

LAKSHYA INSTITUTE OF TECHNOLOGY



BSC.DS

**1ST SEM OLD
UNIVERSITY**

QUESTION

[4]

- e. What are natural disasters ? Write some natural disasters and their management.
- f. Write a note on management and conservation of wildlife.
- g. Write short notes on :
 - (i) Water Act
 - (ii) Air Act
 - (iii) Wildlife Protection Act



2025

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

1. Answer all questions. [1 x 12 = 12]
 - a. _____ proposed the term “ecosystem”.
 - b. The study of human population is called _____.
 - c. The chief contributors of gases are _____ and _____.
 - d. The part of the earth where differed ecosystems operate is called _____.
 - e. When sulphur dioxide and nitrogen oxides reacts in the atmosphere, it forms _____.
 - f. The wildlife protection Act enacted in the year of _____.
 - g. The _____ remain at the base of a pyramid of energy.

[2]

- h. The diseases that are transferred from one person to another are called _____ diseases.
- i. The plants synthesized/ prepare their own food, so they are called _____.
- j. An _____ is a sudden shaking (vibrations) of ground caused by disturbances in the earth crust.
- k. The daily atmospheric condition of an area is called _____.
- l. CPCB stands for _____.

2. Answer any EIGHT of the following questions.

[2 x 8 = 16]

- a. What is Food Chain ? Define with example.
- b. Differentiate between renewable and non-renewable resources.
- c. What is Green Marketing ?
- d. Write two effect of air pollution.
- e. Write scope of environment.
- f. What are the causes of Acid rain ?
- g. What is the difference between Hazard and Disaster ?
- h. Define wild life management.
- i. How Ozone layer depletion causes ?
- j. What is photochemical smog ?

[3]

3. Answer any EIGHT of the following questions.

[3 x 8 = 24]

- a. Give some points for conservation of soil.
- b. Write the functions of State Pollution Control Board.
- c. What are natural resources and its types ?
- d. Write a brief note on Air borne diseases.
- e. What is Natural Disaster ? What is the behavioral response during and after the cyclone ?
- f. Write a note on Carbon cycle.
- g. Define urbanization and its effects.
- h. What are the components of lithosphere ?
- i. What are the causes and effects of radiation pollution ?
- j. What is non-communicable disease ?

4. Answer any FOUR of the following questions.

[7 x 4 = 28]

- a. What do you mean by ecosystem ? What are the components of Ecosystem ? Mention in details.
- b. What are communicable diseases ? Mention in detail.
- c. Write a note on control methods of pollution.
- d. Write the structure and functions of Central pollution Control Board.

[Cont...

[Cont...

[4]

Part – IV

Answer all within 500 words maximum :

4. Describe the energy flow in Eco-system. [7]
OR

Describe the source, effects and control of water pollution.

5. Discuss the causes and effects of population growth in India. [7]

OR

Write an essay on HIV/AIDS, its prevention, control measures and awareness.

6. Write a note on Environmental Movements in Odisha. [7]

OR

Give an account of Women welfare in India.

7. Describe the salient features of the Wild Life Protection Act, 1972. [7]

OR

Discuss the equitable distribution of natural resources and wealth between rich and the poor countries will lead to sustainable life- styles.



I - S - BCA - CBCS - AECC - I -
(Environmental Science) - (R & B)

I - S - BCA - CBCS - AECC - I -
(Environmental Science) - (R & B)

2023

Full Marks - 80

Time - As in the Programme

The figures in the right hand margin indicate marks.

Answer ALL questions.

Part – I

1. Answer the following question with ONE word or fill in the blank : [1 x 12 = 12]
(a) The peeling of Ozone Umbrella is mainly caused due to the release of _____ gas into the atmosphere.
(b) Water which is suitable for _____ is called _____ water.
(c) The collection of individuals which belongs to the same species when live together in a region is known as _____.
(d) _____ disease continues for many days and causes _____ on body.
(e) In _____ diseases, microbes cannot be transmitted from infected person to a susceptible person by contact or by any other methods.

[Cont...]

[2]

- (f) Narmada Bachao Movement is led by _____.
- (g) The Central Pollution Control Board (CPCB) is established under _____.
- (h) Our society has changed a lot for women as a result of their struggle for _____.
- (i) A _____ plays numerous roles in the transmission of knowledge.
- (j) The resources that reproduce within a specified time span are _____.
- (k) Air is a _____.
- (l) A place where animals are protected in their natural habitat is called _____.

Part - II

2. Answer any EIGHT questions within TWO or THREE sentences maximum : $[2 \times 8 = 16]$

- (a) Define Ecosystem.
- (b) What is Biosphere ?
- (c) What do you mean by Nitrogen Cycle ?
- (d) What is Pollution ?
- (e) Give some examples of Non-Communicable Diseases.
- (f) What are the objectives of SPCB ?
- (g) What are the 4 types of natural resources ?

[Cont...]

[3]

- (h) Differentiate the recyclable, renewable and non-renewable resources.
- (i) In your own words, define "Conservation."
- (j) Give the full form of ODRAF and NDMA.

Part - III

3. Answer any EIGHT questions within 75 words maximum : $[3 \times 8 = 24]$

- (a) Describe the scope of environmental science.
- (b) Differentiate between Ecology and Ecosystem.
- (c) Differentiate between "population explosion and population clock".
- (d) Lay out how people's health is negatively impacted by pollution.
- (e) Describe the role of women in environment.
- (f) Discuss some of the functions of Central Pollution Control Board.
- (g) Give the features of Water Act, 1974.
- (h) What is meant by Natural Resources and list out the problems associated with natural resources exploitation.
- (i) How will you create awareness among people about natural resources ?
- (j) How does soil erosion occur ? State your remedy for the same.

[Cont...]

2023

Time :As in Programme

Full Marks : 80

The figures in the right-hand margin indicate marks.

Answer all questions.

PART-I

1. Fill in the blanks. 1x12

ଶୂନ୍ୟସ୍ଥାନ ପୂରଣ କର ।

a. The study of human population is called ____.

ମନୁଷ୍ୟ ଜନସଂଖ୍ୟା ପତନକୁ ____ କୁହାଯାଏ ।

b. The influenza virus chiefly transmitted by ____.

ଜନପ୍ରତ୍ୟାମା ଭୃତ୍ୟାମୁ ମୁଖ୍ୟତଃ ____ ଦାରା ସଞ୍ଚାରିତ ହୋଇଥାଏ ।

c. The daily atmospheric condition of an area is called as ____.

ଗୋଟିଏ ଅଞ୍ଚଳର ବାୟୁମଣ୍ଟଳର ଦେନନ୍ତିନ ଅବସ୍ଥାକୁ ____ କୁହାଯାଏ ।

d. The ____ remain at the base of a pyramid of energy.

ଶକ୍ତିର ପିରାମିଡ଼ରେ ତଳ ପ୍ରତିରରେ ____ ମାନେ ଅବସ୍ଥାନ କରୁଛନ୍ତି ।

e. The chief contributor gases of acid rain are ____ and ____.

ଅମ୍ଲବର୍ଷାର ମୁଖ୍ୟ ବାଷ୍ପଗୁଡ଼ିକ ହେଲା ____ ଏବଂ ____ ।

f. The Water Act was enacted in the year of ____.

ଜଳ ପ୍ରଦୂଷଣ ଆଇନ ____ ମସିହାରେ ପ୍ରଶ୍ନୟନ ହୋଇଥିଲା ।

g. Rhizobium remains symbiotic in the roots of ____ crops.

ରାଇଜୋବିଅମ ବ୍ୟାକ୍ୟୁରିଆ ____ ଗଛର ଚେରରେ ସହଜୀବୀ ଭାବରେ ସ୍ଥାପନ କରେ ।

h. The wildlife protection Act enacted in the year of ____.

ବନ୍ୟସ୍ତାଣୀ ସୁରକ୍ଷା ଆଇନ ____ ମସିହାରେ କାର୍ଯ୍ୟକାରୀ ହୋଇଥିଲା ।

i. Both fog and smoke form ____ in the atmosphere.

ବାୟୁମଣ୍ଟଳରେ ଧୂଆଁ ଓ କୁହୁଡ଼ି ମିଶଣରେ ____ ସୃଷ୍ଟି ହୁଏ ।

(Turn Over)

j. The KYOTO protocol is about the reduction of ____.
 କିମ୍ବୋଗେ ପ୍ରୋଟୋକଲ/ମୁଦ୍ରାବିଦ୍ କେବଳ କ୍ଷାସ ବିଷୟରେ ଗଠିତ ହୋଇଥିଲା ।

k. The Chernobyl disaster is associated with ____ pollution.
 ଚେରୋବିଲ ବିପର୍ଯ୍ୟନ୍ତ କ୍ଷାସ ସହିତ ଜଡ଼ିତ ।

l. Ban on single use polythene restricts polyethene bags below ____ of thickness.
 ____ ଠାରୁ କମ ମୋଟେଇ ଥିବା ଏକକ ବ୍ୟବହାର ପ୍ଲାସ୍ଟିକ ବ୍ୟବହାର ଉପରେ କଟକଣା ଅଛି ।

PART-II

2. Answer any eight of the following within two to three sentences each. 2x8
 ନିମ୍ନଲିଖିତ ଯେକୌଣସି ଆଠିର ଉଭର ଦୁଇ ବା ତିନୋଟି ବାକ୍ୟରେ ଦିଅ ।

a. Sanitization
 ବିଶୋଧନ

b. Food chain
 ଖାଦ୍ୟ ଶୃଙ୍କଳ

c. Soil pollution
 ମୃତିକା ପ୍ରଦୂଷଣ

d. Earth summit
 ବିଶ୍ୱ ଶିଖର ସମ୍ମିଳନୀ

e. Carbon foot print
 ଅଙ୍ଗାର ପାଦଚିହ୍ନ

f. IMD
 ଆଇଏମ୍ଡି

g. Survival skills during lightening
 ବିଜ୍ଞାନ ମାର୍ବିବା ସମୟର ନୈପୁଣ୍ୟତା

h. Role of Revenue Department in flood management
 ବନ୍ୟା ପରିଚାଳନାରେ ରାଜସ୍ୱ ବିଭାଗର ଭୂମିକା

i. Pandemic disease
 ବିଶ୍ୱ ମହାମାରୀ

j. Sustainable development
 ପରିପୋଷଣକାରୀ ବିକାଶ (2)

(Contd.)

PART-III

3. Answer any eight of the following within 75 words each. 3x8

ନିମ୍ନଲିଖିତ ଯେକୋଣସି ଆଠଟିର ଉଭର ଗୁଣର ଶବ୍ଦରେ ଦିଆ ।

- a. Ecosystem
ପରିସଂଖ୍ୟ
- b. Water cycle
ଜଳଚକ୍ର
- c. Sound pollution
ଶବ୍ଦ ପ୍ରଦୂଷଣ
- d. Anthropogenic causes of global warming
ବିଶ୍ୱତାପନର ମନ୍ୟକୃତ କାରଣଗୁଡ଼ିକ
- e. Flood disaster
ବନ୍ୟା ବିପର୍ଯ୍ୟ
- f. Earthquake
ଭୂମିକାପ
- g. Corporate Social Responsibility
ଶିଳ୍ପ ସଂସ୍ଥାମାନଙ୍କର ସାମାଜିକ ଦ୍ୱାୟିତ୍ବୋଧ
- h. Balanced diet
ସନ୍ତୁଳିତ ଆହାର
- i. Quarantine
କ୍ଲାରେନ୍ଟାଇନ୍
- j. National Health Mission
ଜାତୀୟ ସ୍ଵାସ୍ଥ୍ୟ ମିଶନ

PART-IV

Answer all the following within 500 words each. 7x4

ନିମ୍ନଲିଖିତ ସମସ୍ତ ପ୍ରଶ୍ନର ଉଭର ୫୦୦ ଶବ୍ଦରେ ଦିଆ ।

4. Describe the components and usefulness of atmosphere.
ବାୟୁମଣ୍ଡଳର ଉପାଦାନ ଓ ଉପକାରିତା ସମ୍ବନ୍ଧରେ ବର୍ଣ୍ଣନା କର ।

OR/କିମ୍ବା

(3)

(Turn Over)

Discuss the causes, effects and control measures of air pollution.

ବାୟୁ ପ୍ରଦୂଷଣର କାରଣ, ପ୍ରଭାବ ଏବଂ ନିୟନ୍ତ୍ରଣ ଉପାୟଗୁଡ଼ିକ ଆଲୋଚନା କର ।

5. Explain, in brief, the effects of population explosion and the methods adopted to control population growth.

ଜନସଂଖ୍ୟା ବିଶ୍ୱାରଣର ପ୍ରଭାବ ଏବଂ ଏହାକୁ ନିୟନ୍ତ୍ରଣ କରିବା ପାଇଁ ଅବଳମ୍ବନ ପଞ୍ଜିଗୁଡ଼ିକ ସଂକ୍ଷେପରେ ବ୍ୟାଖ୍ୟା କର ।

OR/କିମ୍ବା

Discuss the different steps taken by government for a sustainable development.

ପରିପୋଷଣକାରୀ ବିକାଶ ପାଇଁ ସରକାର ନେଇଥୁବା ପଦକ୍ଷେପଗୁଡ଼ିକ ଆଲୋଚନା କର ।

6. Discuss the organization, functions and a few success stories of NDRF or ODRAF.

NDRF କିମ୍ବା ODRAFର ସଂଗ୍ରହ, କାର୍ଯ୍ୟ ଓ କେତୋଟି ସଫଳ କାହାଣୀ ଆଲୋଚନା କର ।

OR/କିମ୍ବା

Give an account of survival skills adopted during and post-disaster periods of cyclone and fire.

ଘୂର୍ଣ୍ଣବାତ୍ୟା ଓ ଅଗ୍ନି ବିପର୍ଯ୍ୟୟରୁ ବଞ୍ଚିରହିବା ନୌପୁଣ୍ୟ ଏବଂ ଏହା ପରବର୍ତ୍ତୀ କାର୍ଯ୍ୟପତ୍ର ଉପରେ ରେଖାପାତ୍ର କର ।

7. Discuss the different approaches of life style management for maintaining a good health.

ଏକ ସୁନ୍ଦର ସୁସ୍ଥ ଜୀବନ ପାଇଁ ଆବଶ୍ୟକ ବିଭିନ୍ନ ଜୀବନଚର୍ଯ୍ୟା ପରିଚାଳନା ଉପରେ ଆଲୋଚନା କର ।

OR/କିମ୍ବା

Explain three non-communicable diseases with their causes and effects.

ଡିନିଗୋଟି ଅଣ-ସଂକ୍ରାମକ ରୋଗର କାରଣ ଏବଂ ପ୍ରଭାବଗୁଡ଼ିକ ବ୍ୟାଖ୍ୟା କର ।



(4)

2024

Time :As in Programme

Full Marks : 100

The figures in the right-hand margin indicate marks.

Answer all questions.

PART-I

1. Answer all the questions. [1×10]
 - a) Name one secondary Air pollutant.
 - b) What is biodiversity?
 - c) Which type of disaster is earthquake classified as?
 - d) Who is the head of National Disaster Management Authority (NDMA)?
 - e) Name the Act related to the preservation of air quality in India.
 - f) What is the unit of noise pollution?
 - g) How can urban and industrial waste be managed effectively?
 - h) What is the term used to describe the interrelationship of individuals, species, and population in an ecosystem?
 - i) Name one ex-situ method of biodiversity conservation.
 - j) State one reason for conflicts over water resources.

(4)

VAC-002(4)

51500

VAC-002(4)

(Turn Over)

77

PART-II

2. Answer all the questions in 50 words each. [2×9]

- a) Name two mega-biodiversity countries in the World.
- b) Write two methods for controlling human population?
- c) Name a bio-geographic province of the world.
- d) What do GHGs contribute to concerning the environment?
- e) What is biodiversity Hotspots?
- f) In which year ODRAF was established?
- g) Write examples of Non-renewable sources of energy?
- h) Which Act focuses on controlling and preserving air quality in the environment?
- i) What is the term that describes the act of protecting endangered species within their natural habitats?

PART-III

3. Answer any eight of the following in 250 words each. [5×8]

- a) Discuss the major types of environmental pollution and elaborate on their control measures.
- b) Explain the concept of biodiversity with a focus on threats faced by biodiversity and the conservation measures required to protect endangered species.
- c) Outline the different types of natural resources and associated problems, emphasizing issues related to water resources.
- d) Discuss the institutional framework, preparedness measures, and community participation in disaster management.

(2)

VAC-002(4)

(Contd.)

- c) Explore the social issues related to the environment, focusing on environmental ethics and the impact of climate change.
- f) Explain the causes, effects, and control measures of soil pollution.
- g) Explain urbanization and its effect on the society.
- h) Differentiate between natural disasters and man-made disasters, providing examples of each type along with their causes and effects.
- i) Explain the importance of public awareness in environmental studies.
- j) Discuss the causes, effects, and control measures of water pollution.

PART-IV

4. Answer any four of the following in 800 words each. [8×4]

- a) Define the term 'biodiversity' and explain the concept of hotspots of biodiversity with examples.
- b) Discuss the causes and effects of air pollution, providing examples for each.
- c) Explain the importance of public awareness in environmental studies and provide examples with success story.
- d) Illustrate the role of stakeholders in disaster management and discuss how their participation can improve response and recovery efforts.
- e) Identify the key components of the Disaster Management cycle and explain the significance of each phase in reducing the impact of disasters.



(3)

VAC-002(4)

2018
Full Marks - 80
Time - As in the Programme
The figure in the right hand margin indicate marks
Answer All question.

Group-A

1. (a) Define photochemical smog.
- b) Explain cyclone management
- c) How does earthquake occurs.
- d) What are the important aspects of sustainable development?
- e) What are the important causes of climate change?
- f) What is Green House Effect?
- g) Define population density?
- h) What is full form of HIV & AIDS?
- i) What are the causes of ozone layer depletion?
- j) Define Lmmigration?

Group - B

2. a) Explain the four spheres of present above Earth surface.
- b) Explain Nitrogen Cycle.

OR

- a) Explain any Two :-
 - i) Carbon Cycle
 - ii) Ecology
 - iii) Ecosystem
3. a) What is Pollution? Explain causes and effects of Air Pollution.
- b) Explain different type of Natural Disasters and write donw methods to manage these situations.

OR

- a) Explain causes and effects of any two Pollutions.
 - i) Thermal Pollution
 - ii) Noise Pollution
 - iii) Soil Pollution
4. a) Explain Urbanization and how its affects to the environment?
- b) Defien the terms like 'Species' & 'Community'

OR

Explain different Communicable Diseases . Also describe its transmission methods and how to control such Diseases.

5. a) Explain different Environmental movements in India and also in Odisha.

OR

a) Explain followings

- i) Central pollution Control Board.
- ii) Role of Women in Environmental Movements.
- 6.a) What is Natural Resources? Explain different Natural Resources and why do we need to conserve all these Resources?

OR

b) Explain any Two :-

- i) Water Act
- ii) The Wildlife Act
- iii) Environmental Protection

2022

Full Marks - 60

Time - As in the Programme

Sub: Atomic Structure, Bonding, General Organic
Chemistry & Aliphatic Hydrocarbons

The figure in the right hand margin indicate marks

Answer All question.

Part-I

(Answer all questions)

1. Answer the following question with ONE word or fill in the blank.
 - a) _____ and _____ are two examples of greenhouse gases?
 - b) The lower part of atmosphere is called_____?
 - c) Presently, there are_____ numbers of notified biosphere reserve in India?
 - d) _____ is the macro and _____ is the micro nutrient present in soil.
 - e) Harmful algal blooms and fish kills in the water bodies are the results of a process called_____
 - f) Which UN agency works for the welfare of children?
 - g) Who heads the central pollution control board (CPCB) meeting?
 - h) Name a key person linked to Narmada Bachao Andolan?
 - i) What is AIDS stands for?
 - j) _____ are those resources which we are not extracting at present despite technological availability.
 - k) NDMA stands for_____
 - l) _____ is an example of exhaustible resource.

Part-II

2. Answer any EIGHT questions within TWO or THREE sentences maximum
 - a) Define Ecological Pyramid?
 - b) What is genetic effect of nuclear radiation?
 - c) Write two effects of global warming?
 - d) What is the significance of Red Data book?
 - e) What is mutualism in environmental science?
 - f) Write two objectives of SPCB?
 - g) What is Buffer Zone?
 - h) Differentiate between Hazard and Disaster?
 - i) What are the causes of soil erosion?
 - j) Differentiate between epidemic and pandemic diseases?

Part-III

3. Answer any EIGHT questions within 75 words maximum

- a) Explain the term “Ozone Layer Depletion”?
- b) Write on three scopes of environmental study?
- c) Define the term population density, and population distribution?
- d) What are the features of K-species and R-species?
- e) Differentiate between biotic and abiotic factors?
- f) What are the powers of CPCB?
- g) What are the major causes of population growth?
- h) Differentiate between renewable and non-renewable resources?
- i) Explain Air Act 1981?
- j) Explain the terms BOD and COD in water sample?

Part-IV

Answer all within 500 words maximum

- 4.(a) Discuss causes, advantages, disadvantages and solution of Acid Rain?

OR

- b) What are different segments and elements of environment, explain in brief? Write the name of any four environmental concerns presently we are facing?
- 5.a) What are the communicable diseases and non-communicable diseases, explain with examples? What are the characteristics of communicable diseases?

OR

- b) Explain the various causes of Urbanization? What are its effects on society? Write the solutions of urbanization?
- 6.a) Explain about different causes of environmental conflicts? Explain the role of women in environmental movements?

OR

- b) Write a short note on Bishnoi Movement?
- 7. a) What are the purposes of wildlife conservation? What are the different threats to wildlife? Write two steps to be taken for wildlife conservation?

OR

- b) Write one aspect of disaster management? Explain natural disaster management? Write a short note on effective way of natural disaster management.

2022

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All question.

1. Answer all the questions:

- a) What is vector borne disease?
- b) What is CPCB?
- c) Which chemical used to kill pest in agriculture?
- d) Jungle Bachao Andolan started from which state of India?
- e) What is goal of water act and which year it was started?
- f) Define BOD.
- g) What is greenhouse gas?
- h) Which layer of atmosphere protect earth from harmful UV ray?

2. Answer any EIGHT of the following questions:

- a) Explain food chain with an example.
- b) What is ecological pyramid?
- c) Write notes on non-communicable disease with an example.
- d) What is water borne disease?
- e) What is the role of SPCB?
- f) Write a short note about AIDS.
- g) Write short note on Appiko movement.
- h) What is ammonification?
- i) Difference between renewable and non-renewable resources.
- j) What is Ecology?

3. Answer any EIGHT of the following questions.

- a) Define food web with an example.
- b) Write short note on nitrogen cycle.
- c) Discuss various layers of atmosphere.
- d) Write the impact of urbanization on our society.
- e) Write the impact of overpopulation.
- f) What is Biodiversity ? Discuss about the types of biodiversity.
- g) What is chipko Movement?
- h) What are the role of women in environmental movement?
- i) Explain forest as an ecosystem.
- j) What are the laws of thermodynamics?

4. Answer any FOUR of the following questions.

a) Describe about structure and function of ecosystem

OR

Write the cause, effect and control of water pollution.

b) Write a detailed note about control method of population.

OR

Define natural disasters. Explain the impact of flood& its management.

c) Write the structure and function of central pollution control board.

OR

Write a note on different environmental movement in India.

d) Explain briefly about the wild life and its management. Discuss the procedure of conservation.

OR

Discuss different types of soil erosion and its conservation method.

2022

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All question.

1. Answer all the questions:

- a) In Ecological Pyramid, Pyramid of Energy is always _____.
- b) The process in which ammonia is converted into nitrite is called _____.
- c) All population of a given area is called _____.
- d) The birth rate of a population per unit area at a given time is called _____.
- e) Malaria is a _____ type of disease.
- f) The movement of individuals from an area & return to the same area afterwards is called _____.
- g) _____ is the leader of Chipko Movement.
- h) CPCB stands for _____.
- i) Save Silent Valley Movement occurs in _____ state of India.
- j) The Water Act enacted in the year _____.
- k) Solar energy is a _____ type of natural resources.
- l) An _____ is a sudden shaking (vibration) of ground caused disturbances in the eart crust.

2. Answer any EIGHT of the following questions:

- i) What is Food Chain? Define with example.
- ii) Different between nitrification & de-nitrification.
- iii) What is Pollutants? What is the full form of PAN?
- iv) Who is the leader of Bishnoi Movement? What is the cause of Bishnoi movement?
- v) What is communicable disease? Give two examples of water borne disease.
- vi) What is the role of State Pollution Control Board?
- vii) Difference between Renewable & Non-renewable resources.
- viii) Write a note on Narmada Bachao Andolon.
- ix) What is Biodiversity? Difference between in-Situ & Ex-Situ Conservation.
- x) When the Air Act Established? What is its objectives?

3. Answer any EIGHT of the following questions

- a) Write a note on Atmosphere.
- b) Describe Carbon Cycle.
- c) Control measures against soil pollution.
- d) Give a brief note on Air Borne disease

- e) What are the consequences of overpopulation?
- f) Write a brief note on Appiko movement.
- g) Write a note on role of women in Environment movement.
- h) What is Natural disaster? What is the Behavioural response during & after the cyclone?
- i) Write a note on Wild Life Protection Act.
- j) Define Urbanization. Write two effects of Urbanization.

4. Answer any FOUR of the following questions.

- a) Write a note on structure & function of Ecosystem.

OR

Write a detailed notes on causes effect & measures of control of Air-Pollution.

- b) What are Communicable Diseases?

OR

Write a note on control methods of population.

- c) Write a note on different environment movements in Odisha.

OR

Write the structure & function of Central Pollution Control Board.

- d) Write a note on management & conservation of soil.

OR

What are natural disasters ? Write about flood & its management.

2020

Full Marks - 50

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All question.

Group-A

(Answer all questions. Each carries 2 marks)

1. (i) What is Biosphere?
- ii) How Lithosphere, Hydrosphere & Atmosphere interact Biosphere?
- iii) What is Green Marketing?
- iv) How Eco Mark helpful?
- v) What is Plastic Waste?
- vi) Describe the categories of Plastic & its Recovery.
- vii) How Ozone layer depletion causes?
- viii) Give the difference between GIS, GPS & RS.
- ix) Define the term Eco labelling.
- x) What is Green Technology?

Group -B

(Answer all questions. Each Carries 12 marks)

- 2.(a) What is Energy REsoruces? Explain about the Non Renewable resoruces & types.
- b) What is Renewable resoruces? Why alternative Renewable soruces need to the environment?

OR

- a) How Land use planing to the environemnt. Describe Land Resources.
- b) Explain about Nuclear Energy Resources
- 3.a) Write the 12 pinciples of Green Chemistry?
- b) Explain about Iso certification for the substances.

OR

- a) How Green computing design helpful for the Environment?
- b) Explain the causes of climate change? How Global warmign resonible for it?
- 4.a) Describe the States of EIA?
- b) What is Solid Waste? Explain abot the E-Waste sources, Causes & Management.

OR

- a) What is EIA? Explain its Roles & objectives.
Write the different between EIA, EIS & EA.
- b) Describe about the Environmental Protection Act. 1986.
5. Write short notes on : (Any two)
 - i) Water Act
 - ii) Air Act
 - iii) Wildlife Protection Act.

2020

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All questions including Q.No-1.

1. Answer the following questions.
 - a) What are the control methods of population?
 - b) What are the effects of radiation pollution?
 - c) What is soil pollution?
 - d) Define wild life management.
 - e) What is radiation pollution?
 - f) How does nitrogen return to the soil?
 - g) How can land pollution be prevented?
 - h) What is soil erosion?
 - i) What is biogeochemical cycle?
 - j) What are the compositions of air?
2. Explain various components of ecosystem in details.

OR

Discuss various components of environment and layers of each component with suitable diagram.

3. Define urbanization. Discuss its effect on the society.

OR

Discuss different sources of water pollution. Explain different measures to control over water pollution.

4. What is noise pollution? Discuss different sources of noise pollution? What are the effects of noise pollution?

OR

What are communicable diseases? Write down its transmission methods. How it is different from non-communicable diseases.

5. Write down the role of Central and State Pollution Control Board in details.

OR

Discuss various environment movements in India for safety of the environment. Also explain how women contribute towards such movement.

6. Write down different steps taken by the government for management and conservation of wild life.

OR

Write short notes. (Answer any two)

- a) Wild life Act, 1972
- b) Environment Protection
- c) Conservation of natural resources
- d) Management of natural disaster

2019
Full Marks - 80
Time - As in the Programme
The figure in the right hand margin indicate marks
Answer All question.

Group-A

1. Define each of the following in ONE sentence only.
 - i) Ecology
 - ii) Pollution
 - iii) Disaster
 - iv) Disease
 - v) Urbanization
 - vi) Nitrogen Cycle
 - vii) Conservation
 - viii) Wildlife
 - ix) Biosphere
 - x) Atmosphere

Group-B

2. Give an account of carbon cycle with diagram.

OR

Explain hydrosphere with its importance.

3. Describe the causes and control measures of soil pollution.

OR

Enlist the management during and after cyclone.

4. State the control measures of population.

OR

Give an account of non-communicable diseases.

5. Discuss the role of women in environmental movements.

OR

Mention the role of State Pollution Control Board.

6. Narrate the conservation of wildlife in detail.

OR

Give an account of conservation of forest with its importance.

2022
Full Marks - 80
Time - As in the Programme
The figure in the right hand margin indicate marks
Answer All question.

PART-I

1. Answer in one sentence
 - (a) Give one example of manmade disaster.
 - b) Give one example of Natural Disaster.
 - c) Cholera is example of what types of disease?
 - d) What are the mode of communication to warn people during Natural Disaster.
 - e) What is the Green House Gases?
 - f) What is the importance of Ozone Layer?
 - g) Give one soical cause behind the population growth in India.
 - h) Give one economic cause responsible for population growth.
 - i) What was the main objective of the Environment protection Act-1986?
 - j) What step can be taken to prevent soil erosion?
 - k) What types of forest has the maximum biodiversity?
 - l) What is meant by life style diseases?

PART-II

2. Answer any eight of the following within two to three sentences each
 - a) What is light pollution?
 - b) What is the necessity of Quarantine?
 - c) What is Hydrosphere?
 - d) What are the importance of The Wild Life Protection Act-1972?
 - e) What cause Tsunami?
 - f) What is Vehicular pollution?
 - g) What is the significance of environment?
 - h) What is nitrification?
 - i) HOw to protect one from lighting?
 - j) What is Immunity?

PART-III

3. Answer any eight of the following within 75 words each.
 - a. Biosphere
 - b. Ecosystem

- c. Sound pollution
- d. Community
- e. Global warming
- f. Sustainable Development
- g. Man-made Disaster
- h. National Disaster Management Authority
- i. Preventive measures of Covid-19
- j. HIV and AIDS
- k. Methods to control population growth

PART-IV

Answer the following within 500 words each.

- 4. Explain the significance of carbon cycle.

OR

Discuss the causes, effects and measures to control industrial pollution.

- 5. What is climate change? Explain its causes & effects on environment.

OR

Explain the effects of increasing urbanisation on society and growth

- 6. Give a brief description of types of disasters and their effects.

OR

What are the various institutions and their role in disaster management? Explain.

- 7. Give an account of communicable diseases and their transmission.

OR

Explain the role of different sectors in managing Health Disaster.

2021

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All question.

1. Fill in the blanks.
 - i) Carbon dioxide, methane, nitrous, oxide and chlorofluorocarbon are together called _____ gases.
 - ii) _____ proposed the term "ecosystem".
 - iii) _____ is defined as group of individuals of any one kind of organism.
 - iv) The part of the earth where differed ecosystems operate is called the _____
 - v) The transfer of food energy from plant sources through a service of organization in an ecosystem is known as _____
 - vi) When sulphur dioxide and nitrogen oxides reacts in the atmosphere it forms _____ rain.
 - vii) Unwanted sound is called _____
 - viii) Increased radiation from atomic bomb blasts or radioactive wastes are hazardous, because such radiations are called _____ radiation.
 - ix) An _____ is a sudden shaking (vibrations) of ground caused by disturbances in the earth's crust.
 - x) The diseases that are transferred from one person to another is called _____ diseases.
 - xi) In ecosystem the living organism are placed in different levels called _____ level.
 - xii) The plants synthesize/prepare their own food, so they are called _____

2. Answer any EIGHT of the following

- i) What is soil erosion and what are its effect?
- ii) Define ecosystem and this term was given whom?
- iii) What are the causes of air pollution?
- iv) Give difference food chain and food web.
- v) Define atmosphere
- vi) When was building protection act established? Write its objective.
- vii) When was the water act established and what was its objective.
- viii) Write down the role of central pollution control boards.
- ix) Define pollutants? How many ways they are available?
- x) What is photochemical smog?

3. Answer any EIGHT of the following:

- i) Write a note on hydrosphere.
- ii) Give some points for conservation of soil.
- iii) Write some points on flood.

- iv) Write the functions of State Pollution Control Board.
- v) Define urbanization and its effects.
- vi) What are natural resources and its types.
- vii) How resources can be conserved?
- viii) Write a note on carbon cycle.
- ix) What are the components of lithosphere?
- x) What are the causes and effects of radiation pollution?

4. Answer any FOUR of the following

- i) What do you mean by ecosystem? What are the different components of ecosystem? Mention in detail
- ii) What are communicable diseases? Mention some communicable diseases.
- iii) Write notes on different environmental movements in India.
- iv) Write notes on Environment protection. Discuss various acts related to Environmental Protection.
- v) What are natural disasters? Write some of the disaster and their management.
- vi) Write a detailed notes on causes, effect and measures of control of air pollution.
- vii) Write a note on management and conservation of wildlife.

2021

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All question.

Part-I

A. Define the following:

1. Ecological pyramid
2. Chipko movement
3. SPCB
4. CNG
5. CPCB
6. Noise Pollution
7. Sustainable Development
8. Nuclear Hazard
9. Water Conservation
10. Biodiversity
11. Child Welfare
12. Red Data Book

Part-II

B. Answer the following questions

1. What is the causes of soil erosion?
2. Write two effects of airpollution?
3. Write scope of the environment?
4. What is the meanign of K-selected species?
5. What do you mean Communicable diseases?Give the two examples.
6. What are the main objectives of State PollutionControl Board?
7. What is the difference between Hazard & Disaster?
8. Write the name of two Non Communicable diseases.
9. What is the main objective of Wild life Protection Act 1972?
10. What are the causes of Acid Rain?

Part-III

C. Answer the following questions in brief (any 8)

1. Define the term population density
2. Define the term population distribution?
3. What is a Eco-system?
4. Differentiate between Biotic factors & Abioticfactors.

5. Differentiate between communicable diseases and non -communicable diseases.
6. What is a community?
7. How does radiation cause Pollution? Write two examples.
8. What do you mean by Speciation & Competition of Individuals?
9. What are the objectives of CPCB?
10. What are natural resources?

Part-IV

D. Answer the following questions

1. Describe broadly the constituents of atmosphere and atmosphere structure? Mention which major gasses are present in different levels of atmosphere?

OR

What are different segments and elements of environment? Explain in brief.

2. Explain various causes of Urbanization and its effects on society? How does population affect ecology?

OR

Explain different modes of contact of communicable diseases and non-communicable diseases? What are the steps to be taken to prevent disease transmission?

3. What are the root causes of environmental movements? What are different types of environmental movements? Explain the role of women in environmental movements?

OR

Explain Functions and powers of CPCB?

4. Classify natural resources? What are the causes of depletion of natural resources?

OR

What is natural disaster and classify them? What are the aspects of disaster management? Write a short note on effective way of natural disaster management?

2021

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicate marks

Answer All question.

Part - I

1. a. Fill in the blanks with word(s)

- a) World Environment Day is observed every year on _____
- b) Silent Valley is situated in the state of _____
- c) Maximum biodiversity is found in the _____ forests.
- d) _____ is the major constituent of biogas.
- e) For measuring intensity of earthquake _____ scale is used
- f) Social erosion can be prevented by _____
- g) Cholera is a _____ type of disease
- h) Generic name of man is _____
- i) _____ is the national animal of India.
- j) Coal is a _____ resource
- k) _____ is a fossil fuel
- l) Wildlife protection Act was enacted in the year _____

PART-II

2. Answer any eight questions, each within two to three sentence

(a) Food chain	(b) Biosphere
c) Contact Tracing	d) Mortality
e) Hydrosphere	f) Renewable Resource
g) Pandemic disease	h) Quarantine
i) Tsunami	j) Social afforestation

PART-III

3. Answer any eight questions, each within 75 words

- a) Troposphere
- b) Threats to biodiversity
- c) Effect of yoga on Covid patients
- d) Radiation pollution
- e) The Wildlife Protection Act
- f) Renewable energy
- g) Natural Disaster management

- h) Explain 3R principle
- i) Ozone layer depletion
- j) Corporate Social Responsibility
- k) Chipko Movement

PART-IV

Answer any four questions, each within 500 words

4. Describe the nitrogen cycle and its significance.

OR

Discuss the causes, effects and measures to control water pollution.

5. What is sustainable development? Discuss the steps taken by government towards sustainable development.

OR

Discuss the causes of population growth and different methods adopted to control population.

6. Explain global warming with its causes and effects.

OR

Discuss the preparedness measures taken by government for disaster management.

7. Discuss the different preventive measures adopted during Covid-19 pandemic.

OR

Briefly discuss on water borne diseases.

8. Discuss the effects of urbanisation on the society and methods of urban waste management.

OR

Write notes on :

- a) NDRF
- b) Communicable disease

9. Discuss environmental laws.

OR

Discuss the characteristics of a community.

2019
SUB-EVS
BSc. ITM

1. Write the answer of the following questions.
 - a) Define food chain.
 - b) Write down the biotic component of an ecosystem
 - c) Define the composition of air.
 - d) Define noise pollution
 - e) Define biodiversity.
 - f) Give two examples of control method of population.
 - g) Write down the major roles of State Pollution Control Board.
 - h) What is objective of Chipko movement?
 - i) What is air pollution?
 - j) Define wild life management.
2. Write down the structure and function of ecosystem.

OR

Write notes on:

- a) Atmosphere
- b) Nitrogen cycle

3. Define water pollution. Write down the sources of water pollution. Explain different measures to control water pollution.

OR

Write notes on :

- a) Flood and its management
- b) Thermal Pollution

4. Define what are communicable diseases? Write down its transmission methods.

OR

Explain the following terms in detail.

- a) Urbanization
- b) Population Growth Curve

5. Write down the role of Central Pollution Control Board in details

OR

- a) Appiko Movement
- b) Role of Women in Environmental Movements

6. Write down the conservation of wild life and discuss its management methods.

OR

- a) Wild Life Act
- b) Soil Erosion and conservation

Give an account on water pollution with all its effect, causes and measures to control it

(b) What is population ? Describe all its characteristics.

OR

Write a detailed note on urbanisation and its impact.

(c) Give a detailed note on the major environmental movements in India

OR

Write a note on role of women in environmental movements.

(d) Write a note on different types of environmental laws of our country.

OR

What do you mean by disaster ? Give a note on the preparedness before and after flood and earthquake.



2023

Full Marks - 80

Time - As in the Programme

The figure in the right hand margin indicates marks.

Answer All questions

1. Answer all the Questions. $[1 \times 12 = 12]$
 - (a) Write the full form of SPCB ?
 - (b) Who first use the term 'ecosystem' ?
 - (c) The living component of ecosystem us called _____.
 - (d) Which layer in the atmosphere protects the living organism from harmful radiation of the sun ?
 - (e) The Chipko movement started in which village of Uttar Pradesh ?
 - (f) In which year, the water Act was started?
 - (g) Write an example of in-situ conservation.
 - (h) _____ is the aggregation or arrangement of individual in a population.
 - (i) _____ means exit of individual in a group of population.

[2]

(j) _____ is the number of offspring produced per female per unit time.

(k) In which state of India, Silent valley movement was started ?

(l) _____ is the sudden shaking of ground caused in the Earth's crust.

2. Answer any eight of the following questions.

[2 × 8=16]

(a) What do you mean by biogeochemical cycle ?

(b) Define food chain with examples

(c) What was the aim of NARMADA BACCHAO ANDOLAN ?

(d) What is an earthquake ?

(e) What are pollutants ?

(f) Define Trophic level.

(g) What is pollution ? Write name some of the environmental pollution.

(h) What do you mean by non- communicable diseases give some examples

(i) Define Denitrification.

(j) What was the objectives of Water Act ?

[3]

3. Answer any eight of the following questions.

[3 × 8=24]

(a) Describe the steps of nitrogen cycle.

(b) Write down the Control measures of noise pollution.

(c) Write a note on Appiko movement.

(d) Differentiate between biotic and abiotic component of ecosystem.

(e) Write a note on consumers of ecosystem.

(f) What is community ? Write 3 characteristics of community.

(g) Write a note on water and vector borne diseases.

(h) Write some steps that should be taken after the cyclone.

(i) Differentiate between renewable and non-renewable resources.

(j) Define urbanization. Write two impacts of urbanization.

4. Answer any four of the following questions.

[7 × 4=28]

(a) What is ecosystem ? Describe it in details.

[Cont...]

[Cont...]

[4]

d. Determine Product moment correlation coefficient between X & Y from the following by using Karl-Pearson method.

X	39	65	62	90	82	75	25	98	36	78
Y	47	53	58	86	62	68	60	91	51	84

e. Determine Spearman's Rank Correlation between the variables X and Y.

X	39	65	62	90	82	75	25	98	36	78
Y	47	53	58	86	62	68	60	91	51	84

f. Determine Coefficient of variation in percentage of the following Distribution by using step deviation method.

Class Int.	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	12	10	8	3	2	7



I - S - B.Sc. - DS - (H) - CC - I - (BSDS)

I - S - B.Sc. - DS - (H) - CC - I - (BSDS)

2025

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

1. Answer all questions. [1 x 8 = 8]
 - a. Define SRSWOR.
 - b. What is the difference between linear and circular scale?
 - c. Define cumulative frequency.
 - d. What is a box plot?
 - e. Define standard deviation.
 - f. What is coefficient of variation?
 - g. Define regression.
 - h. State one property of the correlation coefficient.
2. Answer any EIGHT of the following questions. [1.5 x 8 = 12]
 - a. Differentiate between SRSWR and SRSWOR.
 - b. Explain Yule's coefficient of association (Q).
 - c. Write relation between mean, median and mode.
 - d. Differences between various averages (AM, GM, HM). [P.T.O...]

[2]

- e. Distinction between quartiles, deciles, and percentiles.
- f. Define standard deviation.
- g. What is Karl Pearson's coefficient of skewness?
- h. Define Scatter diagram and plot a graph with example.
- i. Explain how a quadratic curve can be fitted using the method of least squares.
- j. Explain the principle of least squares.

3. Answer any EIGHT of the following questions.

[2 x 8 = 16]

- a. Define and differentiate between finite, infinite, homogeneous, and heterogeneous populations.
- b. Describe dichotomous classification for three attributes.
- c. Find mode graphically using a histogram.
- d. State the empirical relationship between mean, median and mode and explain when it holds.
- e. Prove that mean square deviation is minimum when taken about the mean.
- f. Differentiate between absolute and relative measures of dispersion with examples.
- g. Fit a curve of the form $y = ax^b$ using transformation.

[Cont...]

[3]

- h. How do you fit a straight line using least squares? Write steps with the formula.
- i. Define standard deviation and calculate it for a small dataset.
- j. What is the coefficient of variation?

4. Answer any FOUR of the following questions.

[6 x 4 = 24]

- a. Discuss different types of sampling techniques with examples.
- b. Define mean, median and mode. Explain how each is calculated and compare their merits/ demerits with suitable example.
- c. The following data shows the marks obtained by 40 students in a statistics test.

Marks:

45, 40, 60, 50, 55, 60, 50, 40, 45, 55, 60, 70, 65, 55, 50, 50, 60, 55, 60, 45, 50, 55, 60, 65, 50, 55, 60, 70, 50, 55, 60, 55, 60, 65, 70, 75, 55, 60, 65, 70

Task:

- (i) Prepare a frequency distribution table with class width = 5
- (ii) Draw a histogram
- (iii) Calculate the mean, median, and mode
- (iv) Verify the empirical relationship :
$$\text{Mode} \approx 3 \cdot \text{Median} - 2 \cdot \text{Mean}$$

[Cont...]

[4]

- c. What are semantic elements in HTML5 ? Describe their importance in web development and provide examples comparing semantic and non-semantic elements.
- d. Describe the differences between block-level and inline elements in HTML. Include examples and explain how these elements affect the layout of a web page.
- e. Explain the concept of the CSS Box Model. Describe each part of the model — margin, border, padding and content — and how they influence element spacing.
- f. Compare and contrast internal, inline, and external CSS. Discuss their syntax, use cases, pros and cons and their impact on website performance and maintenance.



I - S - B.Sc. - DS - (H) - CC - II - (IP & WT)

I - S - B.Sc. - DS - (H) - CC - II - (IP & WT)

2025

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

1. Answer all questions. [1 x 8 = 8
 - a. Write any two built in data type in python ?
 - b. What is the need of type() function ?
 - c. What are multiple comments ? Explain it with example.
 - d. Which function is used to accept input from the user ?
 - e. Which website is used to download python freely ?
 - f. What is the purpose of the <head> tag in HTML ?
 - g. How is an external CSS file linked to an HTML document ?
 - h. What is the default alignment of text in an HTML paragraph ?
2. Answer any EIGHT of the following questions.

[1.5 x 8 = 12
[P.T.O...

[2]

- a. What do you mean by list data type in Python ?
- b. What is wrong in the statement ? `1_Singer = 'Sonu Nigam'`.
- c. What is local variable & global variable in python ?
- d. Define range function.
- e. Define ternary operator in python.
- f. Write the JavaScript syntax to display a message "Hello World".
- g. Name the attribute used to create form in HTML elements.
- h. Write the HTML tag and attribute to open a link in a new tab.
- i. What is the difference between inline and block elements in HTML ?
- j. What will the following CSS rule do ? `* { margin: 0; padding: 0; }`

3. Answer any EIGHT of the following questions.

[2 x 8 = 16]

- a. What are the advantages of Tuple over List.
- b. Differentiate between `set()` & `frozen set()`?
- c. Difference between `/` and `//` in Python with example.
- d. Why python is called as dynamically typed language ? What is the return type of `bool` ?

[3]

- e. Difference between mutable and immutable objects in python.
- f. Differentiate between `<div>` and `` tags in HTML with suitable examples.
- g. Explain the box model in CSS. Draw a simple labeled diagram and describe each part.
- h. What are semantic HTML elements ? List any four semantic elements and describe their purposes.
- i. Write the HTML and CSS code to create a red-colored button with rounded corners and padding.
- j. Describe the difference between inline, internal and external CSS with examples.

4. Answer any FOUR of the following questions.

[6 x 4 = 24]

- a. What is function in python ? Write a function to calculate the square of a number.
Explain different types of loop statements used in python with example.
- b. Write a program that prompts users to enter two integer `x` and `y`. Calculate the following activities.
 - (i) x^y
 - (ii) Greater among `x` and `y`
 - (iii) Print all number from `x` to `y`Discuss various operators used in python programming.

[Cont...

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b. Define $T: V_3 \rightarrow V_2$ by the rule $T(x_1, x_2, x_3) = (x_1 - x_2, x_1 + x_3)$. Prove that T is a linear map.

c. Define a vector space. Prove that in any vector space V

- $\alpha \vec{0} = \vec{0}$ for any scalar α .
- $0 \vec{u} = \vec{0}$ for any $u \in V$.

d. Let L be the set of all vectors of the form $(x, 2x, -3x, x)$ in V_4 . Then prove that L is a subspace of V_4 .

e. If Z is a homogenous function of degree n in x and y , show that $x^2 \frac{\partial^2 Z}{\partial x^2} + 2xy \frac{\partial^2 Z}{\partial x \partial y} + y^2 \frac{\partial^2 Z}{\partial y^2} = n(n-1)Z$.

f. Evaluate

- $\lim_{x \rightarrow 0} \frac{\tan x - x}{x^2 \tan x}$
- $\lim_{x \rightarrow 0} \left(\frac{1}{\sin x} - \frac{1}{x} \right)$

g. Evaluate $\int_0^1 \frac{x^\alpha - 1}{\log x} dx$, $\alpha \geq 0$.



2025

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.
Answer ALL questions.

- Answer all questions. [1 x 8 = 8]
 - The necessary condition for a function $f(x)$ to have a maxima at $x = c$ is _____.
 - What is the condition to apply L'Hospital's rule to evaluate the limit ?
 - Evaluate $\lim_{x \rightarrow 1} \frac{\log x}{x-1}$.
 - What is critical point of a function ?
 - Matrix has a value. This statement is always true ? (T / F)
 - The trace of a square matrix is _____.
 - Rank of a unit matrix of order 3 is _____.
 - Give an example of a 3×3 matrix of rank 1.
- Answer any EIGHT of the following questions : [1.5 x 8 = 12]
 - The sum of eigen values of a matrix is the _____ of the elements of the principal diagonal.

[2]

b. $\Gamma(n+1) = \underline{\hspace{2cm}} ?$

c. If $f(x, y, z) = (x^2 + y^2 + z^2)^{\frac{-1}{2}}$, then find $f_{xx} + f_{yy} + f_{zz}$.

d. Check whether the following matrix with the given vectors are L.I. or L.D.

$$\begin{bmatrix} 1 & 2 & 1 \\ -1 & 1 & 0 \\ 5 & -1 & 2 \end{bmatrix}.$$

e. Find the inverse of the following matrix $\begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix}$.

f. Define range and kernel of a linear map.

g. Define span of a vector space.

h. $Z = x^3 + x^2y^2 + 5xy + y^3$. Find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}, \frac{\partial^2 z}{\partial x^2}, \frac{\partial^2 z}{\partial y^2}$.

i. Find the maximum and minimum value of the function $f(x) = 8x^5 - 15x^4 + 10x^3$.

j. Write the statement of Euler's theorem on homogeneous functions.

3. Answer any EIGHT of the following questions.

$[2 \times 8 = 16]$

a. For what values of x , the matrix

$$\begin{bmatrix} 3-x & 2 & 2 \\ 2 & 4-x & 1 \\ -2 & -4 & -1-x \end{bmatrix}$$

is singular?

[Cont...]

[3]

b. Define linear independent and dependent with example.

c. Find the eigen values of the matrix $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$.

d. Find the nature of the following quadratic forms $x^2 + 5y^2 + z^2 + 2xy + 2yz + 6zx$.

e. Define a basis and dimension for a vector space V .

f. Define Beta and Gamma function.

g. Evaluate $\lim_{x \rightarrow 0} \frac{\tan x}{x^2 \sin x}$

h. If $u = x^2 \tan^{-1} \frac{y}{x} - y^2 \tan^{-1} \frac{x}{y}$ then prove that

$$\frac{\partial^2 u}{\partial x \partial y} = \frac{x^2 - y^2}{x^2 + y^2}.$$

i. Write the condition for maximum and minimum values of a function of two variables.

j. Verify Euler's theorem for $Z = ax^2 + 2hxy + by^2$.

4. Answer any FOUR of the following questions :

$[6 \times 4 = 24]$

a. Determine the rank of the following matrix

$$A = \begin{bmatrix} 1 & 2 & -1 & 0 \\ -1 & 3 & 0 & -4 \\ 2 & 1 & 3 & -2 \\ 1 & 1 & 1 & -1 \end{bmatrix}.$$

[Cont...]