

Exam. Code : 121203
Subject Code : 102812

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

ENVIRONMENTAL STUDIES

Paper—ESL-221

Time Allowed—3 Hours]

[Maximum Marks—75

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. Discuss about various food resources and type of changes caused by modern agriculture. How fertilizer-pesticide problems can be mitigated ?
2. Discuss in detail about various renewable energy resources.

SECTION—B

3. Write about 'Biogeographical classification of India.' Why is India called as mega diversity nation ?
4. Give introduction, types, characteristic features, structure and function of an aquatic ecosystem.

SECTION—C

5. Write a detailed note on Water (Prevention and Control of Pollution) Act, 1974.
6. Explain about Solid Waste Management. Give causes, effects and control measures of Urban Waste.

SECTION—D

7. Mention about different Family Welfare Programmes.
8. How can you relate environment and human health ? Describe about role of information technology in environment and human health.

(Punjabi Version)

ਨੋਟ :— ਹਰੇਕ ਭਾਗ ਵਿੱਚੋਂ ਘੱਟੋ-ਘੱਟ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦੀ ਚੋਣ ਕਰਦੇ ਹੋਏ, ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰੋ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ। ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਅੰਕ ਬਰਾਬਰ ਹਨ।

ਭਾਗ—ੳ

1. ਵੱਖ-ਵੱਖ ਭੋਜਨ ਸਰੋਤਾਂ ਅਤੇ ਆਧੁਨਿਕ ਖੇਤੀ ਕਾਰਨ ਹੋਣ ਵਾਲੀਆਂ ਤਬਦੀਲੀਆਂ ਬਾਰੇ ਚਰਚਾ ਕਰੋ। ਖਾਦ-ਕੀਟਨਾਸ਼ਕ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਕਿਵੇਂ ਘੱਟ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ ?
2. ਵੱਖ-ਵੱਖ ਨਵਿਆਉਣਯੋਗ ਊਰਜਾ ਸਰੋਤਾਂ ਬਾਰੇ ਵਿਸਥਾਰ ਵਿੱਚ ਚਰਚਾ ਕਰੋ।

ਭਾਗ—ਅ

3. 'ਭਾਰਤ ਦੇ ਜੀਵ-ਭੂਗੋਲਿਕ ਵਰਗੀਕਰਨ' ਬਾਰੇ ਲਿਖੋ। ਭਾਰਤ ਨੂੰ ਮੈਗਾ ਵਿਭਿੰਨਤਾ ਵਾਲਾ ਦੇਸ਼ ਕਿਉਂ ਕਿਹਾ ਜਾਂਦਾ ਹੈ ?

4. ਇੱਕ ਜਲਜੀ ਵਾਤਾਵਰਣ ਪ੍ਰਣਾਲੀ ਦੀ ਜਾਣ-ਪਛਾਣ, ਕਿਸਮਾਂ, ਗੁਣ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ, ਬਣਤਰ ਅਤੇ ਕਾਰਜ ਦਿਓ।

ਭਾਗ—ੲ

5. ਪਾਣੀ (ਪ੍ਰਦੂਸ਼ਣ ਦੀ ਰੋਕਥਾਮ ਅਤੇ ਨਿਯੰਤਰਣ) ਐਕਟ, 1974 'ਤੇ ਵਿਸਤ੍ਰਿਤ ਨੋਟ ਲਿਖੋ।
6. ਠੋਸ ਰਹਿੰਦ-ਖੂੰਹਦ ਪ੍ਰਬੰਧਨ ਬਾਰੇ ਸਮਝਾਓ। ਸ਼ਹਿਰੀ ਕੂੜੇ ਦੇ ਕਾਰਨਾਂ, ਪ੍ਰਭਾਵਾਂ ਅਤੇ ਨਿਯੰਤਰਣ ਉਪਾਅ ਦੱਸੋ।

ਭਾਗ—ਸ

7. ਵੱਖ-ਵੱਖ ਪਰਿਵਾਰ ਭਲਾਈ ਪ੍ਰੋਗਰਾਮਾਂ ਬਾਰੇ ਜ਼ਿਕਰ ਕਰੋ।
8. ਵਾਤਾਵਰਣ ਅਤੇ ਮਨੁੱਖੀ ਸਿਹਤ ਨੂੰ ਤੁਸੀਂ ਕਿਵੇਂ ਜੋੜ ਸਕਦੇ ਹੋ ? ਵਾਤਾਵਰਣ ਅਤੇ ਮਨੁੱਖੀ ਸਿਹਤ ਵਿੱਚ ਸੂਚਨਾ ਤਕਨਾਲੋਜੀ ਦੀ ਭੂਮਿਕਾ ਬਾਰੇ ਵਰਨਣ ਕਰੋ।

(Hindi Version)

ਨੋਟ :— प्रत्येक भाग में से कम से कम एक प्रश्न का चयन करते हुए, कुल पाँच प्रश्न करें। पांचवा प्रश्न किसी भी भाग में से किया जा सकता है। सभी प्रश्नों के समान अंक हैं।

भाग—क

1. विभिन्न खाद्य संसाधनों और आधुनिक कृषि के कारण होने वाले परिवर्तनों के प्रकार के बारे में चर्चा करें। उर्वरक-कीटनाशक समस्याओं को कैसे कम किया जा सकता है ?

2. विभिन्न नवीकरणीय ऊर्जा संसाधनों के बारे में विस्तार से चर्चा करें।

भाग—ख

3. 'भारत के जैवभौगोलिक वर्गीकरण' के बारे में लिखें। भारत को मेगा विविधता वाला राष्ट्र क्यों कहा जाता है ?
4. जलीय पारिस्थितिकी तंत्र का परिचय, प्रकारों, विशिष्ट विशेषताएँ, संरचना और कार्य को बताएँ।

भाग—ग

5. जल (प्रदूषण की रोकथाम और नियंत्रण) अधिनियम, 1974 पर एक विस्तृत नोट लिखें।
6. ठोस अपशिष्ट प्रबंधन के बारे में बताएं। शहरी अपशिष्ट के कारणों, प्रभावों और नियंत्रण के उपायों को बताएँ।

भाग—घ

7. विभिन्न परिवार कल्याण कार्यक्रमों का उल्लेख करें।
8. पर्यावरण और मानव स्वास्थ्य को आप कैसे जोड़ सकते हैं ? पर्यावरण और मानव स्वास्थ्य में सूचना प्रौद्योगिकी की भूमिका के बारे में बताएं।

Exam. Code : 121203

Subject Code : 102745

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

ENGLISH (Compulsory)

Paper : ENC-201

Time Allowed—3 Hours] [Maximum Marks—100

Note :—(1) Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section.

(2) Some questions may be divided into sub-parts, whichever question is chosen should be attempted along with its sub-parts, if any. Sub-parts of questions cannot be chosen from different questions. All the questions carry equal marks.

SECTION—A

1. Do as directed :

(1) Put in the correct word :

I always feel _____ when the sun is shining.
(happy/happily)

(2) Put adjectives in the brackets in correct position :

An enormous umbrella. (red, yellow)

- (3) Make one sentence from two. Complete the new sentence using 'too' or 'enough' :

I can't drink this coffee. It is too hot.

This coffee is _____.

- (4) Put the words in the right order to complete the sentence :

Tom likes to sing.

He has _____. (voice/quite/good/a)

- (5) Put in correct preposition :

It was nice _____ you to come and see me.

- (6) Complete the sentence with 'on time' or 'in time' :

The film was supposed to start at 8:30, but it didn't begin _____.

- (7) Write sentence with 'in the end'. Use the verb in the brackets :

We had a lot of problems with our car.

(sell) _____.

- (8) Complete the sentence with 'by' :

I have to be at the airport not later than 8:30.

I have to be at the airport _____.

- (9) Complete the sentence using your ideas :

I was asked a lot of questions during _____.

- (10) Put in 'by' or 'until' :

I think I will wait _____ Thursday before making a decision.

10×2=20

2. Do as directed :

(1) Put in the correct word :

You look ____ ! Are you alright ? (terrible/terribly)

(2) Put adjective in the brackets in correct position :

An unusual ring (gold).

(3) Make one sentence from two. Complete the new sentence using 'too' or 'enough' :

I can't explain the situation. It is too complicated.

The situation is ____.

(4) Put the words in the right order to complete the sentence :

The bus stop wasn't very near the hotel.

We had to walk _____. (quite/long/a/way)

(5) Put in correct preposition :

Isha doesn't look fine, I am worried _____ her.

(6) Complete the sentence with 'on time' or 'in time' :

Why are you never _____ ? You always keep everyone waiting.

(7) Write sentence with 'in the end'. Use the verb in the brackets :

Anna got more and more fed up with her job.

(resign) _____.

(8) Complete the sentence with 'by' :

Please make sure that you are here not later than 2 o'clock.

Please make sure that _____.

(9) Complete the sentence using your ideas :

Nobody came to see me while _____.

(10) Put in 'by' or 'until' :

I need to pay the phone bill. It has to be paid

_____ tomorrow.

10×2=20

SECTION—B

3. Write an essay on any **ONE** topic :

Pollution due to Excessive use of Plastic.

OR

Health is Wealth.

20

4. Do as directed :

(1) Fill in correct preposition in the following sentence :

I've applied _____ a job at the factory.

(2) Fill in correct preposition in the following sentence :

I don't want to discuss _____ what happened last night.

(3) Fill in correct preposition in the following sentence :

Who's going to take care _____ you when you are old ?

(4) Fill in correct preposition in the following sentence :

I am leaving my house _____ 11 a.m. tomorrow morning.

- (5) Complete the second sentence so that it means the same as first :

There was a lot of furniture in the room.

The room was full _____.

- (6) Complete the following sentence using a verb in the correct form :

I liked an article in the newspaper, so I _____ it out.

- (7) Complete the sentence using – ‘in’ or ‘into’ or ‘out’ or ‘out of’ :

Why did Sarah drop _____ college ? Did she fail in exams ?

- (8) Complete the sentence using – a verb + ‘on’ or ‘off’ :

It was warm, so I _____ my jacket.

- (9) Complete the sentence using – a verb (in correct form) + ‘down’ :

The train _____ as it approached the station.

- (10) Complete the following sentence using a verb in the correct form :

Don't _____ that box away. It could be useful.

10×2=20

SECTION—C

5. From your reading of the poem "That Time of Year Thou Mayst in Me Behold", describe the boughs as they are seen in the autumn and tell how does autumn correspond to the speaker's life? Also explain what do the images of "twilight" and "sunset" suggest. 20
6. From your reading of the poem "To the Skylark", describe the different objects with which the skylark is compared to. Why does the poet think that the bird does not know the pain? How does Shelley treat the bird as a model for the poet? 20

SECTION—D

7. (a) On the basis of your reading of "Global Health", explain what do you know about the disease malaria. Is the disease common today? Where do you think cases of malaria are most likely to be found? How do you think malaria spreads from one person to another? Do you think it can be prevented, treated or cured? 10
- (b) Complete the sentences from the list of words given below. These words replace the words or phrases in parentheses, which are similar in meaning :
- depressed, fatigue, enhance, straightforward, thrive, enhance, primarily, preliminary, reluctant, remote, rural.
- (1) There is a (simple) _____ solution to the problem.

(2) Children (do well) _____ in their classrooms that are filled with activities.

(3) People from (country) _____ villages are sometimes fatigued of cities.

(4) A good education will (improve) _____ your chances of getting a good job.

(5) Tourists are often (hesitant) _____ to visit places where there is a lot of disease. 5

(c) Give one word for the following definitions :

(1) A fatty substance found in body _____.

(2) To carry out and organize an activity _____.

(3) To work with someone with a special purpose _____.

(4) A long-term plan to achieve a goal _____.

(5) A change in focus or direction _____. 5

8. (a) On the basis of your reading of "Multicultural Societies", describe how has globalization affected you and cultures in different countries. What role has technology played in globalization? 10

(b) Give one word for the following definitions :

(1) To slow something down _____.

(2) The process of forcing someone to leave a place _____.

- (3) Not having any connection with religion _____.
- (4) Extremely limiting or difficult _____.
- (5) Official orders _____.

5

- (c) From the list of words given below, find the noun that best continues an idea from the first sentence of each item :

decrease, discovery, fact, opinion, possibility, prediction, requirement, response.

- (1) Some experts believe there will be 9 billion people in the world by 2050. This _____.
- (2) Some people think that the Western culture has had too much influence around the world. This _____.
- (3) About 1.5 million people of Japanese descent now live in Brazil. This _____.
- (4) In the nineteenth century, established immigrant groups often had a hostile reaction to the new immigrant groups. This _____.
- (5) In 1968, a resident of Brooklyn, New York, found the remains of a nineteenth century African American settlement. This _____.

5

Exam. Code : 121203
Subject Code : 102746

B.A./B.Sc. 3rd Sem. (Batch 2023-26) (CBGS)

PUNJABI (Compulsory)

Time Allowed—3 Hours]

[Maximum Marks—100

ਨੋਟ :— ਹਰੇਕ ਭਾਗ ਵਿੱਚੋਂ ਘੱਟੋ-ਘੱਟ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦੀ ਚੋਣ ਕਰਦੇ ਹੋਏ, ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰੋ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ। ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਅੰਕ ਬਰਾਬਰ ਹਨ।

ਭਾਗ—ੳ

1. 'ਸੱਭਿਆਚਾਰ ਤੇ ਸਾਹਿਤ' ਨਿਬੰਧ ਦਾ ਸਾਰ ਲਿਖੋ।
2. 'ਪੁਤਲੀਆਂ ਦਾ ਤਮਾਸ਼ਾ' ਨਿਬੰਧ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਲਿਖੋ।

ਭਾਗ—ਅ

3. 'ਜ਼ਫ਼ਰਨਾਮਾ' ਇਕਾਂਗੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਲਿਖੋ।
4. 'ਜੁੱਤੀਆਂ ਦਾ ਜੋੜਾ' ਇਕਾਂਗੀ ਦਾ ਰੰਗਮੰਚੀ ਪੱਖ ਤੋਂ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ।

ਭਾਗ—ੲ

5. ਹੇਠ ਲਿਖੇ ਪੈਰੂ ਦੀ ਸੰਖੇਪ ਰਚਨਾ ਕਰੋ :

ਲੋਕਨਾਚ ਉਹ ਨਾਚ ਹੈ ਜਿਸਨੂੰ ਲੋਕੀਂ ਨੱਚਦੇ ਹੋਣ। ਜਿਸ ਵਿੱਚ ਇਲਾਕੇ ਦੇ ਆਮ ਲੋਕ ਆਪਣੀਆਂ ਖੁਸ਼ੀਆਂ, ਸੱਧਰਾਂ, ਮਨ

ਦੀਆਂ ਭਾਵਨਾਵਾਂ ਅਤੇ ਵਲਵਲੇ ਦਰਸਾਉਂਦੇ ਹੋਣ। ਲੋਕ ਨਾਚ ਆਪਣੇ ਇਲਾਕੇ ਦੀ ਸੱਭਿਅਤਾ ਦਾ ਦਰਪਣ ਹੁੰਦਾ ਹੈ ਕਿਉਂਕਿ ਜਦੋਂ ਲੋਕੀਂ ਖੁਸ਼ੀ ਦੀ ਤਰੰਗ ਵਿੱਚ ਹੁੰਦੇ ਹਨ ਤਾਂ ਉਹ ਆਪਣੇ ਅਸਲੇ ਪ੍ਰਗਟ ਕਰਦੇ ਹਨ। ਮੁੱਢਲਾ ਮਨੁੱਖ ਜਦੋਂ ਖੁਸ਼ੀ ਵਿੱਚ ਆ ਕੇ ਨੱਚਣ ਲੱਗਾ ਤਾਂ ਉਸਦੇ ਸਾਥੀ ਉਸਨੂੰ ਖੁਸ਼ ਵੇਖ ਕੇ ਨਾਲ ਹੀ ਨੱਚਣ ਲੱਗ ਪਏ। ਇੱਕ ਦੀ ਖੁਸ਼ੀ ਵੱਧ ਕੇ ਕਈ ਗੁਣਾ ਹੋ ਗਈ ਜਦੋਂ ਉਸਨੇ ਦੂਜਿਆਂ ਨੂੰ ਆਪਣੀ ਖੁਸ਼ੀ ਵਿੱਚ ਮਿਤ ਹੋ ਕੇ ਨੱਚਦੇ ਵੇਖਿਆ। ਖੁਸ਼ੀਆਂ ਦੀਆਂ ਘੜੀਆਂ ਲਈ ਲੋਕ ਨਾਚ ਇਕ ਸਹਿਜ ਵਸੀਲਾ ਬਣ ਗਿਆ। ਹਰ ਖੁਸ਼ੀ ਦੇ ਸਮੇਂ ਨੱਚਣਾ ਇਕ ਰਵਾਇਤ ਬਣ ਗਿਆ। ਪੁੱਤਰ ਜੰਮਣ ਤੇ ਵਿਆਹ-ਸ਼ਾਦੀ ਉੱਤੇ, ਤਿੱਥਾਂ-ਤਿਉਹਾਰਾਂ ਉੱਤੇ, ਮੇਲਿਆਂ ਤੇ ਹੋਰ ਖੁਸ਼ੀ ਭਰੇ ਇਕੱਠਾਂ ਤੇ ਨੱਚਣਾ ਜ਼ਰੂਰੀ ਅੰਗ ਸਮਝਿਆ ਜਾਣ ਲੱਗਾ।

6. ਹੇਠ ਲਿਖੇ ਪੈਰ੍ਹੇ ਵਿਚਲੇ ਅਸੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸੁੱਧ ਰੂਪ ਵਿੱਚ ਲਿਖੋ :

ਇਸ ਮਸ਼ੀਣੀ ਦੌਰ ਵਿਚ ਪੂਜੀਵਾਦ ਪਰਬੰਦ ਹੇਠ ਮਨੁੱਖ ਦੀਆਂ ਮਾਣਸਿਕ ਬਮਾਰੀਆਂ ਵਧੀਆਂ ਹਨ। ਅਯੋਕੇ ਮਨੁੱਖ ਦਾ ਜੀਵਣ ਉਤਸਾਹ ਮਰ ਰੇਹਾ ਹੈ। ਉਹ ਵਦੇਰੇ ਡਹਿੰਦੀਆਂ ਕਲਾ ਵਿਚ ਰਹਿੰਦਾ ਹੈ, ਗੁਸਾ, ਕਾਹਲ ਤੇ ਖਿਜ ਕਈ ਵਾਰ ਉਸਨੂੰ ਕਮਲਾ ਕਰ ਰੇਹਾ ਹੈ। ਇਸਦਾ ਕਾਰਣ ਮਸ਼ੀਨੀ ਸਨਅਤ ਨਾਲ ਜੀਵਣ ਵਿਚ ਪੈਦਾ ਹੋਈ ਕਾਹਲ ਦਸਿਆ ਜਾਦਾ ਹੈ। ਲੇਖਕ ਦਾ ਵੇਚਾਰ ਹੈ ਕਿ ਇਹ ਸਬ ਕੁਜ ਪੂਜੀਵਾਦ ਪਰਬੰਦ ਦਾ ਅਨਿਖੜਵਾਂ ਅਗ ਹੈ।

ਭਾਗ—ਸ

7. ਵਾਕਾਂਸ਼ ਵਿਆਕਰਨਕ ਇਕਾਈ ਨੂੰ ਪਰਿਭਾਸ਼ਤ ਕਰਦਿਆਂ ਇਸਦਾ ਵਰਗੀਕਰਨ ਕਰੋ।
8. ਵਾਕ ਵਿਆਕਰਨਕ ਇਕਾਈ ਨੂੰ ਪਰਿਭਾਸ਼ਤ ਕਰਦਿਆਂ ਇਸਦਾ ਵਰਗੀਕਰਨ ਕਰੋ।

Exam. Code : 121203

Subject Code : 102816

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

MATHEMATICS

(Analytical Geometry)

Paper-II

Time Allowed—3 Hours]

[Maximum Marks—75

Note :—Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (a) By a suitable transformation of axes remove the terms of the first degree in the equation

$$x^2 + 3xy - y^2 + 3x - 7y + 11 = 0. \quad 8$$

- (b) Prove that the trace $(a + b)$ and discriminant $(ab - h^2)$ of the expression $S = ax^2 + 2hxy + by^2 + 2gx + 2fy + c$ remains invariant under shifting of origin. 7

2. (a) Find the angle between the lines represented by

$$6y^2 - x^2 - xy + 10y + 4 = 0. \quad 8$$

- (b) Show that the pair of lines $a^2x^2 + 2h(a + b)xy + by^2 = 0$ is equally inclined to the pair $ax^2 + 2hxy + by^2 = 0$. 7

SECTION—B

3. (a) Find the equation of a parabola with vertex (2, 1) and focus (1, -1). 7

- (b) Find the locus of the middle point of a chord of a parabola which subtends a right angle at the vertex. 8

4. (a) Prove that the length of chord of contact of tangents drawn from the point (x_1, y_1) to the parabola

$$y^2 = 4ax \text{ is } \frac{1}{a} \sqrt{y_1^2 + 4a^2} \sqrt{y_1^2 - 4ax_1}. \quad 7$$

- (b) Find the equation of tangent and normal at (2, 4) to the parabola $y^2 = x$. 8

SECTION—C

5. (a) If any tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ intercepts

length h and k on the axes, prove that $\frac{a^2}{h^2} + \frac{b^2}{k^2} = 1$.

7

- (b) Find length of the chord intercepted by the ellipse $x^2 + 2y^2 = 4$ on the normal at the point $(\sqrt{2}, 1)$.
8
6. (a) Find centre, eccentricity and foci of the hyperbola $9x^2 - 16y^2 + 18x + 32y - 151 = 0$.
7
- (b) Find the equation of the straight lines which are tangents to the parabola $y^2 = 8x$ and the hyperbola $3x^2 - y^2 = 3$.
8

SECTION—D

7. (a) Prove that planes $x = cy + bz$, $y = az + cx$ and $z = bx + ay$ pass through on line if :
 $a^2 + b^2 + c^2 + 2abc = 1$. Also find the equation of line.
7
- (b) Show that the planes $2x + y + z = 3$, $x + y + 2z = 4$, $x + z = 2$ form a triangular prism. Find also the area of normal section of this prism.
8
8. (a) Prove that plane $x + 2y - z = 4$ cuts the sphere $x^2 + y^2 + z^2 - x + z - 2 = 0$ in a circle of radius unity.
7
- (b) Find the equations of the tangent planes to sphere $x^2 + y^2 + z^2 + 6x - 2z + 1 = 0$ which pass through the lines $x + z - 16 = 0$, $2y - 3z + 30 = 0$.
8

Exam. Code : 121203

Subject Code : 102770

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

MATHEMATICS (Analysis)

Paper-I

Time Allowed—3 Hours] [Maximum Marks—100

Note :—Attempt FIVE questions in all, selecting at least ONE question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (a) Define a sequence with example. Prove that every convergent sequence is bounded and has a unique limit.
(b) Show that the sequence, $\{S_n\}$, where
$$S_n = \frac{1}{1!} + \frac{1}{2!} + \dots + \frac{1}{n!},$$
 for all $n \in \mathbb{N}$, is convergent.
2. (a) If a sequence $\{a_n\}$ is bounded, then show that limit inferior and limit superior of $\{a_n\}$ are both finite.

- (b) Show that every monotonic increasing sequence which is not bounded above, diverges to $+\infty$.

SECTION—B

3. (a) Show that the series $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^p}$, $p > 0$ converges if $p > 1$ and diverges for $p \leq 1$.
- (b) Prove that every absolutely convergent series is convergent.
4. (a) Test the convergence of the series

$$\frac{2^2}{3^2} + \frac{2^2 \cdot 4^2}{3^2 \cdot 5^2} + \frac{2^2 \cdot 4^2 \cdot 6^2}{3^2 \cdot 5^2 \cdot 7^2} + \dots$$

- (b) Show that the series $\sum(1/n^p)$ converges if $p > 1$, and diverges if $p \leq 1$.

SECTION—C

5. (a) Show that every continuous function is integrable.
- (b) Show that if a function f is monotonic on $[a, b]$, then it is integrable on $[a, b]$.
6. Let f_1 and f_2 be two bounded and integrable functions on $[a, b]$. Prove that $f = f_1 - f_2$ is also integrable on $[a, b]$ and $\int_a^b f \, dx = \int_a^b f_1 \, dx - \int_a^b f_2 \, dx$.

SECTION—D

7. Show that $\beta(m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$ where $m > 0, n > 0$.

8. (a) Examine the convergence of the integrals

$$\int_0^{\infty} \sin x \, dx \quad \text{and} \quad \int_0^{\infty} x^3 e^{-x^2} \, dx.$$

(b) Find the value of m and n for which the integral

$$\int_0^1 \left(\log \frac{1}{x} \right)^m \, dx \quad \text{converges.}$$

Exam. Code : 121203
Subject Code : 102778

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

QUANTITATIVE TECHNIQUES

(Quantitative Techniques-III)

Time Allowed— 3 Hours]

[Maximum Marks—100

Note :— Attempt FIVE questions in all, selecting at least ONE question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (i) Find the first order and second order partial derivatives with respect to x and y of the function :
 $z = 4x^2y^2 + x^3 + 3y^2$.
- (ii) Determine two positive numbers, whose sum is 15 and the sum of whose squares is minimum.
 $10+10=20$
2. (i) Find the maximum and minimum values of the function :
 $(x - 1)^2(x + 3)^3$.
- (ii) Divide 16 into two parts so that their product is maximum.
- (iii) What is a decreasing function ? Explain with the help of an example.
 $10+5+5=20$

SECTION—B

3. (i) Find the integral of : $\frac{x^3 + 3x^2 + 4}{\sqrt{x}}$ w.r.t. x .
- (ii) Evaluate : $\int_0^1 (e^x - e^{-x})^2 dx$. 10+10=20
4. (i) If the market demand curve is given by $p = 20 - 2x$, where p and x are respectively the price and amount demanded of a commodity, find the consumer's surplus when $p = 4$ and $p = 8$.
- (ii) The supply curve for a commodity is given by : $p = \sqrt{9 + x}$ and the quantity sold is 7 units. Find producer's surplus. 10+10=20

SECTION—C

5. With the help of hypothetical examples, explain the following :
- (i) Transpose of a matrix
- (ii) Symmetric matrix
- (iii) Skew-symmetric matrix
- (iv) Diagonal matrix. 4×5=20

6. Solve the following system of equations by Cramer's rule :

$$x + 6y - z = 10$$

$$2x + 3y + 3z = 17$$

$$3x - 3y - 2z = -9$$

20

SECTION—D

7. The input-output coefficient matrix (A) and final demand vector (D) for an economy with three sectors are given below :

$$A = \begin{bmatrix} 0.1 & 0.2 & 0.4 \\ 0.3 & 0.2 & 0.1 \\ 0.2 & 0.4 & 0.3 \end{bmatrix}, D = \begin{bmatrix} 40 \\ 50 \\ 80 \end{bmatrix}; \text{ calculate the output level}$$

for the three sectors.

20

8. (i) What are the underlying assumptions of linear programming ?
- (ii) Solve the following linear programming problem by graphic method :

$$\text{Minimize } Z = 2x_1 + 3x_2$$

subject to the constraints :

$$x_1 + x_2 \geq 8$$

$$3x_1 + 5x_2 \geq 30$$

$$2x_1 + x_2 \geq 12$$

$$x_1, x_2 \geq 0$$

5+15=20

Exam. Code : 121203
Subject Code : 102752

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

COMPUTER SCIENCE

(Computer Oriented Numerical & Statistical Methods)

Time Allowed— 3 Hours]

[Maximum Marks—75

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. What is difference between numerical methods and numerical analysis ? Which are different types of errors and their measures ?
2. Find a root of equation $x^3 - x^2 + x - 7 = 0$ near $x = 2$ using bisection method.

SECTION—B

3. Solve the following system of equations using Gauss Jordan method :

$$2x - 3y + z = -1$$

$$x + 4y + 5z = 25$$

$$3x - 4y + z = 2$$

4. Which are different methods to solve non-homogenous system of linear equations ? Write the algorithm of Gauss Siedel method.

SECTION—C

5. Using following table that gives the normal weights of a baby during the first six months of age estimate the weight of a baby at age of 4 months :

Age in Months :	0	2	3	5	6
Weight (Kg.) :	5	7	8	10	12

6. (a) Write the algorithm of Simpson's 1/3 rule to find area under curve.

- (b) Using trapezoidal rule find the area between x-axis and the lines $x = 1$ and $x = 4$ and the curve through the points given by :

X:	1	1.5	2	2.5	3	3.5	4
Y:	2	2.3	2.9	3.6	4.5	5.2	5.8

SECTION—D

7. Calculate mean and mode of the distribution given below :

X (less than):	5	10	15	20	25	30	35	40
Frequency :	5	20	45	75	115	135	145	50

8. What is Dispersion ? Which are various measures of dispersion? Compare Dispersion and Skewness.

Exam. Code : 121203

Subject Code : 102760

B.A./B.Sc. 3rd Semester (Batch 2023-26) (CBGS)

ECONOMICS

(Indian Economy)

Time Allowed—3 Hours]

[Maximum Marks—100

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. Discuss various causes of decline in agricultural productivity in India.
2. Elaborate various clauses of WTO related with agriculture. How have they affected Indian agriculture ?

SECTION—B

3. What are the major problems of Indian industry ? How they can be solved ?
4. Discuss the role of public sector in India. What are its major shortcomings ?

SECTION—C

5. Critically examine various policy measures to promote foreign trade in India.
6. Why India faces adverse balance of payments ? How it can be corrected ?

SECTION—D

7. Discuss the causes of inequality in India. How it can be removed ?
8. Elaborate the main objectives of Indian Plans. How far have we been able to achieve these objectives ?

(Punjabi Version)

ਨੋਟ :— ਹਰੇਕ ਭਾਗ ਵਿੱਚੋਂ ਘੱਟੋ-ਘੱਟ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦੀ ਚੋਣ ਕਰਦੇ ਹੋਏ, ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰੋ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ। ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਅੰਕ ਬਰਾਬਰ ਹਨ।

ਭਾਗ—ੳ

1. ਭਾਰਤ ਵਿੱਚ ਖੇਤੀ ਉਤਪਾਦਕਤਾ ਵਿੱਚ ਗਿਰਾਵਟ ਦੇ ਵੱਖ-ਵੱਖ ਕਾਰਨਾਂ ਬਾਰੇ ਚਰਚਾ ਕਰੋ।
2. ਖੇਤੀਬਾੜੀ ਨਾਲ ਸੰਬੰਧਤ WTO ਦੀਆਂ ਵੱਖ-ਵੱਖ ਖੰਡਾਂ ਨੂੰ ਵਿਸਤ੍ਰਿਤ ਕਰੋ। ਭਾਰਤੀ ਖੇਤੀ ਨੂੰ ਉਨ੍ਹਾਂ ਨੇ ਕਿਵੇਂ ਪ੍ਰਭਾਵਿਤ ਕੀਤਾ ਹੈ ?

ਭਾਗ—ਅ

3. ਭਾਰਤੀ ਉਦਯੋਗ ਦੀਆਂ ਮੁੱਖ ਸਮੱਸਿਆਵਾਂ ਕੀ ਹਨ ? ਉਹਨਾਂ ਨੂੰ ਕਿਵੇਂ ਹੱਲ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ ?

4. ਭਾਰਤ ਵਿੱਚ ਜਨਤਕ ਖੇਤਰ ਦੀ ਭੂਮਿਕਾ ਬਾਰੇ ਚਰਚਾ ਕਰੋ।
ਇਸ ਦੀਆਂ ਮੁੱਖ ਕਮੀਆਂ ਕੀ ਹਨ ?

ਭਾਗ—ੲ

5. ਭਾਰਤ ਵਿੱਚ ਵਿਦੇਸ਼ੀ ਵਪਾਰ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕਰਨ ਲਈ ਵੱਖ-ਵੱਖ ਨੀਤੀਗਤ ਕਾਰਜਾਂ ਦੀ ਆਲੋਚਨਾਤਮਕ ਜਾਂਚ ਕਰੋ।
6. ਭਾਰਤ ਨੂੰ ਭੁਗਤਾਨ ਸੰਤੁਲਨ ਦੇ ਪ੍ਰਤੀਕੂਲ ਸਥਿਤੀ ਦਾ ਸਾਹਮਣਾ ਕਿਉਂ ਕਰਨਾ ਪੈਂਦਾ ਹੈ ? ਇਸ ਨੂੰ ਕਿਵੇਂ ਠੀਕ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ ?

ਭਾਗ—ਸ

7. ਭਾਰਤ ਵਿੱਚ ਅਸਮਾਨਤਾ ਦੇ ਕਾਰਨਾਂ ਦੀ ਚਰਚਾ ਕਰੋ। ਇਸ ਨੂੰ ਕਿਵੇਂ ਹਟਾਇਆ ਜਾ ਸਕਦਾ ਹੈ ?
8. ਭਾਰਤੀ ਯੋਜਨਾਵਾਂ ਦੇ ਮੁੱਖ ਉਦੇਸ਼ਾਂ ਦੀ ਵਿਆਖਿਆ ਕਰੋ। ਅਸੀਂ ਇਹਨਾਂ ਉਦੇਸ਼ਾਂ ਨੂੰ ਕਿੱਥੋਂ ਤੱਕ ਪ੍ਰਾਪਤ ਕਰ ਸਕੇ ਹਾਂ ?

(Hindi Version)

- ਨੋਟ :— ਪ੍ਰत्येक भाग में से कम से कम एक प्रश्न का चयन करते हुए, कुल पाँच प्रश्न करें। पांचवा प्रश्न किसी भी भाग में से किया जा सकता है। सभी प्रश्नों के समान अंक हैं।

भाग—क

1. भारत में कृषि उत्पादकता में गिरावट के विभिन्न कारणों पर चर्चा करें।
2. कृषि से संबंधित WTO के विभिन्न खंडों पर विस्तार से चर्चा करें। भारतीय कृषि पर इनका क्या प्रभाव पड़ा है ?

भाग—ख

3. भारतीय उद्योग की प्रमुख समस्याएँ क्या हैं ? इनका समाधान कैसे किया जा सकता है ?
4. भारत में सार्वजनिक क्षेत्र की भूमिका पर चर्चा करें। इसकी प्रमुख कमियाँ क्या हैं ?

भाग—ग

5. भारत में विदेशी व्यापार को बढ़ावा देने के लिए विभिन्न नीतिगत कार्यों का आलोचनात्मक परीक्षण करें।
6. भारत को भुगतान संतुलन की प्रतिकूल स्थिति का सामना क्यों करना पड़ता है ? इसे कैसे ठीक किया जा सकता है ?

भाग—घ

7. भारत में असमानता के कारणों पर चर्चा करें। इसे कैसे दूर किया जा सकता है ?
8. भारतीय योजनाओं के प्रमुख उद्देश्यों पर विस्तार से चर्चा करें। हम इन उद्देश्यों को किस हद तक प्राप्त कर पाए हैं ?