

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

Ph.D. (ECOLOGY & ENVIRONMENTAL SCIENCES)

COURSE CODE : 111

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 111

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. Ex-situ conservation is needed because of
 - (A) various threats operating on species in natural ecosystems
 - (B) various threats operating on species in controlled conditions
 - (C) globalization
 - (D) denitrification in ecosystem

2. Sources of precipitation include
 - (A) ponds and lakes
 - (B) lakes and reservoirs
 - (C) throughfall and stem flow
 - (D) rainfall, dew, snow, fog

3. Woody climbers are characteristic of
 - (A) taigas
 - (B) tundras
 - (C) temperate forests
 - (D) tropical forests

4. Tree rings are distinct in
 - (A) tropical species due to indistinct seasonality
 - (B) temperate species due to distinct seasonality
 - (C) subtropics due to moisture
 - (D) subtropics due to high illumination

5. Forest ground flora are dominated by
 - (A) Acathaceae, Araceae, gingers & ferns
 - (B) Rubaceae, Meliaciae, ferns & pines
 - (C) Lauraceae, Tiliaceae, firs & ferns
 - (D) Moraceae, Bixaceae, ferns & oaks

6. Leaflessness and thorniness increase with
 - (A) Salinity stress
 - (B) Soil nutrients
 - (C) Drought stress
 - (D) Plant nutrition

7. Vegetation type with single stratum is
 - (A) tropical woodlands
 - (B) temperate grasslands
 - (C) temperate taigas
 - (D) tropical scrubs

8. Salinity of sea water in ppt
 - (A) 05
 - (B) 15
 - (C) 25
 - (D) 35

9. Volitinism in insects pertains to
 (A) spinning (B) ecdysis
 (C) moth emergence (D) no. of generations/ yr
10. Cell organelle that aids in photorespiration is
 (A) peroxysomes (B) mitochondria
 (C) golgi bodies (D) none of the above
11. Major biomes include
 (A) arctic-alpine, cold & warm temperate, tropical
 (B) arctic & Antarctic
 (C) deserts & rain forests
 (D) grasslands & savannas
12. Soil profile comprises of
 (A) organic layer, mineral layer & parental rock
 (B) litter, humus & soil layer
 (C) soil, plants & burrowing fauna
 (D) litter, soil & plant cover
13. Estuarine fauna include
 (A) corals & large fishes (B) oysters & crabs
 (C) corals & mice (D) voles & shrews
14. Orderly arrangement of 4 fungal groups
 (A) Chlorella, nastoc, Fucus & Polysiphonia
 (B) Riccia, Marchantia, Bryum, Spagnum
 (C) Albugo, Peziza, Polyporus, Fusarium
 (D) Cycus, Pinus, Gnetum, Ephedra
15. The enzyme that breaks DNA into segments
 (A) Ligase (B) Amylase
 (C) Endonuclease (D) Polymerase
16. Palms characteristically possess
 (A) thick fibrous roots, caudex & spadix
 (B) thin tap roots, caudicle & spikes
 (C) drupes, firs & cymes
 (D) berries, spruce & thyrses

17. Latitudinal limit of tropical region is
 (A) 13.5 degree North to 13.5 degree South
 (B) 23.5 degree North to 23.5 degree South
 (C) 33.5 degree North to 33.5 degree South
 (D) 43.5 degree North to 43.5 degree South
18. Families with greatest number of species include
 (A) Rosaceae, Rutaceae, Myrtaceae, Lamiaceae
 (B) Asteraceae, Poaceae, Orchidaceae, Fabaceae
 (C) Violaceae, Sapindaceae, Mimosaceae, Apiaceae
 (D) Acanthaceae, Capparaceae, Pinaceae, Buxaceae
19. Fibre resources are obtained from
 (A) Agave, Musa, Corchorus, Hibiscus
 (B) Zea, Poa, Orchis, Taxus
 (C) Valonia, Salicornia, Lannea, Swetienia
 (D) Thuja, Ephedra, Cycas, Prunus
20. Succulents include
 (A) Melia, Ruta, Annona, Walsura
 (B) Garcinia, Carallia, Musa, Aster
 (C) Zinnia, Olea, Cucurbita, Laurus
 (D) Euphorbia, Agave, Aloe, Cacti
21. How many net molecules of ATP are produced in glycolysis?
 (A) 2 (B) 4
 (C) 34 (D) 36
22. Biodiverse island systems include
 (A) Canada, USA, India, Australia
 (B) India, UK, USA, Africa
 (C) Madagascar, SE Asia, Australia, New Zealand
 (D) Russia, Canada, Africa, UAE
23. The major problems associated with the lake Victoria is
 (A) introduction of cichlids in to the lake
 (B) invasive species
 (C) presence of toxic chemical in the water that killed all of the animal life
 (D) oil spills

24. Titrimetry exemplified by an oxidizing & a reducing agent is
 (A) Oxalic acid Vs HCl (B) Oxalic acid Vs KMnO_4
 (C) HCl Vs NaOH (D) Nitric acid Vs KOH
25. Which provision of ISO emphasise quality management standards?
 (A) ISO 14001 (B) ISO 14031
 (C) ISO 9000 (D) ISO 14040
26. What is an organism's realized niche?
 (A) All the places an organism can survive
 (B) Lifestyle an organism pursues and the resources it actually uses
 (C) The ecosystem where an animal lives and all the foods available to it
 (D) The location that has the most resources available
27. Races of species having a larger body size are generally found in the cooler parts of the range while those having a smaller body size are found in the warmer parts. This rule is known as
 (A) Allen's rule (B) Gloger's rule
 (C) Bergmann's rule (D) Blackman's rule
28. In microbial mining, one of the following organism is utilized
 (A) Thiobacillus (B) Clostridium
 (C) Pseudomonas (D) Azotobacteria
29. Radioactive pollution along Kerala coast is due to
 (A) thorium (B) caesium
 (C) plutonium (D) zinc
30. The average air pressure at sea level is approximately
 (A) 1230 millibars (B) 1 kg/cm^2
 (C) 13.3 pounds/inch² (D) 6.2 pounds/inch²
31. The value of ionic product of water is
 (A) 1×10^{-23} (B) 1×10^{-14}
 (C) 1×10^{-22} (D) 6.023×10^{22}
32. Hydrophytes usually have well developed
 (A) root system (B) vascular system
 (C) stomata (D) aerenchyma

33. Bioluminescence is caused by
(A) luciferin (B) enzyme
(C) reflection of light (D) hormones
34. Colour of distillery industry effluent is due to the presence of
(A) Caramel (B) Iron oxide
(C) Dextrose (D) Lingo cellulose
35. In which of the national parks Indian lions are nurtured in their natural habitat?
(A) Corbett (B) Gir
(C) Bandipur (D) Kaziranga
36. Rh+ blood is due to genes which are
(A) dominant (B) recessive
(C) codominant (D) neutral
37. The coefficient of correlation
(A) has no limits (B) can be less than one
(C) varies between ± 1 (D) can be more than one
38. The calculated value of chi-square test is
(A) always positive (B) always negative
(C) can be either positive or negative (D) none of these
39. Deficiency of sodium and potassium causes
(A) diarrhoea (B) headache
(C) muscular cramps (D) all are correct
40. The number of producers and consumers in an ecosystem is mutually controlled by a
(A) feedback mechanism (B) food chain mechanism
(C) productivity control (D) any of these
41. Causes of coastal pollution include
(A) oil-spills, effluents, solid dumps, etc.
(B) oil-extraction, aquaculture, agriculture, etc.
(C) over-exploitation of fishery resources
(D) under-utility of fishery resources

42. Orderly arrangement of 4 major algal group representatives include
 (A) Chara, Cyclotella, Codium, Ulva
 (B) Anabaena, Cycas, Pinus, Gnetum
 (C) Nostoc, Ulva, Padina, Polysiphonia
 (D) Mangifera, Moringa, Ficus & Fucus
43. Monoculture means
 (A) Plantation of single species (B) Mixed crop plantation
 (C) Plantation of Eucalyptus & Acacias (D) Bacterial culture
44. The reason for signing 1987 Montreal Protocol was
 (A) to stop global trade of products made from endangered animals
 (B) to do away with the use of CFC's, which were found to be responsible for depletion of the ozone layer
 (C) to prohibit and ban nuclear testing in tropical deserts and oceans
 (D) to start using renewable sources of energy instead of fossil fuels to reduce the anthropogenic greenhouse effect
45. Tree trunks of humid tropical forests are clothed with
 (A) saprophytes (B) parasites
 (C) epiphytes (D) hydrophytes
46. Largest leaf & flower respectively are known in
 (A) Vanda teesselata & Russelia
 (B) Vaccinium neigherrense & Rhamnus
 (C) Victoria amazonica & Rafflesia
 (D) Viscum orientale & Ruscus
47. Transgenics are known to be
 (A) disease-prone (B) disease-resistant
 (C) disease-inducive (D) disease-promotive
48. The persistent pollutants in the food-chain are increased through
 (A) bioaccumulation (B) bioconcentration
 (C) bioexcretion (D) biomagnification
49. The Bhopal gas tragedy, in 1984, was caused by the leakage of
 (A) CO (B) MIC
 (C) HNO₃ (D) HCHO

50. An ecosystem that is characterized by decreasing productivity would be best described as one undergoing
- (A) eutrophication (B) flooding
(C) desertification (D) none of the above
51. A study of data in 19th century on availability of lynx and hare fur in Canada revealed that there was a cyclic variation with the same period. This is because
- (A) there was a time gap between the availability of hare meat and lynx reproduction in response
(B) each generation of lynx and hare learnt to avoid traps but did not pass this knowledge on to their succeeding generation
(C) newer trappers replaced old ones and they required time to learn
(D) overall variation in sunspot activity
52. What is the Raunkiaer system?
- (A) Systems for classifying plants by life-form
(B) Part of the photosynthetic cycle
(C) Method to measure light intensity in forests
(D) A method to assess plant diversity
53. Epiphytes grow on
- (A) soil (B) water
(C) other plants (D) underground
54. Which of the following non-biodegradable waste can pollute the earth to dangerous levels of toxicity, if not handled properly
- (A) DDT (B) CFC
(C) Radioactive substances (D) PAN
55. Prions are
- (A) micro RNA's (B) a type of virus
(C) a gene sequence (D) proteinaceous infectious agent
56. Trophic pyramid in an ecosystem is constructed by estimating the
- (A) food types of animals and plants
(B) length of the food chain
(C) relative abundance of each functional feeding group
(D) the total number of functional groups

57. Life tables are used for assessing
- (A) food webs
 - (B) population growth and regulation
 - (C) probability of surviving to a particular age
 - (D) livelihood options of communities
58. Population genetics is the study of
- (A) changes in allele frequency and distribution
 - (B) the quantity of genetic diversity in populations
 - (C) the heterozygosity and fitness of populations
 - (D) the rate of phenotypic changes with evolution
59. The second law of thermodynamics deals with
- (A) creation of matter in the Universe
 - (B) energy cannot be created or destroyed
 - (C) all systems are in thermal equilibrium
 - (D) entropy in a system
60. A biogeochemical cycle is the
- (A) cycling of energy through the biosphere
 - (B) a part of pollution treatment plants
 - (C) global meteorological cycles
 - (D) cycling of elements through the biotic and abiotic sphere
61. The Competitive Exclusion Principle was proposed by
- (A) G. Evelyn Hutchinson
 - (B) G.F. Gause
 - (C) Lotka and Volterra
 - (D) Robert MacArthur
62. The main greenhouse gases are
- (A) carbon dioxide, methane, nitrous oxide and sulphur dioxide
 - (B) carbon dioxide, carbon monoxide, nitrous oxide and sulphur dioxide
 - (C) carbon, methane, nitrous oxide, ethylene and fluorocarbons
 - (D) carbon, methane, nitrous oxide and sulphur hexafluoride
63. Carbon sequestration is the
- (A) net removal of CO₂ from the atmosphere
 - (B) net release of CO₂ from sinks
 - (C) sink-source dynamics
 - (D) trends in carbon emissions

64. An IUCN classification of 'endangered' species is
 (A) species that has ceased to exist
 (B) danger of extinction in the foreseeable future
 (C) very high risk of extinction in the near future
 (D) species that is only found in captivity
65. Biodiversity hotspots located in India are
 (A) Western Ghats only
 (B) Western Ghats and Eastern Himalayan
 (C) Western Ghats, Eastern Himalayas and Indo-Burma
 (D) Western Ghats, Eastern Himalayas and Sundarban
66. The standard deviation is
 (A) a parameter of distribution
 (B) a measure of dispersion
 (C) a measure of central tendency
 (D) a measure of randomness
67. In a linear model such as $y=ax+b$, the slope is
 (A) "y"
 (B) "x"
 (C) "a"
 (D) "b"
68. Which of the following is found in both prokaryotic and eukaryotic cells?
 (A) Centriole
 (B) Nucleolus
 (C) Peroxisome
 (D) Ribosome
69. The logistic growth curve indicates
 (A) maximal sustainable harvesting
 (B) resource availability in the environment
 (C) density independent growth
 (D) density dependent growth
70. Organisms reproducing once in life time are respectively referred in plants and animals as
 (A) monocarpic & semelparous
 (B) polycarpic & iteroparous
 (C) monophyletic & polyphyletic
 (D) viviparous & semelparous
71. Which region of the earth supports more population?
 (A) 0-30° N
 (B) 30-60° N
 (C) 60-90° N
 (D) none of the above

72. Conifers include
- (A) pines, firs, spruce & yews
 - (B) alders, beeches, ashes & poplars
 - (C) eucalypts, myricas & myristicas
 - (D) teak sal, & terminalias
73. Tick the order indicating increasing rainfall gradient
- (A) cold deserts, hot deserts, grasslands
 - (B) rainforests, savannas & deciduous forests
 - (C) grasslands, rainforests & deserts
 - (D) deserts, savannas, deciduous & evergreen forests
74. Arthropods include four major groups
- (A) canids, felids, scuirids & bovids
 - (B) annelids, centipedes, crabs & polychaetes
 - (C) millepedes, crabs, lepidopterans & arachnids
 - (D) nematodes, flatworms, earthworms & corals
75. Weed control is achieved by
- (A) cytological, physiological & embryological means
 - (B) mechanical, chemical & biological means
 - (C) pathological, karyologocal & cytological means
 - (D) chronological, cytological & astrological means
76. Endozoochory involves fruit processing by
- (A) ingestion, digestion & egestion
 - (B) injestion, extraction & sedimentation
 - (C) impression, compression & petrification
 - (D) expression, suppression & consumption
77. The major pollutants released from thermal power plants are
- (A) CO & CO₂
 - (B) SO₂ & CO₂
 - (C) SO₂ - NO₂
 - (D) Hydrocarbons
78. In post-fertilization stage ovary, ovule & zygote respectively develop into
- (A) seed, embryo & fruit
 - (B) seed, endosperm & perisperm
 - (C) fruit, seed & embryo
 - (D) embryo, endosperm and fruit

79. Floating & rooted macrophytes of pond ecosystems
 (A) Utricularia - Oenothera; Wolfia - Eichhornia
 (B) Enhalus - Blyxa & Lemna - Hydrocharis
 (C) Halophila - Halodule & Eichhornia - Pistia
 (D) Lemna - Wolfia & Elodia - Vallisneria
80. Conservation areas are prioritised on
 (A) high diversity, endemism & geographic uniqueness
 (B) low diversity, wide distribution & geological substrate
 (C) climate, soil & cultigens
 (D) human population, climate & soil
81. Saprophytic mode is exhibited by
 (A) coprophilous fungi (B) soil algae
 (C) mosses (D) ferns
82. Temporary hardness of water is due to
 (A) carbonate and bicarbonates (B) oxides of divalent compounds
 (C) TDS (D) DOM
83. Tick the set of invasive weeds
 (A) pine, fir, linden (B) teak, sal, red sanders
 (C) lantana, eichhornia, chromolaena (D) gnetum, connarus, derris
84. Sustainable use of resources would refer to
 (A) optimal resource harvest within regenerative potential of species
 (B) maximal resource harvest in all seasons
 (C) resource harvest at long time intervals of resource harvest at all
 (D) no resource harvest at all
85. Endemics are
 (A) species with wide distribution (B) species with restricted distribution
 (C) biomes of wide range (D) biomes of narrow range
86. Deforestation reduces _____ and increases _____.
 (A) CO₂ uptake in photosynthesis, & global warming
 (B) O₂ uptake in respiration & guttation
 (C) N uptake & photosynthesis
 (D) P uptake & transpiration

87. Methods of fossilization include
- (A) sublimation, impression, predation & dispersion
 - (B) sedimentation, impression, compression & petrification
 - (C) nitrification, cryopreservation, compression & pollination
 - (D) denitrification, crystallization, fossilization & preservation
88. Plant & fungal cell wall are respectively made of
- (A) chitin & creatinine
 - (B) maltose & lactose
 - (C) cellulose & chitin
 - (D) glucose & galactose
89. Succession initiating from aquatic environment is
- (A) Hydrosere
 - (B) Xerosere
 - (C) Mesosere
 - (D) None of the above
90. Extinct bird of Mauritius island
- (A) sunbird
 - (B) humming bird
 - (C) dodder
 - (D) dodo
91. Marine mammals include
- (A) seacucumber, corals & polychetes
 - (B) mammoths, mouse, deer & marsh crocodile
 - (C) manatees, dugongs & whales
 - (D) caulapa, halimeda & codium
92. Population regulation mechanisms help in
- (A) density reduction & diversity maintenance
 - (B) density increase & diversity reduction
 - (C) diversity and density increase equally
 - (D) diversity and density decrease equally
93. Model predictions about global climate change indicates that
- (A) there are close agreement on trends and values (for example, predicted carbon dioxide concentrations)
 - (B) no agreement at all
 - (C) there are close agreement on trends however; little agreement on values
 - (D) there is general agreement on trends but little agreement on values

94. In which of the following ecosystem an ecological pyramid of energy flow is often an inverted one?
- (A) ocean (B) tundra
(C) rainforest (D) desert
95. The characteristics of human placenta is that they are
- (A) haemoendohelial, monodiscoidal and nondeciduate
(B) haemochorial, monodiscoidal and deciduas
(C) syndeschomorial, monodiscoidal and deciduate
(D) superficial, discoidal and deciduate
96. Evolutionary changes in floral morphology influence evolutionary changes in pollinator morphology and vice versa. This type of evolution is known as
- (A) Evolutionary ecology (B) Ecological evolution
(C) Co-evolution (D) Macroevolution
97. Major wetlands include
- (A) Bogs, marshes, mangroves & swamps
(B) Oceans, continental shelf, rivers & streams
(C) Lakes, ponds & puddles
(D) Rivers, streams & ponds
98. The Water (Prevention and Control of Pollution) Act 1974
- (A) Regulates the discharge of hazardous pollutants into the nations surface water
(B) Regulates the emission of hazardous air pollutants
(C) Regulates waste disposal of sea
(D) Regulates the transportation of hazardous materials
99. The instrument used to measure relative humidity is
- (A) Hygrometer (B) Hydrometer
(C) Barometer (D) Thermometer
100. Tick the related mammal group
- (A) Manatees , elks & cheetah (B) Musk deer, otters & lion
(C) Capibara, elands & bats (D) Mammoths, elephants & tapirs