ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

Ph.D. (ECOLOGY AND 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 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. Volitinism in insects pertains to

(A) spinning
(B) ecdysis
(C) moth Emergence
(D) no. of generations/yr

2. Cell organelle that aids in photorespiration is

(A) peroxysomes
(B) mitochondria
(C) golgi bodies
(D) none

3. *In situ* conservation is advantageous because

(A) it provides ecosystem-level natural interaction of biota
(B) it is coast effective
(C) it is harmless
(D) it offers ecosystem services

4. The enzyme that breaks DNA into segments

(A) Ligase
(B) Amylase
(C) Endonuclease
(D) Polymerase

5. How many net molecules of ATP are produced in glycolysis

(A) 2 (B) 4 (C) 34 (D) 36

6. Habitat zonation in coastal marine ecosystems follows the following gradient from landward to seaward

(A) salt marshes, mangroves, sea grasses and coral reefs
(B) coastal reefs, mangroves, salt marshes and sea grasses
(C) mangroves, coastal reefs, sea grasses and salt marshes
(D) sea grasses, salt marshes, coastal reefs and mangroves

7. 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

8. Which provision of ISO emphasise quality management standards?

(A) ISO 14001
(B) ISO 14031
(C) ISO 9000
(D) ISO 14040

9. Macro and micronutrients include

(A) N, P, Cu, Zn and K, Zn, Fe, Mg
(B) N, P, K, Ca, Mg and Cu, Fe, Mn, Zn
(C) Cu, Fe, Mn, Zn and N, P, K, Ca, Mg
(D) None of the above

10. Secondary metabolites include

(A) tannins, proteins and carbohydrates
(B) amino acids, proteins and carbohydrates
(C) gums, resins, tannins and polyphenols
(D) sugar, proteins and fats

11. 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

12. One of the following represents an order

(A) Consumer, decomposer, producers and cycling
(B) Decomposer, producer, recycling and consumers
(C) Producers, consumers, decomposer and recycling
(D) Producer, recycling, decomposers and consumers

13. Some of the hottest Biodiversity hot spots include

(A) Australia, Texas, Canada and Sri Lanka
(B) Western Ghats-Sri Lanka, Indo-Burma, Madagascar, Caribbean and Brazil
(C) Russia, Nigeria and Mangolia
(D) Canada, Greenland and Finland

14. 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

15. Major determinants of global distribution of biomes include

(A) altitude, latitude, and longitude
(B) temperature and rainfall
(C) soil and rainfall
(D) temperature and altitude

16. In microbial mining, one of the following organism is utilized

(A) Thiobacillus (B) Clostridium
(C) Pseudomonas (D) Azotobacteria

17. Genetic diversity can be detected by

(A) iso-enzyme analysis (B) co-enzyme analysis
(C) protein synthesis (D) photosynthetic ability

18. The coefficient of correlation

(A) has no limits (B) can be less than one
(C) varies between ±1 (D) can be more than one

19. Sacred groves are

(A) natural forests protected on local religious belief
(B) reserve forest
(C) national parks
(D) monoculture forests

20. 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

21. K-Strategists are characterized by

(A) lots of well-cared offsprings (B) lots of uncared offsprings
(C) few well-cared offsprings (D) few uncared offsprings

22. Sources of rubber include

(A) Ficus, Morus & Artrocarpus (B) Mimusops, Ruta & Euphorbia
(C) Calotropis, Plumeria & Melia (D) Ficus, Hevea & Manihot

23. Moth pollination is characterized by

(A) night blooming, scented, white, tubular flowers
(B) day blooming, red, rotate flowers
(C) noon blooming white flowers
(D) day blooming yellow flowers

24. Causes of tropical deforestation

(A) hunting & firewood collections
(B) non-timber resources extraction and small dams
(C) road construction & whaling
(D) timber extraction, land use change & large dams

25. The order of increasing soil grain size is

(A) sand, silt & clay
(B) sand, clay & silt
(C) clay, silt, fine & coarse sand
(D) sand, clay & humus

26. 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

27. 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

28. Electrostatic precipitators remove

(A) carbon dioxide
(B) particulate matter
(C) hydrocarbons
(D) none of these

29. Which of the following is found in both prokaryotic and eukaryotic cells?

(A) Centriole (B) Nucleolus (C) Peroxisome (D) Ribosome

30. Bioluminescence is caused by

(A) luciferin (B) enzyme (C) reflection of light (D) hormones

31. 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

32. The major pollutants released from thermal power plants are

(A) CO & CO_2
(B) SO_2 & CO_2
(C) $SO_2 - NO_2$
(D) Hydrocarbons

33. The gas which is generally present in the sewer is

(A) CO_2 (B) Methane (C) H_2S (D) All of these

34. Temporary hardness of water is due to

(A) Carbonate and bicarbonates
(B) Oxides of divalent compounds
(C) TDS
(D) DOM

35. The aquatic thermal strata where no temperature gradients are observed is called as

(A) Hypolimnion
(B) Metalimnion
(C) Epilimnion
(D) Thermocline

36. 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

37. 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

38. 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

39. Tip of ecological pyramid is occupied by

(A) herbivores
(B) carnivores
(C) producers
(D) none of these

40. 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

41. Tropical rain forests occur in

(A) Polar region, Russia

(B) Central Africa, Central & South America, South & South East Asia

(C) North America, Russia

(D) Deccan Plateau, North America

42. Major wetlands include

(A) bogs, marshes, mangroves & swamps

(B) oceans, continental shelf, rivers & streams

(C) lakes, ponds & puddles

(D) rivers, streams & ponds

43. The terms grana and ETP are related to

(A) nucleus and microtubules respectively

(B) chloroplast and mitochondria respectively

(C) golgibodies and lysosome respectively

(D) ribosomes and vacuoles respectively

44. The largest mangrove area in India is

(A) Gulf of Mannar (B) Gulf of Combay

(C) Sundarbans (D) Palk Strait

45. Anemophily & entomophily respectively refer to

(A) pollination by animals & water (B) seed dispersal by bats & baboons

(C) pollination by wind & insects (D) seed dispersal by wind & insects

46. Macrofungal fruit bodies are produced in

(A) Phycomycets & Deuteromycetes (B) Ascomycetes & Basidiomycetes

(C) Zygomycetes & Trichomycetes (D) Deuteromycets & Oomycetes

47. Tick the related mammal group

(A) manatees, elks & cheetah (B) musk deer, otters & lion

(C) capibara, elands & bats (D) mammoths, elephants & tapirs

48. The persistent pollutants in the food-chain are increased through

(A) bioaccumulation (B) bioconcentration

(C) bioexcretion (D) biomagnification

49. The instrument used to measure relative humidity is

(A) hygrometer (B) hydrometer

(C) barometer (D) thermometer

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. CO_2 increase in atmosphere leads to increase in global temperature because

(A) CO_2 is a poor conductor of heat

(B) CO_2 absorbs electromagnetic radiation in the infra-red frequencies

(C) CO_2 is heavier than water vapour and displaces it from lower altitudes

(D) CO_2 has no Hydrogen

52. A population is so male-oriented that couples continue to beget children until one male child is born; but have no further children after the first male is born. The male : female ratio in the population, assuming no bias in conception, would be

(A) 1 : 1 (B) 2 : 1

(C) 3 : 1 (D) None of the above

53. 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

54. A source of asbestos and other fibrous particles is

(A) vinyl floor and cement products (B) foam insulations

(C) photocopying machine (D) carpets

55. The entropy of an isolated macroscopic system never decreases, or equivalently, that perpetual motion machines are impossible which is called as

(A) second law of thermodynamics (B) third law of thermodynamics

(C) first law of thermodynamics (D) none

56. Microorganisms which pass independent life and fix atmospheric nitrogen are known as
(A) free living organisms
(B) non-symbiotic nitrogen fixation
(C) diazotrophs
(D) none

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. The Competitive Exclusion Principle was proposed by
(A) G. Evelyn Hutchinson
(B) G. F. Gause
(C) Lotka and Volterra
(D) Robert MacArthur

61. The Competitive Exclusion Principle states that
(A) two species competing for the same resources cannot coexist.
(B) two related species cannot coexist
(C) better competitors will specialize
(D) competition organizes biological communities

62. The exponential growth of populations was proposed by
(A) Mendel (B) Malthus (C) MacArthur (D) Fisher

63. The Convention on Biological Diversity (CDB) was adopted in
(A) Rio de Janeiro in 1992
(B) Kyoto in 1997
(C) Doha in 2001
(D) Geneva in 2004

64. Carbon sequestration is the

(A) net removal of CO_2 from the atmosphere (B) net release of CO_2 from sinks

(C) sink-source dynamics (D) trends in carbon emissions

65. Acid rain can be caused by

(A) natural processes such as volcanic activity

(B) burning of fossil fuels and emission of CO2

(C) air pollution due to emission of SO2 and Nitrogen oxides

(D) all of the above

66. 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

67. 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

68. The Chi-square test is used

(A) to compare frequency distributions (B) to assess probabilities

(C) to compare sample means (D) to compare sample variances

69. In a linear model such as $y = ax + b$, the slope is

(A) "y" (B) "x" (C) "a" (D) "b"

70. The area below the curve of the normal distribution is

(A) equal to zero, this is why it is used as a reference

(B) equal to one, this is why it is used to calculate probabilities

(C) variable, this is why it is used in plenty of applications

(D) none of the above

71. 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

72. Physical & chemical defence against herbivores are

(A) Thorns & Total phenols
(B) Epidermis & Lipids
(C) Vasculature & Glycerol
(D) Nectaries & Proteins

73. Arthopods include four major groups

(A) canids, felids, scuirids & bovids
(B) annelids, centipedes, crabs & polychaetes
(C) millepedes, crabs, lepidopterans & arachnids
(D) nematodes, flatworms, earthworms & corals

74. Weed control is achieved by

(A) cytological, physiological & embryological means
(B) mechanical, chemical & biological means
(C) pathological, karyological & cytological means
(D) chronological, cytological & astrological means

75. Biodiversity is dealt at three levels

(A) ecosystem, climate and soils
(B) ecosystem species and tissue systems
(C) genes, species and ecosystem
(D) genes, cells and tissue systems

76. Endozoochory involves fruit processing by

(A) ingestion, digestion & egestion
(B) ingestion, extraction & sedimentation
(C) impression, compression & petrification
(D) expression, suppression & consumption

77. 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

78. 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

79. Conservation areas are prioritised on

(A) high diversity, endemicity & geographic uniqueness

(B) low diversity, wide distribution & geological substrate

(C) climate, soil & cultigens

(D) human population, climate & soil

80. Extinct relative of Elephant is

(A) Woolly mammoth

(B) African elephant

(C) Giant moa

(D) Malayan tapir

81. Dioecy refers to

(A) separate male and female flowers

(B) separate male and female plants

(C) male and neuter flowers on same plant

(D) male and female parts in same flower

82. Carnivorous plants include

(A) Paspalum, Wolfia, Pistia, Casuarina

(B) Utricularia, Drosera, Nepenthes, Aldrovanda

(C) Laurus, Fagus, Mangifera, Quercus

(D) Rhannus, Capparis, Loranthus

83. Saprophytic mode is exhibited by

(A) coprophilous fungi

(B) soil algae

(C) mosses

(D) ferns

84. Tick the set of invasive weeds

(A) pine, fir, linden

(B) teak, sal, red sanders

(C) lantana, eichhornia, chromolaena

(D) gnetum, connarus, derris

85. Photoperiodism refers to

(A) movement towards light

(B) movement towards gravity

(C) differential sensitivity of plants to length of dry season

(D) differential sensitivity of plants to length of day

86. Exotic plants exhibit

(A) slow growth and low-nutrient efficiency

(B) fast growth and high-nutrient efficiency

(C) slow elongation and growth

(D) none of the above

87. Endemics are

(A) species with wide distribution

(B) species with restricted distribution

(C) biomes of wide range

(D) biomes of narrow range

88. Deforestation reduces ———— and increases ————

(A) CO_2 uptake in photosynthesis, & global warming

(B) O_2 uptake in respiration & guttation

(C) N uptake & photosynthesis

(D) P uptake & transpiration

89. Anaerobic conditions are common in

(A) lentic system

(B) lotic system

(C) dry lands

(D) wetlands

90. Transgenics are known to be

(A) disease-prone

(B) disease-resistant

(C) disease-inducive

(D) disease-promotive

91. Echinoderms include

(A) finfish, bivalves & gastropods

(B) shelfish, gastropods & oysters

(C) star fish, sea urchins & sea cucumbers

(D) clams, prawns & shrimps

92. Plant & fungal cell wall are respectively made of

(A) chitin & creatine

(B) maltose & lactose

(C) cellulose & chitin

(D) glucose & galactose

93. Monoculture means

(A) plantation of single species

(B) mixed crop plantation

(C) plantation of Eucalyptus & Acacias

(D) bacterial culture

94. Extinct bird of Mauritius island

(A) sunbird (B) humming bird

(C) dodder (D) dodo

95. Gulf of Mannar Biosphere Reserve is known for

(A) fresh water resources (B) giant squirrels & slender loris

(C) sea grasses, algae and marine fauna (D) crab-eating macaques

96. Hermaphrodite refers to

(A) male and female parts in the different flowers of same plant

(B) male and female parts in the same flower

(C) male and female flowers in separate plants

(D) plants with some female and some bisexual flowers

97. 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

98. Photosynthesis is the transformation of ———— energy into ———— energy.

(A) unavailable, available (B) light, chemical

(C) unusable, usable (D) mechanical, chemical

99. One of the following plant groups is known for rubber source

(A) Ericaceae, Cactaceae, Linaceae

(B) Euphorbiaceae, Moraceae, Asteraceae

(C) Rosaceae, Leeaceae, Malvaceae

(D) Annoncaceae, Araceae, Rubiaceae

100. Mercury pollution causes the disease called minamata, which affects

(A) lymphatic (B) respiratory system

(C) nervous system (D) ophthalmic complex