DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB35

SYLLABUS : Organisms and Populations

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which part of the world has a high density of organisms?
(a) Grasslands
(b) Savannahs
(c) Deciduous forests
(d) Tropical rain forests

2. Competition for light, nutrients and space is most severe between
(a) closely related organism growing in different habitats
(b) closely related organisms growing in the same habitat
(c) distantly related organisms growing in the same habitat
(d) distantly related organisms growing in different habitats

3. A mutually beneficial association necessary for survival of both partners is
(a) mutualism/symbiosis (b) commensalism
(c) amensalism (d) both (a) and (b)

4. Praying mantis is a good example of
(a) warning colouration
(b) social insects
(c) camouflage
(d) mullerian mimicry

5. In increasing order of organizational complexity, which one of the following is the correct sequence?
(a) Population, species, community, ecosystem
(b) Population, variety, species, ecosystem
(c) Population, ecosystem, species, community
(d) Species, variety, ecosystem, community

6. Keystone species in an ecosystem are those
(a) present in maximum number
(b) that are most frequent
(c) attaining a large biomass
(d) contributing to ecosystem properties

7. Niche overlap indicates
(a) two different parasites on the same host
(b) sharing of one or more resources between the two species
(c) mutualism between two species
(d) active cooperation between two species

RESPONSE GRID					
1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ			

Space for Rough Work

8. Animals that can tolerate a narrow range of salinity are
(a) stenohaline (b) euryhaline
(c) anadromous (d) catadromous

9. Human population growth in India
(a) tends to follow a sigmoid curve as in case of many other animal species
(b) tends to reach a zero population growth as in case of some animal species
(c) can be reduced by permitting natural calamities and enforcing birth control measures
(d) can be regulated by following the national programme of family planning

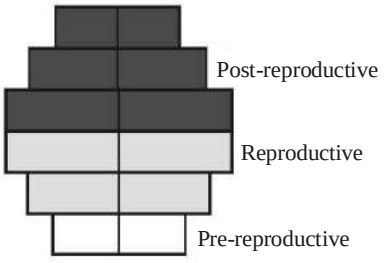
10. Consider the following four conditions (i) - (iv) and select the correct pair of them as adaptation to environment in desert lizards.
The conditions :
(i) Burrowing in soil to escape high temperature
(ii) Losing heat rapidly from the body during high temperature
(iii) Bask in sun when temperature is low
(iv) Insulating body due to thick fatty dermis
(a) (iii), (iv) (b) (i)
(c) (iii), (ii), (iv) (d) (i), (ii)

11. A force acting against achievement of highest possible level of population growth is
(a) Carrying capacity
(b) Environment resistance
(c) Population pressure
(d) Saturation level

12. Natality is the characteristic of a population which means
(a) the total number of individuals present per unit area at a given time
(b) the increase in number of individuals in a population under given environmental conditions
(c) loss of individuals due to death in a population under given environmental conditions
(d) the movement of individuals into and out of population

13. The number of births per thousand people in the population is expressed as :
(a) Reproduction rate (b) Conception rate
(c) Crude birth rate (d) Growth rate

14. What type of human population is represented by the following age pyramid?



(a) Vanishing population
(b) Stable population
(c) Declining population
(d) Expanding population

15. The logistic population growth is expressed by the equation:
(a) $dt/dN = Nr\left(\frac{K-N}{K}\right)$
(b) $dN/dt = rN\left(\frac{K-N}{K}\right)$
(c) $dN/dt = rN$
(d) $dN/dt = rN\left(\frac{N-K}{N}\right)$

16. What is the best pH of soil for cultivation of plants ?
(a) 3.4 – 5.4 (b) 6.5 – 7.5
(c) 4.5 – 8.5 (d) 5.6 – 6.5

17. The maintenance of internal favourable conditions, by a self-regulated mechanism, inspite of the fact that there are changes in the environment, is known as
(a) entropy (b) enthalpy
(c) steady state (d) homeostasis

18. Two different species cannot live for long duration in the same niche or habitat. This law is
(a) Allen's law
(b) Gause's hypothesis
(c) Dollo's rule
(d) Weisman's theory

19. One of the important consequences of geographical isolation is
(a) preventing speciation
(b) speciation through reproductive isolation
(c) random creation of new species
(d) no change in the isolated fauna.

RESPONSE GRID					
	8. ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ
	13. ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ
	18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ			

Space for Rough Work

20. Which one of the following areas in India, is a hotspot of biodiversity?
(a) Eastern Ghats (b) Gangetic Plain
(c) Sunderbans (d) Western Ghats

21. A taxon facing an extremely high risk of extinction in wild in the immediate future is called :
(a) critical endangered
(b) endangered
(c) vulnerable
(d) extinct in wild

22. The species that invade a bare area are called
(a) keystone species (b) extinct species
(c) pioneer species (d) rare species

23. Several plant and animal species present together at a place constitute a
(a) genus (b) population
(c) biome (d) community

24. Deserts, rainforests, tundra, etc. are example of
(a) community (b) biome
(c) ecosystem (d) population

25. Life is sustainable with water only because
(a) it makes 90% of the protoplasm
(b) translocation of nutrients inside the body occurs with the help of water
(c) water loss in form of sweating and transpiration helps to maintain body temperature
(d) all of these

26. Which of the following algae are found in deepest ocean waters?
(a) Red algae (b) Yellow algae
(c) Green algae (d) Brown algae

27. When organisms change their location to escape from harsh environment, it is called as
(a) hibernation (b) vernalization
(c) migration (d) aestivation

28. Species interaction with negative influence on both is referred to as
(a) amensalism (b) mutualism
(c) commensalism (d) competition

29. Total number of individual of a species per unit area and per unit time is called
(a) population size
(b) population density
(c) demography
(d) population dyamics.

30. In a life table, the number of individuals alive at the begining of the 1st year to 2nd year interval is 800. During this interval, 200 individuals die. The death rate for this interval is
(a) 0.25 (b) 200
(c) 800 (d) 0.2

31. Which one of the following is the most productive ecosystem?
(a) Temperate forest (b) Grassland
(c) Desert (d) Tropical rain forest

32. Pedology is the study of –
(a) Locomotion of animals
(b) Rocks
(c) Soil
(d) Reproduction

33. Sequence of humification and mineralisation is-
(a) Dead organic matter → Litter → Duff → Humus → Minerals
(b) Humus → Minerals → Litter → Duff
(c) Minerals → Humus → Litter → Duff
(d) Dead organic matter → Duff → Litter → Minerals → Humus

34. Soil is composed of –
(a) Mineral + Water + Air
(b) Mineral + Organic matter + Water
(c) Mineral + Organic matter + Air + Water
(d) Organic matter + Water

35. Who employed the term ecology to study plants ?
(a) Haeckel (b) Odum
(c) Warming (d) Dudgeon

36. Biotic factors are –
(a) Chemical factors of soil which effect life
(b) Physical factors of soil which effect life
(c) All living organisms which influence other organisms
(d) Atmospheric factors which influence life

RESPONSE GRID					
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
	25. ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ
	30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ
	35. ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ			

Space for Rough Work

37. The age of pyramid with broad base indicates
(a) High percentage of young individuals
(b) Low percentage of young individuals
(c) High percentage of old individuals
(d) Low percentage of old individuals

38. Permafrost is the most distinctive feature of
(a) Taiga (b) Temperate grasslands
(c) Tundra (d) Pacific northwest

39. Which statement does not reflect a reason why grasses predominate in savannas ?
(a) There are few native herbivores in this biome.
(b) Grasses grow well in fine, sandy soils.
(c) The above ground portions of grass plants die during dry seasons.
(d) The deep roots of the grasses can survive many months of drought.

40. Desert regions are characterized by ___ centimeters of rainfall per year.
(a) less than 5 (b) less than 15
(c) less than 25 (d) over 50

41. To avoid summer - related problems such as heat and dessication fish undergoes
(a) hibernation (b) diapause
(c) aestivation (d) none of these

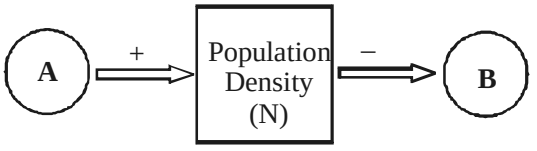
42. Seals have a thick layer of fat (blubber) below their skin that acts as an
(a) thermostat (b) capacitor
(c) resistor (d) insulator

43. Match the following

	Population		**Example**
A.	Predation	I.	*Cuscuta* and hedge plants
B.	Commensalism	II.	*Balanus* and *Chathamalus*
C.	Parasitism	III.	Cactus and moth
D.	Competition	IV.	Orchid and mango

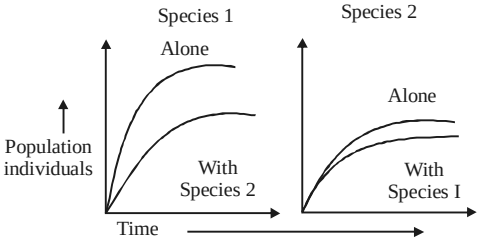
(a) A-III; B-IV; C-I; D-II
(b) A-IV; B-III; C-II; D-I
(c) A-I; B-III; C-II; D-IV
(d) A-III; B-IV; C-II; D-I

44. The density of a population in a given habitat during a given period, fluctuates due to changes in four basic processes On this basis choose the correct option to fill up A and B boxes in the given diagram.



(a) A = Natality + Immigration, B = Mortality + Emigration
(b) A = Natality + Mortality, B = Immigration + Emigration
(c) A = Birth rate + Death rate, B = Mortality + Emigration
(d) A = Natality + Emigration, B = Mortality + Immigration

45. In laboratory experiments, two species of the protist *Paramecium* were grown alone and in the presence of the other species. The following graphs show growth of species 1 (left) and species 2 (right), both along and when in mixed culture.



Interpretation of these graphs shows that
(a) competitive exclusion occurred in these experiments.
(b) both species are affected by interspecific competition but species 1 is less affected.
(c) both species are affected by interspecific competition but species 2 is less affected.
(d) both species are affected equally by interspecific competition.

RESPONSE GRID					
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 35 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB35

1. (d) Tropical rain forests occur in equatorial and subequatorial regions. The forests receive all the external inputs for optimum plant growth. Due to abundant plant growth, a large number of animals live in tropical rain forests. In grasslands fire occur periodically which prevent tree growth. In savannahs, periods of drought are common. In deciduous forests broad leaved hard wood deciduous trees are found predominantly.

2. (b) Competition is most severe between the members of a population belonging to same habitat.

3. (a) Symbiosis or mutualism is a mutually beneficial association necessary for the survival of both the partners.

4. (c) Praying mantis is a good example of camouflage. Camouflage is the natural colouring of an animal which enables it to blend in with its surroundings.

A praying mantis, or praying mantid, is the common name for an insect of the order Mantodea. Often mistakenly spelled **preying mantis** (a tempting mistake, as they are notoriously predatory) they are in fact named for the typical "prayer-like" stance. The word *mantis* derives from the Greek word mantis for prophet or fortune teller.

A praying mantis from **India**

5. (a) Population is an aggregation or grouping of individuals of the same species at the same time in a particular area. Species is a grouping of individuals of one or more populations resembling each other in important morphological, anatomical and biochemical characters and can potentially interbreed. Biotic community is an assemblage of interdependent, and ecosystem is a self sufficient and self regulating segment of nature comprising of a biotic community and its physical environment, both interacting and exchanging materials. The basic level of ecological organisation starts with the individual, the next more complex levels are populations, species, community and then ecosystem.

6. (d) The keystone species in an ecosystem are those who are the main contributors to the ecosystem.

7. (b) Niche indicate the habitat of a particular species and the interaction of that species with the resources present in the habitat. Niche overlap means that two or more species sharing the resources present in a particular niche.

8. (a) **Stenohaline :** Steno meaning narrow and haline meaning salt. A fish cannot handle a wide fluctuation of salt content in water. Many fresh water fish tend to be stenohaline and die in environments of high salinity such as the ocean. Fish living in coastal estuaries and tide pools are often euryhaline (tolerant to changes in salinity) as are many species which have life cycle requiring tolerance to both fresh water and sea water environments such as *Salmon*.

9. (d) Human population growth in India can be regulated by following the national programme of family planning.

10. (b) Some species make permanent burrows deep into the soil to escape high temperature or sunlight and some cold blooded animals often like to bask in the sun to warm up their body.

11. (b) **12. (b)** **13. (c)**

14. (c) This age pyramid represents the declining population of any organism. Population decline is the reduction over time in region's census. It can be caused for several reasons that includes heavy immigration disease, famine or sub-replacement fertility.

15. (b) The logistic population growth is expressed by the equation $\frac{dN}{dt} = rN\left[\frac{(K-N)}{K}\right]$ where N is population density at time t, r is the Malthusian parameter (rate of maximum population growth) and K is the so called carrying capacity (*i.e.* maximum sustainable population). It is a type of population growth when resources are limiting.

16. (b) The best pH of soil for cultivation of plants is 6.5 – 7.5.

17. (d) A self regulatory mechanism of maintaining favourable internal conditions for uninterrupted chemical reactions in the living system despite changes in the external environment is homeostasis. Total energy stored within system is enthalpy.

18. (b) Gause's hypothesis states that two different competing species cannot coexist together for a long in the same niche, one has to get eliminated by the other competing species, if they do coexist, then they do so as a result of niche differentiation, i.e. differentiation of then realized niches.

19. (b) Speciation takes place via reproductive isolation which is the most important consequence of geographical isolation.

20. (d) Hotspots are the geographical area where biodiversity is maximum. Two hotspots in India are Western ghats and North eastern himalayan region.

21. (b) **22. (c)**

23. (d) A natural association of interdependent populations of different species inhabiting a common environment or habitat as a visible, self-contained unit is called a biotic community or biocoenosis.

24. (b) A biome is a large regional unit characterized by a major vegetation type and associated fauna found in a specific climatic zone some examples of terrestrial biomes are desert, temperate deciduous forest, tropical rain forest, etc.

25. (d) Protoplasm is the material comprising the living content of a cell. It consists of 90% water alongwith the minerals, sugars, amino acids, proteins, enzymes, etc. The translocation of nutrients inside the body occurs via blood which also majorly consists of water. In an environment with excessive heat, water loss in the form of sweating and transpiration keeps the body cool. Thus, water maintains the body temperature.

26. (a) The red colour of red algae is due to abundant formationof phycoerythrin which is able to absorb blue green wavelengths of light. Being shorter, these wavelengths are able to reach the maximum depth in water. Therefore, red algae can be found in deepest ocean waters.

27. (c) The seasonal movement of complete populations of animals to a more favourable environment is called migration. It is usually in response to uneven precipitation and lower temperatures resulting in a reduced food supply and is often triggered by a change in day length. Migration is common in mammals (e.g. porpoises), fish (e.g. eels and salmon) and some insects but is most marked in birds.

28. (d) Competition is defined as the active demand by two or more individuals of the same species or members of two or more species at same trophic levels for a common resource. Intraspecific competition is competition amongst members of the same species for a common resource such as for food, space and mate. Interspecific competition amongst members of different species for a common resource such as for food, space and mate. Interspecific competition is rivalry amongst members of different species. The severity of competition depends upon similarity in the requirement of food and shelter.

29. (b) Population density is the number of individuals present per unit area of volume at a given time. If the total number of individuals is represented by letter N and the number of

units of space (area for land organisms and volume for water organisms) by letter S, then the population density D can be represented as D = N/S. For instance, number of animals per square kilometer, number of trees per acre in a forest etc.

30. (a) $$\text{Date rate} = \frac{\text{Number of deaths}}{\text{Initial number of individuals}}$$

$$= \frac{200}{800} = \frac{1}{4} = 0.25$$

31. (d) Tropical rain forest shows the maximum diversity and also the maximum productivity. More solar energy and resources are available in tropics which promotes higher productivity. On land the maximum primary production rate is found in tropical rain forests, followed by tropical deciduous forests, temperate forests, savannah, temperate grasslands and desert shrubs.

32. (c) 33. (a) 34. (c) 35. (c) 36. (c) 37. (a)

38. (c) Permafrost, a permanently frozen subsoil, is a distinctive characteristic of the tundra.

39. (a) Grasslands are typically maintained by grazing herbivores and by periodic fires. Overgrazing, such as may occur if agricultural livestock are introduced, which can lead to destruction of the grassland.

40. (c) Deserts have less than 25 centimeters of rainfall per year.

41. (c) Aestivation is the cessation or slowing of metabolic activity during the summer period to avoid problems of heat and desiccation etc.

42. (d) Blubber is the fatty layer present between the skin and muscle of whales and other cetaceans. It acts as an insulator and protects the animal from heat loss and serves as a food reserve.

43. (a) Predation is a relation between two organisms in which one organism captures and feeds on other. Commensalism is a relation between two organisms in which one benefits and the other neither derives benefit nor harms. Parasitism is a relation between organisms in which one lives as a parasite on another and harms the host. Competition is process in which the fitness and survival ability of one species is significantly lower in the presence of another species.

44. (a) Population density varies due to changes in the following basic process - A: Natality + Immigration; B: Mortality + Emigration

Natality is the proportion of births to the total population in a place in a given time. Immigration is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration. Mortality is the number of deaths in the population during a given period of time. Emigration is the number of individuals of the population who left the habitat and have gone elsewhere during a given period of time.

45. (c)