by the process of photolysis of water, i.e.  $O_2$  is released during this type of food synthesis.

82. (b)

Water is an essential constituent of cytoplasm of all living organisms. It helps in distribution of substances within the organism, elimination of waste products, maintenance of body temperature, etc. It is absent on the moon.

Anaerobic organisms that can live in the absence of  $O_2$ . Light and temperature are already known to exist on the moon.

83. (b)

First living beings were formed in the environment of sea having abundant organic molecules. They absorbed the organic materials for the sake of nutrition and hence, were chemoheterotrophs.

84. (d)

Acetyl Co-A is common to respiration mediated breakdown of fats, carbohydrates fatty acid and glycerol and again fatty acid degraded to acetyl Co-A. Protein first degraded by proteases to individual amino acids which deaminated to puruvic acid and further decarboxylised to acetyl Co-A.

85. (c)

Chemiosmotic theory postulated by the British biochemist Peter Mitchell (1920-22) to explain the formation of ATP in the mitochondrial electron transport chain. As electrons are transferred along the electron carrier system in the inner mitochondrial membrane,



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hydrogen ions (protons) are actively transported into the space between the inner and outer mitochondrial membranes, which thus contains a higher concentration of protons than the matrix. This creates an electrochemical gradient across the inner membrane.

86. (c)

The membrane of bacteria has foldings called mesosomes where respiration occurs. Respiration in animals.

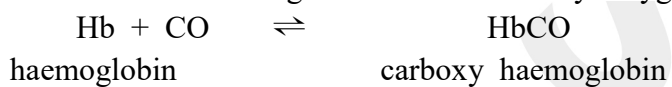
87. (d)

Vital capacity of lungs is largest possible expiration after largest possible inspiration that is greatest. Volume of air can be exchanged in single respiration or amount of air breath in and out with greatest possible efforts.

$$\begin{aligned} VC &= TRV + TV + ERV \\ &= 3000 + 500 + 1100 \\ &= 4600 \text{ ml} \end{aligned}$$

88. (d)

Carbon monoxide forms a stable compound with haemoglobin called carboxy haemoglobin as affinity of Hb for CO is 210 times greater than its affinity for O<sub>2</sub>. In this form haemoglobin does not carry oxygen resulting in death too.



89. (c)

Chlorosis is loss of chlorophyll caused by deficiency of elements, necrosis is death of tissue due to deficiency of Ca, K, Mg, Cu. Shortening of internode also caused by deficiency of mineral nutrition or hormone (gibberellins).

Etiolation is a process in which flowering plants develop in complete or partial absence of light.

90. (a)

Inulin a polymer of fructose, is used as a food store, particularly in roots and tubers of family-Compositae. Pectin is a mucopolysaccharide which is found in cell wall of plants. During the time of food ripening, the pectin becomes hydrolyse and gives rise the constituents of sugar.