

UNIT - 10 ECOLOGY
CHAPTER : 13 ORGANISMS AND POPULATIONS
(KEY POINTS)

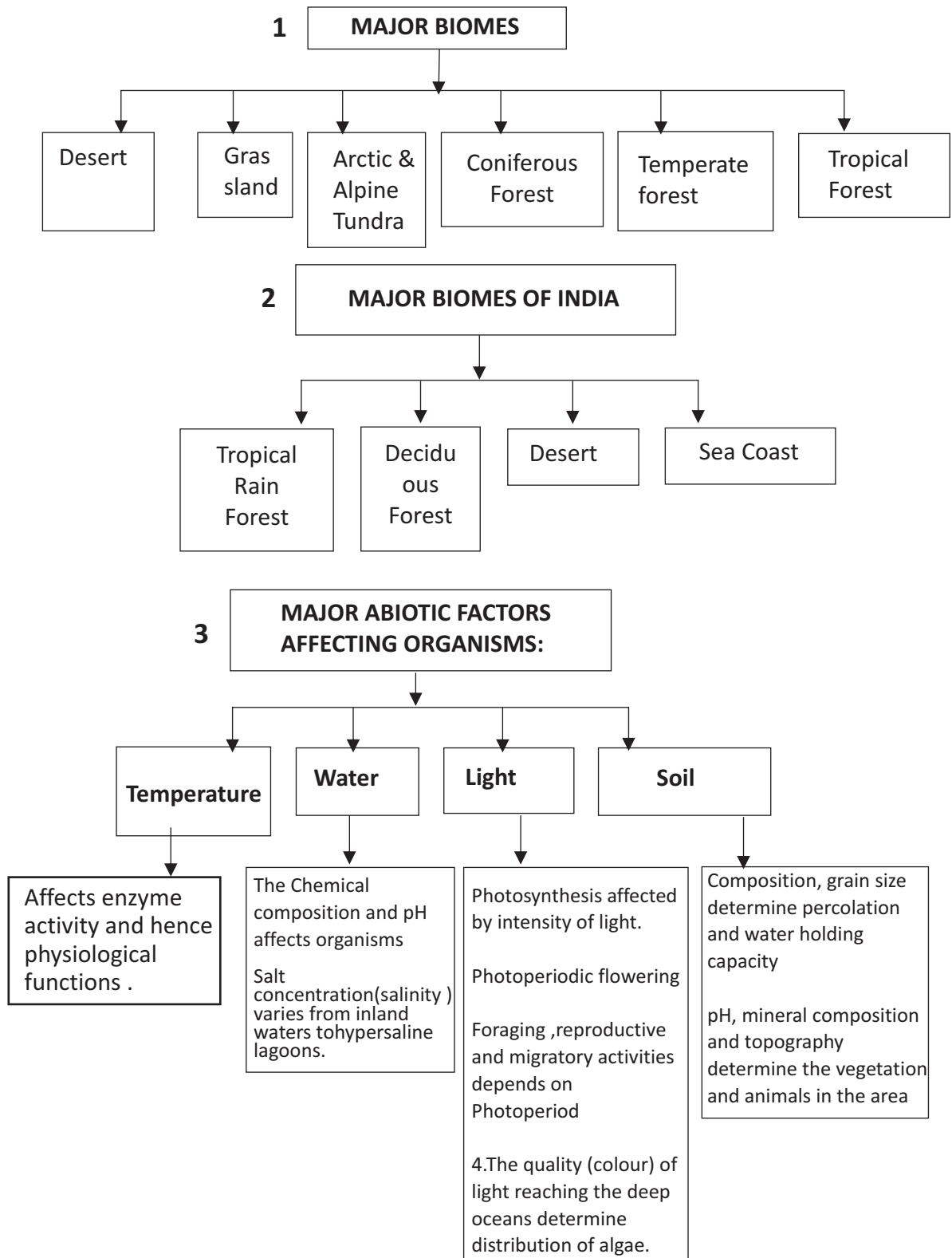
S.N	Term	Explanation
1	Benthic Zone	Angler
2	Carrying capacity	Max. no. of an organism of a population that can be sustained by a given habitat or ecosystem
3	Ecological niche	Ranges of tolerance, resources utilizes & its functional role in an ecosystem
4	Aerenchyma .	In aquatic plants gives buoyancy to the aquatic plants due to presence of air chambers
5	Eurythermal	Tolerate & thrive in a wide range of temperatures
6	Stenothermal	Organisms restricted to a narrow range of temperatures
7	Habitat	Place where organism lives, reproduces
8	Sexual deceit	Ophrys get its flower pollinated
9	Phytophagous	Animal feeding on plant sap & other parts of plants
10	Allen's rule	Mammals in colder climate have shorter ears & shorter limbs to minimise heat loss.
11	Pseudocopulates	Male bee is attracted to what it perceives as female "pseudocopulates" with the flower..e.g.Mediterranean orchid-ophrys-sexual deceit —pollinated-bees, bumblebees.-co-evolution-operates.; (petal similar to female bee)
12	Brood parasitism	Cuckoo/koel lays its eggs(resembles the egg of host)in the nest of crow & lets the host incubate them
13	Competitive release	A species whose distribution is restricted to a small geographical area because of the presence of a competitively superior species, is found to expand its distributional range when the competing sps. is removed.(Connell's elegant field experiments —rocky sea coasts of Scotland-larger competitively superior barnacle Balanus dominates, & excludes smaller barnacle Chthamalus), Abingdon Tortoise eliminated by goat due to greater grazing efficiency

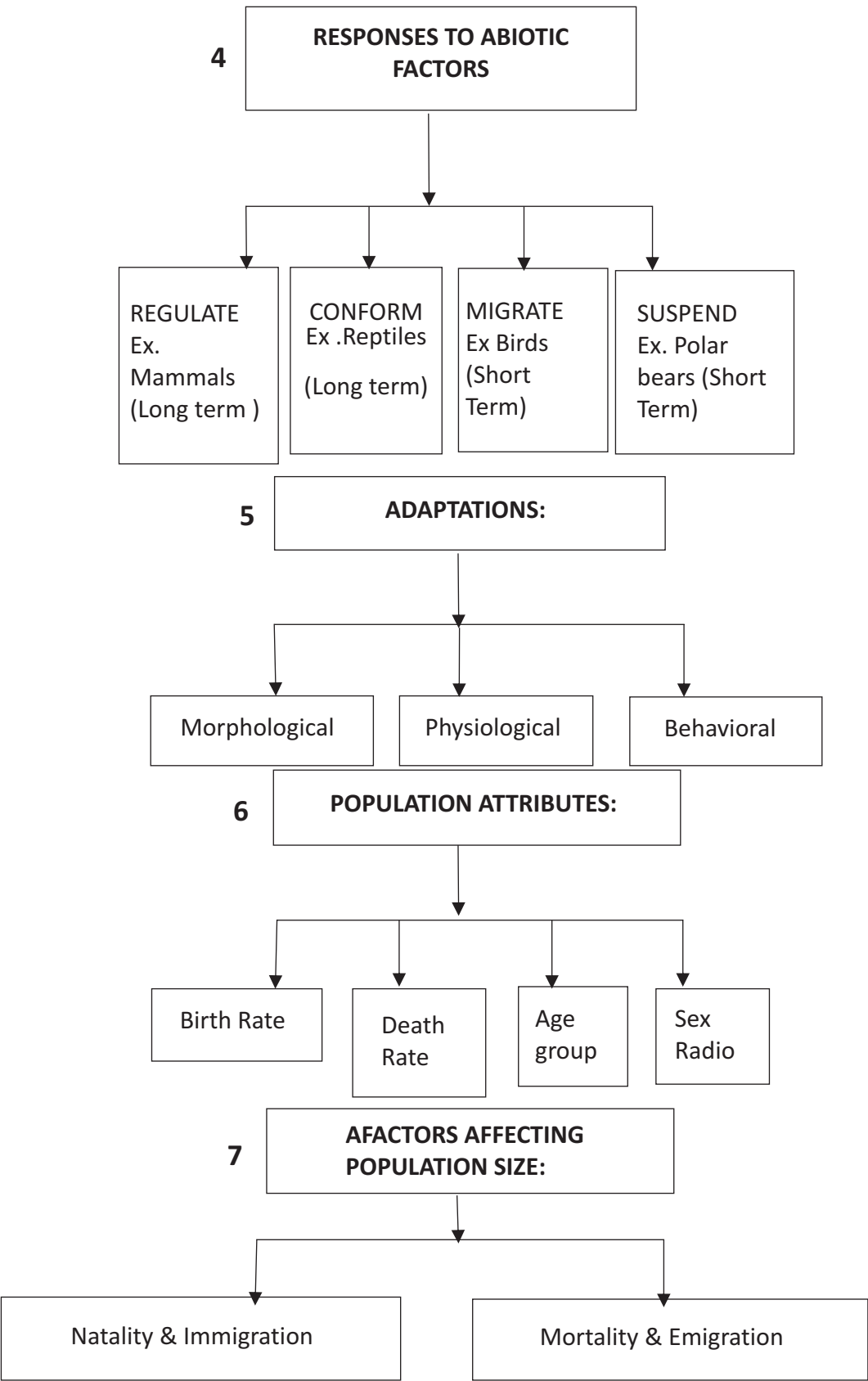
14	Regulators	Organisms maintain homeostasis by physiological & behavioral means
15	Conformers	Organisms change their osmotic concentration of the body fluids change with that of the ambient water osmotic concentration
16	Age pyramid	Age distribution (percent individuals of a given age group) is plotted for the population. Shape of the pyramid- expanding, stable & declining
17	Natality Mortality Emigration Immigration	Birth rate Death rate Moving out-population decreases Coming in population increases.
18	Logistic growth	When the resources become limited ,population growth will be 's' shaped, 'sigmoid', no exponential
19	Mutualism	Interaction in which both species are benefitted
20	Amensalism	Interaction between 2 different species —one harmed & the other neither benefitted nor harmed.
21	Predators	Interspecific interaction where an animal —predator kills & consumes the other weaker animal-prey.
22	Competition	Both the species suffer & it may exist between some sps.(interspecific competition) or between individuals of different species(intraspecific competition)
23	Gause's Principle	'Competitive exclusion principle' states that two closely related species competing for the same resource cannot coexist indefinitely & the competitively inferior one will be eliminated eventually by the superior one
24	Resource partitioning, co-existence.	Phenomenon- in which species facing competition might evolve mechanisms that promote co-existence rather than exclusion. MacArthur showed that 5 closely related warblers living on the same tree were able to avoid competition & co-exist due to behavioural differences in their foraging activities.
25	Parasitism	one sps. Depends (parasite) on other sps. (host) for food, shelter, and in the process host is damaged.

26	Endoparasite	Parasite live inside the host's body. E.g. Plasmodium
27	EctoParasite	Parasite feed on the external surface of the host organism for food & shelter-lice, copepods, ticks, cuscuta
28	Diapause	In unfavourable conditions, many sps. In lakes & ponds are known to enter a stage of suspended development-diapause. It occurs both in summer & winter, e.g. Zooplankton —diapause in lakes & ponds
29	Hibernation	Winter /summer sleep to evade stress/unfavourable conditions. Winter-bear winter sleep. Frog
30	Prey defence mechanism	Insects & Frogs-camouflaged. Monarch Butterfly-distasteful to birds (by eating poisonous weed, -spl chemical into body) Plants-thorns/spines-Acacia, Cactus Plants produce highly poisonous chemicals like cardiac glycosides, nicotine, caffeine, quinine, strychnine, opium-defence against grazers & browsers.
31	Phenotypic adaptation	Non-genetic temporary nonheritable changes in physical or morphological characteristics/behaviour/physiology-in response to changes in environment. E.g. appearance of mountain sickness at high altitude —gradually disappear by increasing RBC, increasing breathing rate.
32	Endothermic	Warm blooded- regulate body temp.-Monkey
33	Ectothermic	Cold blooded-changes its body temp with that of envt.
33	Ecology	Cold blooded-changes its body temp with that of envt
34	Ecology	Branch of Science —deals with interactions among organisms & between the organisms (biotic)& its Physical (abiotic) environment
35	Population	Sum total of all individuals of a species in a specific geographical area.
36	Species	Group of individuals of one or more populations —resemble each other, interbreed among themselves successfully.
37	Biotic community	Assemblage of all the populations of different species present in an area that interact among themselves. 3 types, Plant community, Animal community, & Microbial community

38	Ecosystem	Sum total of biotic & abiotic components of a particular geographical area being integrated through exchange of energy & recycling of nutrients are collectively called ecosystem
39	Biome	Large unit of environment, consists of a major vegetation type & its associated fauna in a specific climatic zone
40	Biosphere	All ecosystems of the world-collectively called Biosphere
41	Factors of environment	Abiotic(Temperature, water, light, Soil), Biotic(Pathogen, Parasites, Predators & Competitors)
42	CAM	Crassulacean Acid Metabolism-Photosynthetic pathway
43	Adaptation-desert plants	Waxy coating on leaf-cuticle, CAM(Stomata closes during day), Spines-in place of leaves--> reduce water loss
44	Adaptation-Mammal-Cold climate	Shorter ears & limbs-Allen's rule, Thick layer of fat-blubber below skin-insulator-reduce loss of heat.
45	Adaptation-desert-Lizards	Absorb heat from sun when body temp. drops below comfort zone., move to shade when ambient temp. temp. rise above comfort levels
46	Adaptation-high altitude-human	Compensate low O ₂ by increasing RBC & total HB-increased breathing-vital capacity.
47	Population density	No. of individuals of a species per unit area or volume. $PD = N/S$; N=individuals, S=Area
48	Birth rate	No. of births per 1000 individuals of a population
49	Death rate	No. of deaths per 1000 individuals of a population
50	Sex ratio	No. of females per 1000 males of a population in a given time
51	Exponential growth	-common where the resources (food+ space) are not limited. $dN/dt = (b-d)N = rN$; r =intrinsic rate of natural increase

CHAPTER : 13 ORGANISMS AND POPULATIONS (FLOW CHART)



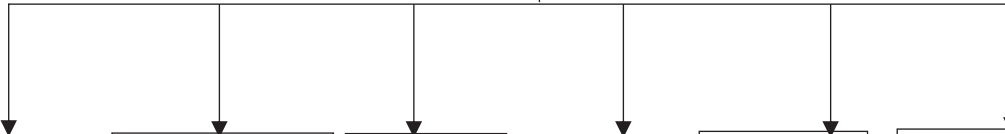


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**RESPONSES TO ABIOTIC
FACTORS**



POPULATION INTERACTIONS:



Mutualism
Ex Lichens

Commensalism
Ex Sea
Anemone
& Clown Fish

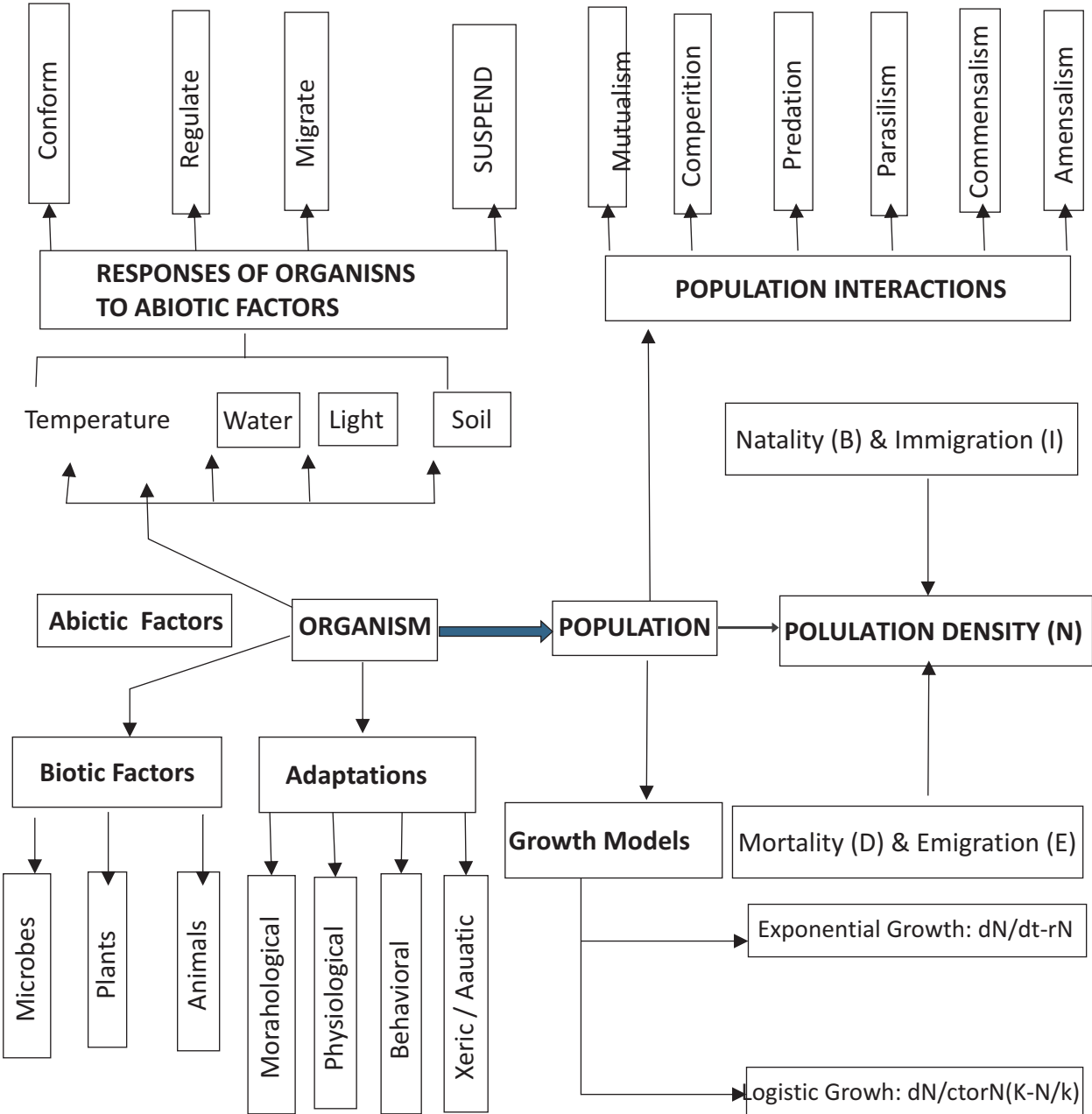
Predation
Ex Lion &
Deer

Parasitism
Ex .Liver
Fluke &
Man

Competition
Ex. Any
two
herbivores
for grass

Ammensalism
Ex.
Bacteria
producing
antibiotics
that kills
other
microbes

CHAPTER : 13 ORGANISMS AND POPULATIONS (CONCEPT MAP)



CHAPTER : 13 ORGANISMS AND POPULATIONS (QUESTION BANK)

1. Predators are prudent. Why?	1
2. Will the distribution level of species be affected by gradual increase in temperature? Say briefly	1
3. How is orchid ophrys pollinated by sexual deceit?	1
4. What is the relationship between egret and grazing cattle? Why?	1
5. Why is female mosquito not considered a parasite?	1
6. What is brood parasitism?	1
7. How is liver fluke adapted to parasitism?	1
8. Gause's competitive exclusion principle, where does this apply?	1
9. How is competition avoided in Nature? Give example.	1
10. How have prey reduced impact of predation?	2
11. How have plants developed defence against predators?	2
12. How are the four levels of biological organisations in ecology interrelated?	2
13. How does temperature affect distribution of animals? Name two types based on their temperature tolerance.	2
14. How does water affect aquatic animals? Explain.	2
15. What is the importance of light for organisms? How do deep sea organisms get their energy?	2
16. Which is the deepest dwelling algae- red, green or brown, why?	2
17. What characteristic of soil determine the vegetation? How are these different at different places?	2
18. What adaptation have parasites evolved?	2
19. What do you mean by competitive release?	2
20. What are the roles of predators?	3
21. Give three example of mutualistic relationship.	3
22. Name the major biomes and the factors by which they vary.	3
23. What are the factors that lead to the variation in the conditions of the habitat?	3
24. How does constancy in the internal environment help an organism? How do organisms achieve it with regard to temperature? Give example.	3
25. What alternatives do organisms take if stressful external conditions are localized? Give examples.	3
26. What is altitude sickness? How does the body overcome this?	3
27. Give example of adaptation to desert condition shown by organisms.	5
28. Give example of biochemical adaption shown by organisms. What are the behavioral adaptations shown by organisms.	5
29. Define population and population density. How is it estimated? What are the attributes that determine the population characteristics?	5
30. What factors contribute to growth in population. In what way does logistic growth differ from exponential growth?	5
31. Define adaptation. What is the adaptation shown by, - a, whales, b, kangaroo rat, c, polar bear. Why do cold regions not have small animals?	5
32. Lions are natural predators .Can you compare this act with that of indiscriminate killing of animals by humans for their leather horns etc . Comment .What can be done to create awareness about this.	4

CHAPTER : 13 ORGANISMS AND POPULATIONS
(ANSWER KEY)

Q.NO.	Value Points	Marks
1	They keep they prey population in check without causing their extinction	1
2	Yes the pattern of distribution will shift towards the poles with increase in temperature	1
3	Sexual deceit	1
4	Commensalism-egret benefits while the cattle are not affected	$\frac{1}{2}+\frac{1}{2}$
5	It does not live in/on the body of the host	1
6	Onespecieslayseggsinthenestofanotherbird,letsthehostincubatethem.E.g. Cuckoolays eggsinthenest ofacrow	1
7	Flat body,suckers for adhering to the host	$\frac{1}{2}+\frac{1}{2}$
8	Organisms living closely related and in case if resources are limiting	1
9	Resource partitioning,two species adopt to have different razing time to avoid competition.	1
10	Various defences-distasteful ,cryptically coloured to avoid detection	1+1
11	Morphological-thornsand chemical-cardiac glycosides defences	1+1
12	-Similar organisms make Populations -make communities make Biomes	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
13	Enzymes activity and therefore metabolic activities ,Eurythermal,stenothermal	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
14	pH of water salt concentration Salinity,	1+1
15	Quality of light,photoperiod affect photosynthesis, affectreproductive, for agingactivities, ii)scavenging and predation	1+1
16	Red-has longest wavelength	1+1
17	Soil composition,grainsize,percolation and water holding capacity-different based on climate and the weathering process	1+1
18	Loss of unnecessary sense organs,presence of adhesive organs,suckers , loss of digestive system,high reproductive capacity	1+1
19	A species whose distribution is restricted because of the presence of a competitively superior species, expands its distribution when the superior competitor is removed	1+1
20	Conduits of energy,checks prey population,maintains species diversity	1+1+1
21	Lichens-algae and fungi,bird and cattle,wasp and fig tree,	1+1+1
22	Desert,forest and grasslands-Precipitation,temperature,soil	1+1+1

23	Soil,temperature,water,light and biotic components like pathogens, parasites, predators and competitors.	1½+1½
24	Constant internal environment permits all biochemical reactions to proceed with maximal efficiency,ii)regulate by physiological means eg sweating to reduce temperature when the external temperature increases.	1+1+1
25	Suspend activities for a brief period till the stressful conditions go(Hibernate or aestivate),migrate –move away to a far off place and return when stressful period is over-birds	1½+1½
26	At higher altitudes the body shows symptoms like nausea,fatigue, heart palpitations, due to insufficient oxygen in the body.The body increases RBC production,decreases oxygen binding capacity of haemoglobin and increases breathing rate.	1½+1½
27	Spines in place of leaves in cactus,deeply set stomata,thick cuticle covering leaves, CAM photosynthetic pathway ,minimum loss of water in excretion, flattened green photosynthetic stems in place of leaves	½ x 6
28	Presence of thermostable enzymes in thermophiles,presence of antifreeze proteins in cold water fishes, presence of molecules that can withstand high pressure conditions in the deep sea .Lizards bask in the sun when temperature of their body drops and move to shade,burrows when the temperature around starts increasing	1x5
29	The organisms of the same species at a given time in a specific area. Number of organisms is a measure of population density,or the biomass cover,ii) attributes are natality,mortality,immigrationemigration,sex ratio and age distribution	1+1+1+1+1
30	Increase Natality and Immigration .decrease mortality and emigration. exponential growth takes place when resources are unlimited and therefore the reproductive potential is highest.,logistic growth shows that the population cannot grow beyond the carrying capacity of the environment.(Depict graphically)	1+1+1+1+1
31	Adaptation is any attribute of an organism that allows the organism to survive and reproduce in its habitat.i)Blubber a layer of fat to prevent heat loss from the body ii)the animal needs only the metabolic water to survive iii)hibernation in polar bears iv)they lose heat faster than the rate of production as their surface area is large compared to its volume.	
32	No predators are prudent and with decrease in prey population the predator population also decreases. This is a Natural chain that helps in keeping a check on population size.Humans on the other hand kill for greed and not for basic needs.It should be realized that every species has a significant role in Nature	1+1+1+1