GS- 2024 MSc Wildlife Biology and Conservation Entrance Exam
Held on December 10th , 2023

All questions in SECTIONS A (**General)**, B (**Quantitative**) and C (**Wildlife and Conservation Science**) are multiple choice questions. Each question has only ONE correct or best answer. All questions carry ONE mark. There is NO negative marking. There are a total of 75 questions for a maximum of 75 marks.

Section D has an **Essay** type question. The essay carries 25 marks. The word limit for the essay is **750 words.**
However, to qualify for your essay to be graded, you must score a minimum of 50% in each of Sections A, B and C.

You are allowed a maximum of 3 hours for the exam (estimating about 2 hours and 15 minutes for Sections A, B and C and 45 minutes for Section D).

SECTION A

1. Which of the following was the reason for the breach of the Teesta III dam in Sikkim in 2023?

a) **Glacial lake outburst flood**
b) Earthquake
c) Rock-ice avalanche
d) Landslide

2. According to the data released by the National Tiger Conservation Authority in April 2022, India has about 3700 tigers. Which set of the states shown below has the largest populations of tigers, according to this report?

a) Madhya Pradesh, Rajasthan, Uttarakhand and Maharashtra
b) Madhya Pradesh, Karnataka, Uttarakhand and Maharashtra
c) Karnataka, Tamil Nadu, Madhya Pradesh and Uttar Pradesh
d) Karnataka, Uttarakhand, Odisha and Maharashtra

3. Virat Kohli recently scored his 50th century to become the batsman with the most One-Day International (ODI) centuries. Who previously held the record for the most ODI centuries?

a) Ricky Ponting
b) Rohit Sharma
c) **Sachin Tendulkar**
d) Kumara Sangakkara

4. Global warming is predicted to lead to more frequent extreme rainfall events (i.e unusually large amounts of rain falling during a single rainfall episode) in the future. Which one of the following is a plausible explanation for this?

a) Warmer air rises higher
b) Warmer air holds more water
c) Warmer air results in greater wind speeds
d) Warmer air is more dense

5. Which dimensions are considered in the calculation of the Multidimensional Poverty Index (MPI) for Indian states?

a) Income and education
b) Health, education, and living standards
c) Agricultural productivity and employment
d) Urbanization and infrastructure

6. Which of the following is not a greenhouse gas?

a) Nitrous oxide
b) Sulphur di-oxide
c) Water vapour
d) Methane

7. Three friends Priya, Sanjay and Mihir are sitting in a row. In how many ways can they be seated if Sanjay must be to the left of Mihir?

a) 2
b) 3
c) 6
d) 12

8. Ngwame, who lives in the Serengeti, travels south-east a distance of 7 km, then she travels 14 km west. Then she turns towards the north-west and travels a distance of 7 km, and finally she moves a distance of 4 km east. How far is she from the starting point?

a) 10 km
b) 20 km
c) 30 km
d) 40 km

9.Five people ran a race. A finished before C, but behind B. E finished before D and A. Which one of these is a possible finishing order (from first to last)?

a) A, B, C, D, E
b) B, A, C, E, D
c) E, B, A, D, C
d) B, C, D, A, E

10.Thirty years ago, Umesh was half as old as he would be 10 years from now. Umesh's current age is:

a) 30
b) 50
c) 60
d) 70

11. Anand visited two different protected areas – A & B - in India, both of similar area. He noticed that the densities of sambar deer in protected area A were twice those of protected area B. Which one of the following inferences can he conclusively draw based on this observation?

a) B has twice as many predators of sambar deer as A.
b) Poaching incidents are twice as high in B compared to A.
c) A is twice as fertile as B.
d) **None of the above.**

12. Which of the following is not a UNESCO world heritage site?

a) **Ranthambore National Park**
b) Great Himalayan National Park
c) Kaziranga National Park
d) Keoladeo National Park

13. A job advertisement for a college lecturer stated that "applicants must be fluent in Sanskrit and know how to dance Kathak". Therefore, being fluent in Sanskrit and knowing how to dance Kathak are:

a) **necessary to get this job**
b) sufficient to get this job
c) necessary and sufficient to get this job
d) neither necessary nor sufficient to get this job

14. At the end of a long day hiking down the mountains, as the darkness descended around them and a light drizzle began, four hikers glimpsed twinkling lights from a village ahead. In another ten minutes they were walking on the main street of the village. Relieved, Nitin turned to his friends and said "Whew….Let's get a bite to eat!" to which his friends replied as below:

Shashi said: I don't really like bites.
Menon said: Lets do that, I am starving.
Nina said: I have never understood how anyone can eat a bite.
Nair said: No, I just want to sleep, I'm not hungry.

Which of his friends correctly understood Nitin?

a) Shashi and Nina
b) Nina and Menon
c) Menon and Nair
d) Nair and Shashi

15. The following paragraph (adapted from *Sapiens* by *Yuval Noah Harari*) is missing a sentence. Which of the options given below the paragraph is the most logical sentence to fill in the blank?

The healthy and diverse diet, the relatively short working week, the low densities in which they lived and the rarity of infectious diseases in pre-agricultural forager societies have caused many experts to define these as "the original affluent societies"._____.
Though they lived better lives than most people in agricultural and industrial societies, their world could still be harsh. Periods of want and hardship were not uncommon, child mortality was high, and an illness which would be minor today could be a death sentence. Further, being able to keep up with the movement of fellow foraging group members was a necessity for individual survival and well-being.

a) Theirs was a Utopian world that we no longer experience in the modern day.
b) It would be a mistake, however, to idealise the lives of these ancients.
c) Since they were not sedentary societies, they always experienced good climatic conditions.
d) People in these societies were always in the warm company of their foraging band.

16. The following sentence contains a missing word. Which of the options given below the sentence is the most appropriate word to fill in the blank?
"The wooden hut appeared ----------- in the midst of the stone cottages that surrounded it."

a) incredulous
b) incongruous
c) intrepid
d) introspective

17. Among the students in his class, Rajan distinguished himself by his strong work ethic, always doing his work on time, writing unusually creative essays and doing extra research on any topic that was assigned for study. Which of the following expressions most correctly describes Rajan's work relative to his classmates?

a) Rajan jumped out from the rest of the class
b) Rajan leapt out from the rest of the class
c) Rajan stood out from the rest of the class
d) Rajan reached out from the rest of the class

18. Choose the most correct combination of words to fill in the blanks in the sentence below:
The coach scolded his team, saying, "You _____ when your defence becomes_____".

a) loose/loose
b) loose/lose
c) lose/loose
d) lose/lose

19. Choose the Odd one out of the following:

a) Babies in a crèche
b) Eggs in a clutch
c) Puppies in a litter
d) Seeds in a pod

20. Which instrument has captured an infrared image of the Herbig-Haro 46/47 stars?

a) Chandra X-Ray Observation Telescope
b) Hubble Space Telescope
c) James Webb Space Telescope
d) Rover of Chandrayaan 3

END OF SECTION A

SECTION B

21. Pressure increases by one atmosphere (also called 1 bar) with every 10 metres of depth in the sea. Hence, pressure at the depth of 10 metres is 2 bars, at 20 metres is 3 bars, and so on. A marine biologist carries an inflated balloon of volume 6000 millilitres with her. What will be the volume of the balloon when she reaches the depth of 10 metres and 30 metres, respectively?

a) **3000 and 1500 millilitres**
b) 4000 and 1000 millilitres
c) 3000 and 2000 millilitres
d) 6000 and 6000 millilitres

22. A bag contains 5 white balls and 5 black balls. The probability of drawing two balls of the same color from the bag is:

a) 2/5
b) 2/10
c) 4/9
d) 2/8

23. While estimating the distribution of income of all people in Mumbai city, Pradyumna realized that he had left out the income for members of the three wealthiest families in the city, known for its billionaires. Adding this information will likely change his estimates of the mean, median and mode of the income of people in Mumbai. Which of the following statements represents possible outcomes of this change?

a) **Mean showed a large increase, Median a small increase, while mode did not change**
b) Mean showed a large increase, Median did not change, and mode showed a large increase
c) Mean showed a small increase, Median a large increase, while mode did not change
d) Mean showed a small increase, Median did not change, and mode showed a large increase

24. A research team studies body colour and ectoparasite prevalence in a fish species. They catch all 100 fish in a pond, measure the colour (red, not red), note down the parasitism status (parasitized, not parasitised), and then release the fish back into the pond. The diagram below displays these data (circle R = set of Red, circle P = set of Parasitised).

If I catch a red fish at random from this pond, what is the probability that it is parasitised?
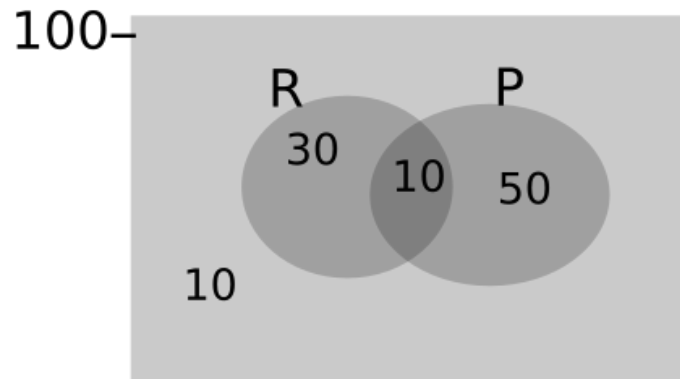
a) 1/10
b) 1/8
c) 1/6
d) 1/4

25. A researcher wants to perform a study on spatial memory of urban male and female dogs. There are 5 males and 6 females available for the study. In how many ways, can the researcher select 3 males and 3 females from those available?

a) 11
b) 30
c) 200
d) 270

26. A researcher wishes to estimate the height of a tree. She is able to obtain the measurements shown in the figure below: the distance from the tree top (A) to the observer top (B) is 15ft; the height of the observer is 6 ft; the distance from the observer (C) to the base of the tree (D) is 9 ft; the angle of tree trunk to the ground, Angle ADC is 90^0. Given these measurements, the height of the tree (length AD) is:
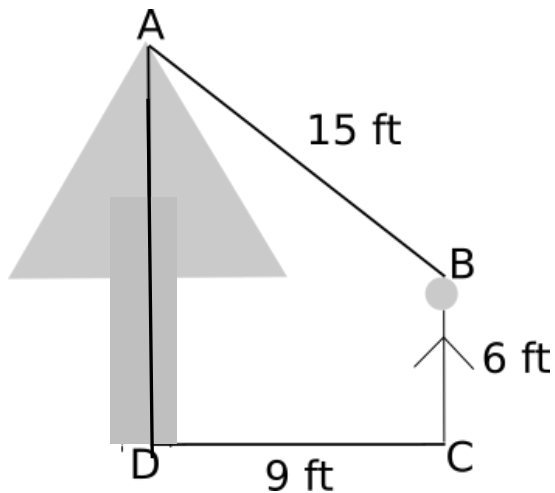
a) 12 ft
b) 18 ft
c) 22 ft
d) 33 ft

27. Which one of the following options lists measures of central tendency?
a) Median and mode
b) Mean and variance
c) Standard deviation and standard error
d) Median and interquartile range

28. I am interested in studying the distribution of leaf galls on the leaves of a tree. My expectation is that leaf galls are distributed non-randomly across leaves of a tree. I measure the number of galls on a sample of 300 leaves from a tree. I calculate the mean and variance in the number of galls per leaf. Which one of the results below indicates that galls are distributed evenly/uniformly across leaves in the tree?

a) Variance/Mean = 1
b) Variance/Mean < 1
c) Variance/Mean > 1
d) Variance/Mean = 2

29. In a population of tigers, the probability of being photographed by a camera trap is 0.6. The probability of a tiger surviving to the next year is 0.9. Given that a tiger in this population is photographed in a given year, what is the probability that it is photographed again in the following year?

a) 0.54
b) 0.90
c) 0.60
d) 0.66

30. In a population of birds, a team of researchers hypothesise that males are, on average, larger than females. They then measure the body weights of 50 males and 50 females in the population. To test whether this hypothesis is true, which is the most appropriate of the following statistical tests?

A. Linear regression
B. Chi-squared test
C. Spearman's rank correlation
D. **t-test**

31. If a population is growing at 5% per year, and the population size in year t is denoted as N_t, then which of the following statements is true?

A. $N_{(t+1)} = 5$
B. $N_{(t+2)}/N_{(t+1)} = 5/100$
C. **$N_{(t+3)}/N_{(t+2)}$ is equal to $N_{(t+2)}/N_{(t+1)}$**
D. $N_{(t+3)}-N_{(t+2)}$ is equal to $N_{(t+2)}-N_{(t+1)}$

32. If x and y are positive integers such that x + y = 10, what is the maximum possible value of the product x*y?

a) 20
b) **25**
c) 30
d) 36

33. In the figure below, ABC and BCD represent two isosceles triangles. The height of triangle BCD is 1/3 that of triangle ABC. The length BC is 10cm and the height of triangle ABC is 15cm.
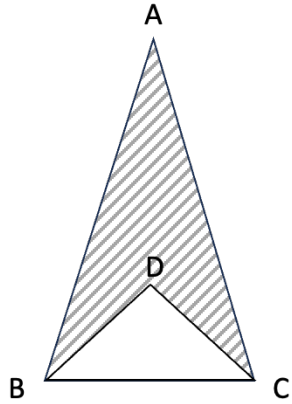

The area of the shaded part of the figure is:

a) 25 cm²
b) 50 cm²
c) 75 cm²
d) 100 cm²

34. A researcher measured the number of seeds that were produced by a species of plant when individuals were grazed and not grazed. The figure below plots the number of seeds produced by these plants as a function of their height. The open circles and filled black circles represent plants that were grazed and not grazed, respectively. The dashed and solid lines represent the best fit lines for plants that were grazed and not grazed, respectively. The slopes of these lines are not statistically different from one another. Which of the following conclusions can be drawn from this figure?
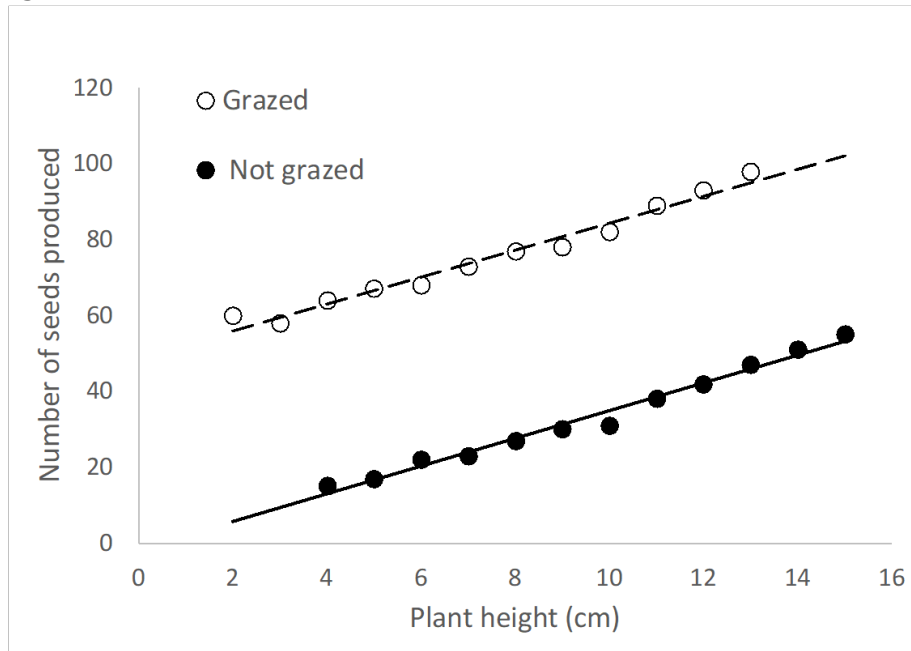
a) Grazed plants are on average taller than plants that were not grazed.
b) The rate of increase in seed production with plant height differs between grazed plants and plants that were not grazed.
c) **For a given height, grazed plants produce more seeds than plants that were not grazed.**
d) Seed production is only dependent on plant height.

35. The figure below shows the metabolic rates of endothermic and ectothermic marine predators as a function of water temperature. This suggests that marine ecotherms like sharks would perform relatively better (as measured by their metabolic rates) at lower latitudes, while endotherms like orcas would perform better at higher latitudes. Further, there appears to be a crossover point, a latitude at which the relative performances of endotherms and ectotherms flip. How would global warming and increasing sea temperatures affect this crossover point ?
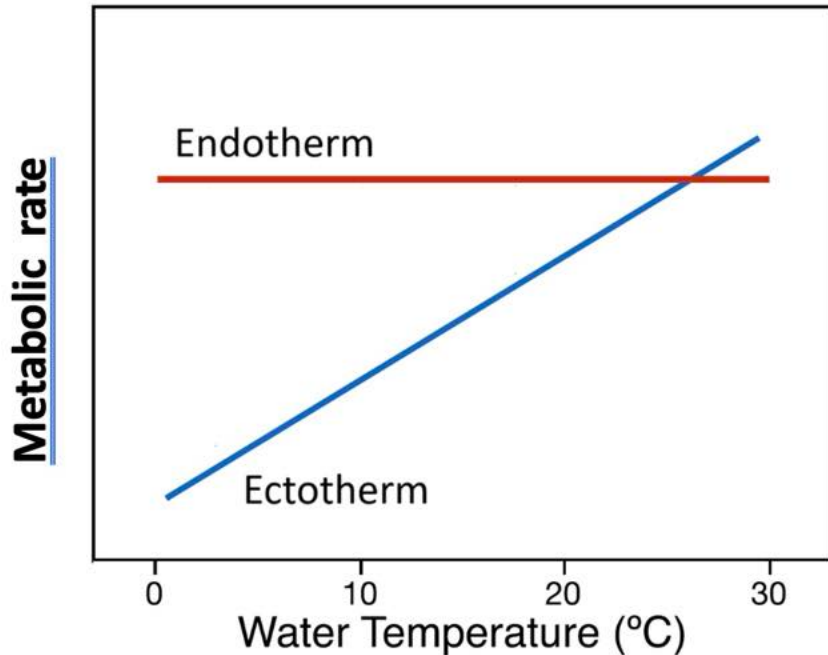
a) **The crossover point will move to higher latitudes, towards the poles**
b) The crossover point will move to lower latitudes, towards the equator
c) The crossover point will move to lower latitudes, in the southern hemisphere only
d) The crossover point will not change

36. Examine the table below:

Protected Area	Area (km²)	Number of ungulate species	Number of large carnivore species	Density of ungulates (individuals/km²)	Density of large carnivores (individuals/km²)
A	80	7	4	40.0	3.30
B	200	10	6	12.0	2.01
C	350	11	7	24.2	3.10
D	1250	15	13	18.0	2.45
E	4000	18	13	15.5	2.72

Given the above data, examine the following statements:
1) Density of large carnivores is correlated with ungulate species richness
2) Larger protected areas have more species of ungulates and large carnivores
3) Ungulate and large carnivore species richness are correlated
4) Large carnivore density is correlated with protected area size
Which of the above statements are true?

a) 1 & 4
b) **2 & 3**
c) 1 & 2
d) only 4

37. A researcher measures the foraging rate of sandpipers under different competitor densities and estimates the relationship to be $log_e(Y) = 2.3 - 0.5log_e(X)$ where Y is foraging rate in number of prey items consumed per minute and X is number of competitors (ranging from 1 to 100). According to this equation, the foraging rate (rounded to the nearest integer) of a sandpiper in the presence of 1 competitor is:

a) 2 items per minute
b) 5 items per minute
c) **10 items per minute**
d) 20 items per minute

38. Vigilance shown by an individual in antelope groups shows a second order polynomial relationship with group size, as follows: $Y = 18 - 0.23X + 0.0011X^2$, where Y is vigilance, X is group size and X ranges from 1 to 200. Which one of the options below best represents this relationship?
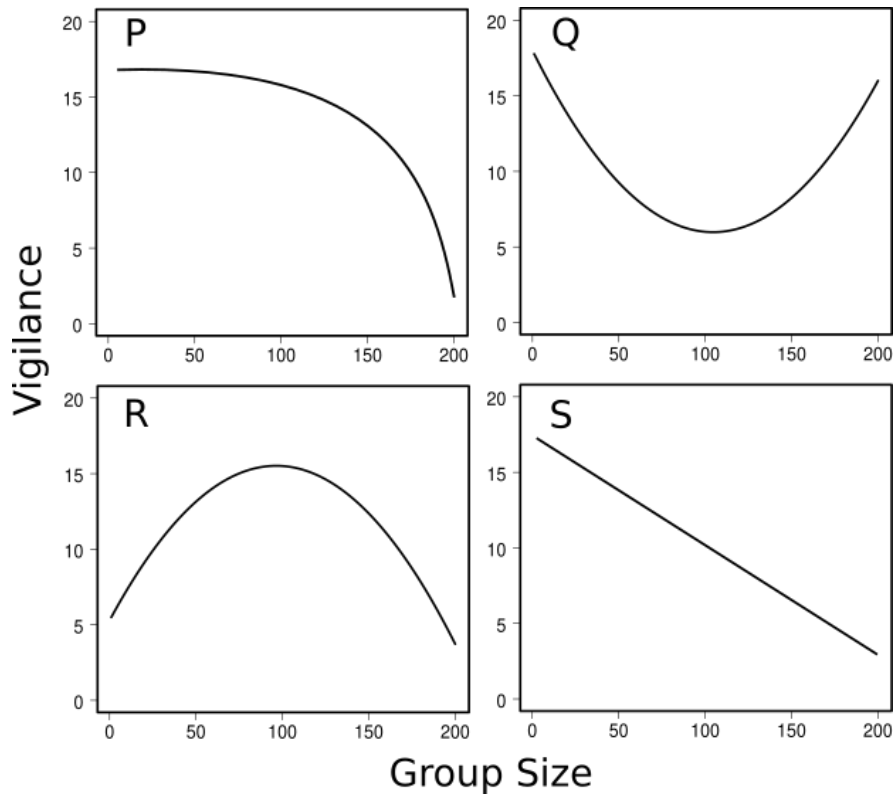
a) P
b) Q
c) R
d) S

39. A grocer has 400 kg of coffee in stock, 20% of which is decaffeinated. If the grocer buys another 100 kg of coffee of which 60% is decaf, what percent, by weight, of the grocers' stock of coffee is decaffeinated?
a) 28%
b) 30%
c) 32%
d) 40%

40. A 20.6 m long rope is cut into 2 pieces. If the length of one piece is 2.8 m shorter than the length of the other, what is the length of the longer piece of rope?

a) 7.5 m
b) 11.7 m
c) 9.9 m
d) 10.3 m

41 If a rectangle of area 24 cm^2 is divided into exactly 3 non-overlapping squares of equal area, what is the length of the longer side of the rectangle (rounded to two decimal places)?

a) 2.82
b) 5.64
c) 8.48
d) 11.28

42. In statistical hypothesis testing, alpha is the probability of falsely rejecting a true null hypothesis, also called Type I error. Alpha is usually set at 0.05. If we reduce alpha to 0.01, the probability of falsely rejecting a true null hypothesis:
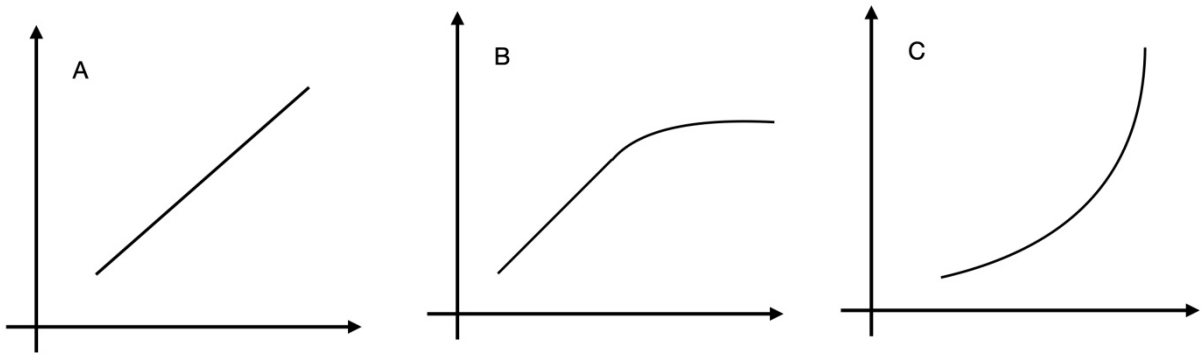
a) decreases
b) increases
c) remains the same
d) saturates

43. Match each of the relationships below to the graph that best represents it.

       1: The age of a snake and its body length

       2. The cross-sectional diameter of a snake and its body volume

       3. The mass of a snake and its body volume

a) 1 = B; 2 = C; 3 = A

b) 1 = C; 2 = B; 3 = A

c) 1 = A; 2 = B; 3 = C

d) 1 = A; 2 = C; 3 = B

44. A study examined how grazing by large herbivores affects herbaceous plant species richness in areas with different rainfall levels. The researcher hypothesizes that plant species richness peaks at intermediate rainfall levels because water stress reduces species richness at low rainfall and competition reduces species richness at high rainfall levels. She also hypothesizes that grazing negatively impacts plant species richness at lower than average rainfall by adding to the water stress; whereas grazing enhances plant species richness at higher than average rainfall by reducing the impact of competition. Which of the following graphs best depicts her hypothesis?
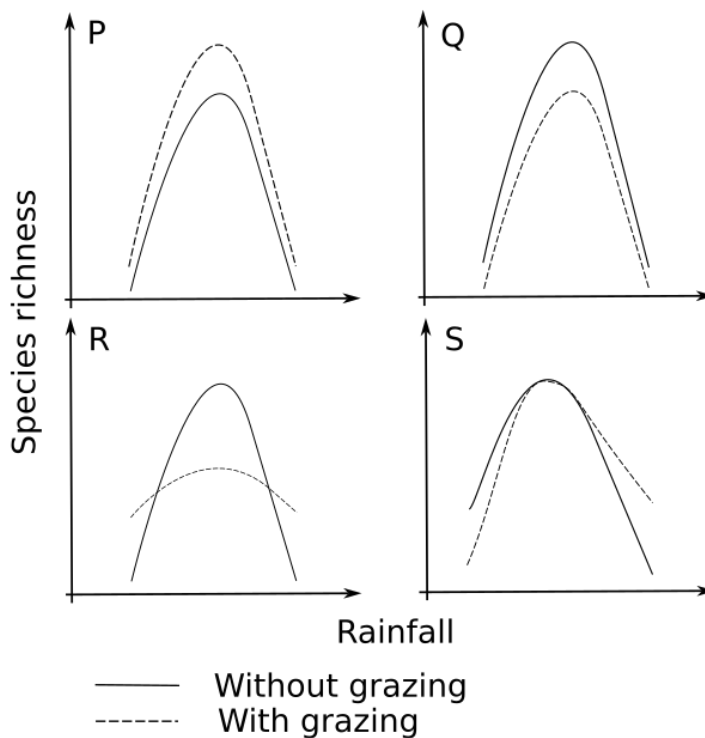
a) P
b) Q
c) R
d) S

45. In the figure below (adapted from the work of David Lack), the bars show the frequency distribution of clutch sizes (the number of eggs laid at a time by a female) in a population of birds, while the dotted line shows the number of young fledged per clutch. Using only these data, which of the following conclusions are valid for this population of birds?
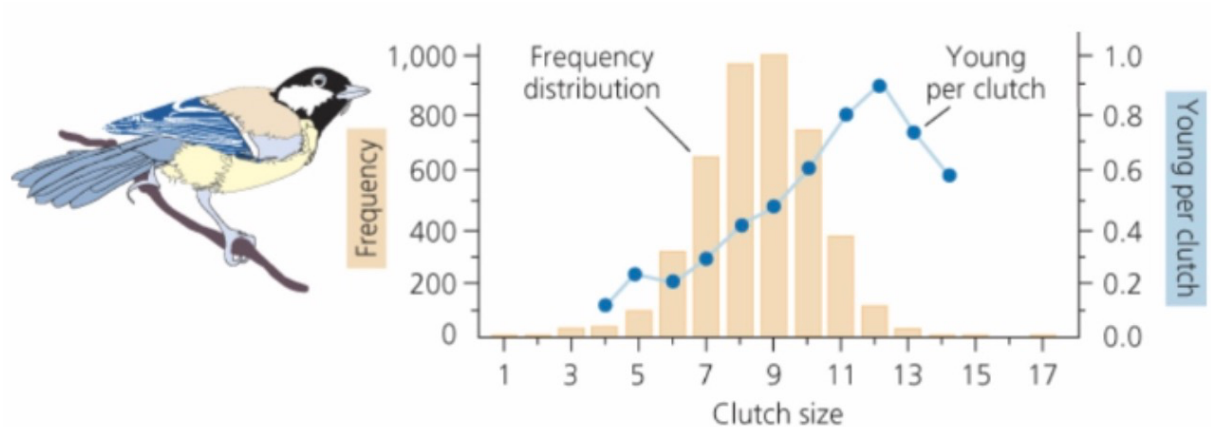
a) The largest clutch sizes in the population result in the maximum number of young fledged per clutch
b) The most frequent clutch size in the population is greater than the clutch size that maximizes the number of young fledged per clutch
c) **The most frequent clutch size in the population is smaller than the clutch size that maximizes the number of young fledged per clutch**
d) The most frequent clutch size in this population is the one that maximizes the number of young fledged per clutch.

END OF SECTION B

SECTION C

46. The relationship between coral polyps and zooxanthellae is an example of which type of interaction?

a) Commensalism
b) **Mutualism**
c) Parasitism
d) Predation

47. Which of these ecosystems typically hold the most amount of soil carbon per unit area?

a) Agricultural lands
b) Grasslands
c) Wet evergreen forests
d) **Wetlands**

48. Which of the following species is not known to be invasive in India:

a) *Chromolaena odorata*
b) ***Eucalyptus globulus***
c) *Lantana camara*
d) *Parthenium hysterophorus*

49. Which of the following taxa of trees are not gymnosperms?

a) Cycads
b) Junipers
c) **Oaks**
d) Pines

50. As we move away from the equator to the poles, the elevation at which we encounter the treeline on mountains is expected to:

a) **decrease**
b) increase
c) first increase and then decrease
d) remain unchanged

51. The dugong is a species of marine mammal that predominantly feeds on:
a) crustaceans
b) marine fish
c) **sea grasses**
d) seaweed

52. Panel P below shows the population sizes of two insect species m and n when occurring alone and when occurring together, and Panel Q shows the population sizes of two insect species x and y when occurring alone and when occurring together. Which one of the following descriptions of their interaction is most likely?
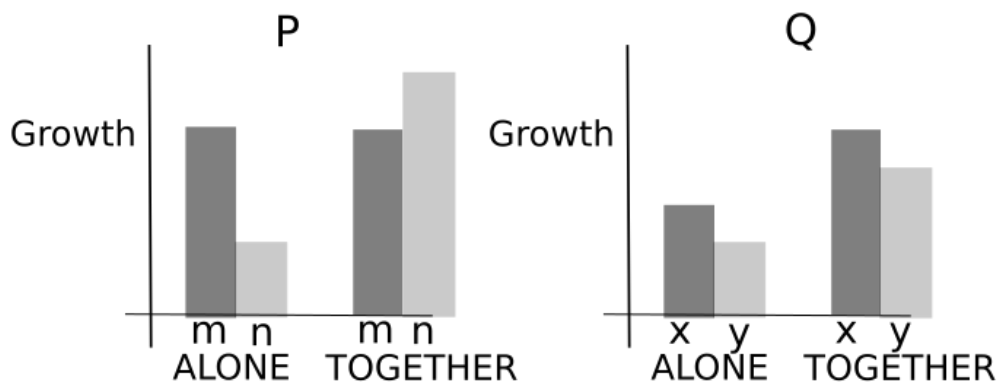
a)   P: Mutualism, Q: Commensalism
b)   P: Commensalism, Q: Parasitism
c)   **P: Commensalism, Q: Mutualism**
d)   P: Parasitism, Q: Commensalism

53. Heterozygosity at a locus H with two alleles p and q under Hardy-Weinberg equilibrium is maximised when

a)   p = 0.1 and q = 0.9
b)   p = 0.2 and q = 0.8
c)   p = 0.4 and q = 0.6
d)   **p = 0.5 and q = 0.5**

54. Relatedness, which is the probability of two individuals sharing an allele by descent, for a diploid sexually reproducing animal, is:

a)   0.75 for parent and offspring, 0.5 for siblings and 0.25 for grandparent-grandoffspring
b)   **0.5 for parent and offspring, 0.25 for siblings and 0.25 for grandparent-grandoffspring**
c)   0.5 for parent and offspring, 0.5 for siblings and 0.5 for grandparent-grandoffspring

~~d)   0.75 for parent and offspring, 0.25 for siblings and 0.5 for grandparent-grandoffspring~~

Typographic error. No correct answer. All candidates will be given a mark for this question

55. According to island biogeography theory of *MacArthur and Wilson*, the number of species on an island is a balance between:

a) **colonisation and extinction**
b) competition and predation
c) instantaneous growth rate r and carrying capacity K
d) resource acquisition and predation

56. Match the following books with their authors

1. Indira Gandhi: A Life in Nature	A. K.UllasKaranth
2. Among Tigers	B. Prerna Singh Bindra
3. The Wild Heart of India	C. Jairam Ramesh
4. The Vanishing: India's Wildlife Crisis	D. T.R.Shankar Raman

a)   1:A, 2:D, 3:B, 4:C
b)   1:B, 2:A, 3:C, 4:D
c)   1:C, 2:D, 3:B, 4:D
d)   **1:C, 2:A, 3:D, 4:B**

57. You have been given a list of 8 endangered species and 8 protected areas, and have been asked to select the least number of protected areas which would give protection to all the 8 endangered species.

Endangered species: Elephant, tiger, rhino, lion-tailed macaque, swamp deer, Great Indian Bustard, Bengal Florican and clouded leopard.

Protected areas: Kanha National Park, Ranthambore Tiger Reserve, Corbett National Park, Kaziranga National Park, Silent Valley National Park, Jailsalmer Desert National Park, Panna Tiger Reserve, Eaglenest Wildlife Sanctuary

Which are the protected areas that you would select?
a) Corbett National Park, Silent Valley National Park, Eaglenest Wildlife Sanctuary, Kaziranga National Park
b) Kaziranga National Park, Silent Valley National Park, Panna Tiger Reserve
c) **Kaziranga National Park, Jaisalmer Desert National Park, Silent Valley National Park**
d) All the protected areas.

58. Arrange amphibians, mammals and birds in increasing order of species richness in India.

a) Mammals<Birds<Amphibians
b) Amphibians<Birds<Mammals
c) **Amphibians<Mammals<Birds**
d) Birds<Amphibians<Mammals

59. The Forest (Conservation) Amendment Bill 2023, was passed by the Parliament in July 2023. This amendment will:

a) Simplify procedures for diversion of forest land for strategic and development projects in border areas.
b) Override several provisions in the Forest Rights Act (2006) which recognizes the rights of the forest dwelling tribal communities and other traditional forest dwellers to forest resources.
c) Remove the "dictionary" definition of forests which the Supreme Court of India applied in the Godavarman case, 1996, while banning clear felling in all ecological forests, regardless of ownership.
d) **Do all of the above**

60. Name a non-native tree species much favoured by frugivorous bats in India?
a) Mango

b) Jack fruit
c) **Cashew**
d) Jamun

61. Carbon stocks in two forest ecosystems A and B are measured every year for a few decades. The carbon stock in ecosystem A increases linearly with time. In ecosystem B, it increases, becomes flat for a while and then decreases. Carbon sequestration is the rate at which carbon stock changes with time. Which of the following is true:

a) Both ecosystems have a constant rate of carbon sequestration
b) The rate of carbon sequestration is non-zero in both ecosystems at all times
c) **Ecosystem B has a zero rate of carbon sequestration at some point in time**
d) Ecosystem B has a positive rate of sequestration throughout

62. Which region in India is likely to experience the highest rate of warming due to global climate change?

a) Central India
b) **Eastern Himalaya**
c) Gangetic plains
d) Western Ghats

63. Bats are potential reservoirs of zoonoses because:

a) There are many bat species that are phylogenetically close to humans
b) There are bat species phylogenetically close to humans that fly long distances
c) **They carry many RNA viruses and often live close to humans**
d) They fly short distances and carry many bacterial pathogens

64. Which of the following is a set of extinct **species**?

a) Tasmanian tiger, Passenger pigeon, White rhino
b) Northern white rhino, South China tiger, Amur tiger
c) Tasmanian tiger, Passenger pigeon, Asian cheetah
d) **Tasmanian tiger, Passenger pigeon, Quagga**

65. Which one of the statements below correctly describes the relationship between instantaneous birth rate (b) and population size (N) in a population showing logistic population growth?

a) **b decreases linearly with N**
b) b increases linearly with N

c) b remains constant across varying values of N
d) b shows a unimodal relationship with N

66. A study sampled butterfly communities at three different grassland sites. The table below shows the species and their abundances quantified at the three sites. Which one of the options given below represents the sites correctly ordered according to their species diversity (as quantified by the Shannon-Weiner index which includes both species richness and relative abundances)?

Species identity	Site R	Site S	Site T
E	50	25	22
F	10	10	24
G	15	20	20
H	5	5	22
I		12	19
J		10	23
K		6	19
L		6	20

a) R > S > T
b) S = T > R
c) S > R > T
d) T > S > R

67. Aggressive ants live in the swollen thorns of a small tropical tree and feed on oil-rich bodies that the tree produces at the tip of its leaflets. Of the following experiments, which best tests the hypothesis that ants defend the plant by either killing or chasing away leaf-feeding insects?

a) **Remove ants and measure subsequent leaf damage**
b) Remove oil-rich bodies and measure subsequent ant density.
c) Remove the thorns and measure subsequent ant density.
d) Remove leaf-feeding insects and measure subsequent plant growth.

68. Which of the following accurately depicts the correct sequence, in decreasing order, of the distribution of biomass across the major kingdoms?

a) Animals > fungi > plants > bacteria >protists
b) Bacteria > plants > fungi > animals >protists

c) Fungi > bacteria > plants >protists> animals
d) Plants > bacteria > fungi >protists> animals

69. Plants with C4 photosynthetic pathways have specialized adaptations that help them avoid photorespiration. This allows C4 plants to limit how much they open their stomates relative to C3 plants. This gives C4 plants a relative advantage over C3 plants in:

a) cool environments
b) dry environments
c) nutrient rich environments
d) shaded environments

70. In which of the river systems does theGangetic river dolphin occur:
a) Ganga, Godavari, Krishna
b) Ganga, Yamuna, Godavari
c)Ganga, Brahmaputra, Mahanadi
d) Ganga, Yamuna, Narmada

71. Which of the following species is not endemic to the Indian peninsula?
a) Bonnet macaque
b) Yellow throated bulbul
c) Indian Peafowl
d) Jerdon's courser

72. Which of the following choices gives the geologic eras in the correct sequence, from the oldest to the most recent?
A. Cenozoic—Mesozoic—Paleozoic—Precambrian
B. Precambrian—Paleozoic—Mesozoic—Cenozoic
C. Paleozoic—Precambrian—Cenozoic—Mesozoic
D. Paleozoic—Cenozoic—Precambrian—Mesozoic

73. Charles Darwin's proposed conditions for natural selection encompass all of the following with regard to a given population EXCEPT
A. Differential survival of individuals
B. Differential production of offspring
C. Competition for limited resources
D. Changing environmental conditions

74. Examine the biome-climate diagram shown below (Adapted from Whitaker 1979):
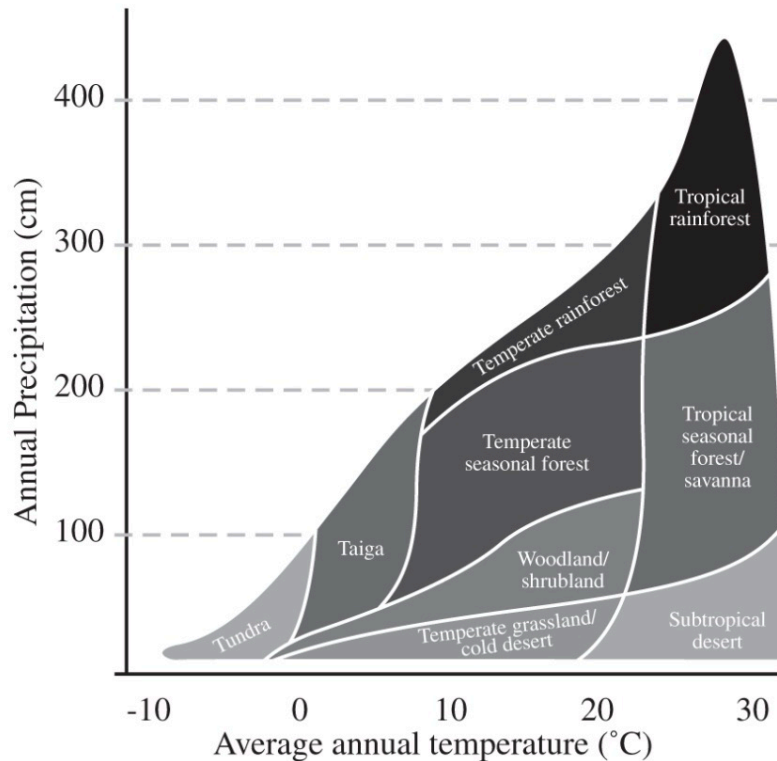
Given the above, which vegetation forms would most likely be found in a location with an average annual temperature below 10°C and average annual precipitation above 100 cm?

a) **Coniferous trees, fungi, mosses, lichens**
b) Shrubs, grasses, herbs, palms
c) Mosses, heath, lichens, algae
d) Cacti, succulents, grasses

75. The shola-grassland ecosystem of the high elevation regions of the Southern western Ghats is a mosaic system. Here patches of stunted evergreen forests (known as sholas) and large stretches of montane grassland occur together in a patchwork pattern. The boundaries between these two ecosystem states- shola and grassland- are very abrupt and sharply defined. It is thought that frosts and fires are important in determining these boundaries. Fires and frosts occur frequently in the grasslands, and while grasses are adapted to them, shola trees cannot establish under these conditions. In contrast, the dense canopies of sholas do not allow frosts and fires to penetrate, and while shola trees do well under these conditions, grasses are shaded out. Thus, the conditions in each ecosystem state promote its persistence. This is an example of a:

a) Negative feedback loop
b) Neutral feedback loop
c) **Positive feedback loop**
d) None of the above

END OF SECTION C

76. **SECTION D**

Write an essay on ONE of the following topics. You are allowed a maximum of 750 words.

You will be scored on the content of the essay, clarity of thought, logic of arguments, flow of text and writing clarity.

TOPIC 1

The United Nations has declared 2021-2030 as the Decade of Ecosystem Restoration in recognition of the urgent need to prevent, halt and reverse the loss of earth's natural ecosystems to combat climate change and prevent the breaching of planetary boundaries. Restoration of habitats is critical to bring back biodiversity and ecosystem function to areas that have been degraded. However, although well-intentioned, we (administrators, funders, citizens) have come to equate restoration with tree planting. Newspaper headlines claiming a record number of trees being planted are a common occurrence. Often non-native species are used to make up the numbers; endangered habitats such as grasslands are planted over by trees; compensatory tree planting is done to make up loss of old growth forests; overall this often does more harm than good. Imagine that you are in charge of drafting India's guidelines on restoration. Write an essay about the salient points that you would include in this policy document, how would you suggest that decisions about restoration be made and implemented, and what would you recommend as the goals for restoration, bolstering your suggestions with evidence where you can.

TOPIC 2

The Indian subcontinent stands out in the conservation world as being home to the last viable populations of charismatic megafauna such as Asian elephants and gaur, and large carnivores like tigers, leopards and lions, alongside some of the most dense human populations on earth. The cheetah is the only species of large mammal to have gone extinct on the Indian subcontinent. Recently, cheetahs were brought in from Namibia and South Africa with the intent to create a population of wild cheetahs after an absence of nearly 75 years. Is it important to recover locally extinct species for conservation? Will this project result in a successful establishment of this species in India? Could the resources spent on this project have been used instead for the conservation of other species that are currently threatened with extinction (e.g. Great Indian Bustard)? Or does the project demonstrate India's unwavering commitment to wildlife conservation? Write an essay outlining your views on this project, bolstering your case with evidence where you can.

END OF SECTION D