Exam. Code : 121203
Subject Code : 502167

B.A./B.Sc. 3rd Sem. (Batch 2024-27/28) (CBGS)

ENGLISH LANGUAGE SKILLS–2

Paper : ENAEC201

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

I. Do as directed :

(a) Put in the correct preposition :

1. It was nice ..... you to come and see me when I was ill.

2. I'm tired ..... doing the same thing every day. I need a change.

(b) Put in by, in, on or with :

3. Have you ever been bitten ..... a dog?

4. Sorry we're late. We missed the bus, so we had to come ..... foot.

(c) Put in for or during :

5. Sarah was very angry with me. She didn't speak to me ..... a week.

6. We were hungry when we arrived. We hadn't had anything to eat ..... the journey.

(d) Write sentences with unless :

7. Today is a public holiday. The doctor will see you only if it's an emergency.

8. I don't want to go to the party alone. I'm going only if you go too.

(e) Complete the sentences with although/in spite of/ because/because of :

9. ..... all our careful plans, a lot of things went wrong.

10. I couldn't get to sleep ..... the noise. 20

II. Do as directed :

(a) Complete the sentences using the words in the correct order :

1. ..... (take/I/usually) sugar in coffee.

2. My eyesight isn't very good ..... (i/read/can/ only) with glasses.

(b) Complete the sentences using a superlative or a comparative :

3. What's ..... country in the world? (small)

4. I wasn't feeling well yesterday, but I feel a bit ..... today. (good)

(c) Write the sentences using as ..... as :

5. We are busy today, but we were busier yesterday.

6. You know a bit about cars, but I know more.

(d) Put in so, such or such a :

7. He always looks good. He wears ..... nice clothes.

8. They've got ..... much money they don't know what to do with it.

(e) Complete the sentences with adverbs :

9. Mike keeps fit by playing tennis .....

10. Our team lost the game because we played very 20

SECTION—B

III. Write an essay on any one of the following :

Impact of Social Media

OR

Women Empowerment 20

IV. Do as directed :

(a) Complete the sentences with look for or look after in the correct form :

1. Kate is ..... a job. I hope she finds one soon.

2. Who ..... you when you were ill?

(b) Complete the sentences using a verb + out :

3. The new drug will be ..... on a small group of patients.

4. It took the fire brigade two hours to ..... the fire.

(c) Complete the sentences using a verb + away or back :

5. I was away all day yesterday. I ..... very late.

6. A man was trying to break into a car. When he saw me, he ..... .

(d) Complete the sentences using a verb + on or off :

7. It was warm, so I ..... my jacket.

8. Don't ..... until tomorrow what you can do today.

(e) Complete the sentences using a verb in the correct form :

9. Steve was upset because he'd been ..... out of the team.

10. Amy isn't living in this apartment any more. She ..... out a few weeks ago. 20

SECTION—C

V. (a) What are the main ideas in the chapter 'Malaria: Portrait of a Disease'. 10

(b) Write the words that are similar to the definitions below :

1. easily hurt
2. to cause something to continue
3. a promise to do something
4. things that encourage a person to do something
5. a difficult and unpleasant situation
6. lack of food for a long period of time
7. the reason why you are willing to do something
8. the place where someone is going
9. to be fully involved in an activity
10. to combine or join together 10

VI. (a) Sum up the main ideas in the essay 'The Age of Immigration'. 10

(b) Replace the words or phrases in parentheses with words given below :

Abolish, attractive, colossal, endured, fueled, initially, option, persistent, source, subsequently

1. Scientists identified a gene mutation for breast cancer and (later) ..... developed a test to identify people who carry the gene mutation.
2. Many immigrants believed that leaving home and looking for work in the New World was their only (choice) .....

3. The discovery of gold in the Western United States (encouraged) ..... immigration to California.

4. The idea of a new life in a new country was very (appealing) ..... to many immigrants.

5. Many people would like the government to (end, eliminate) ..... the income tax, but this is unlikely to happen.

6. A/an (very large) ..... storm damaged the immigrant's farm.

7. The (origin) ..... of political discontent is often economic.

8. Many countries (at first) ..... welcomed immigrants because they needed workers.

9. The (continuous) ..... persistent failure of national economic policies has forced many people to look for jobs in other countries.

10. The slaves who were brought to the New World (suffered) ..... terrible treatment and many of them even died. 10

SECTION—D

VII. (a) Sum up the main ideas in the essay 'When Does Language Learning Begin?' 10

(b) Give one word for the following definitions :

1. More than enough
2. Expensive
3. Clear and firm

4. Places where garbage is buried
5. In complete agreement
6. The protection of natural resources
7. Scientists who study plants
8. Average
9. To fall apart
10. To return to an earlier and better condition

10

VIII.(a) Sum up the main ideas in the essay 'The Aral Sea: An Environmental Crisis'. 10

(b) Use the following words to complete the sentences :

Collapsed, concluded, conference, exploitation, paradigm, reliant, reversed, sustainable, transport, volume

1. Efforts to reach an agreement ..... when the government refused to meet the environmental group's demands.
2. Experts warn that short-term ..... of natural resources inevitably leads to long-term environmental problems.
3. In spite of growing support for solar and wind energy, the world remains ..... on oil and coal.
4. An international ..... was organized to assess the progress in slowing down global deforestation.

5. The Aral Sea is a/an ..... of the terrible environmental consequences of short-term economic planning.

6. Experts warn that a decrease in ..... will result in increased salinity for Mono Lake, California.

7. Using cleared forestland for agricultural purposes is not ..... since without the trees, the land quickly becomes infertile.

8. A year after the massive oil spill, scientists reviewed the evidence and ..... concluded that fishing was once again safe.

9. During the nineteenth century, railways were developed to ..... coal to England's industrial areas.

10. After new evidence emerged about long-term environmental problems, the city ..... its previous decision and refused the company's request to build a new factory. 10

Exam. Code : 121203
Subject Code : 502174

B.A./B.Sc. 3rd Semester (Batch 2024-27/28) (CBGS)

COMPUTER SCIENCE

(Computer Oriented Numerical and 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. (a) What is the difference between Numerical methods and numerical analysis?

   (b) Which are different types of Errors and their measures?

2. (a) Find a root of the equation $x^3 - 4x - 9 = 0$ using the bisection method.

   (b) Find a root of the equation $x^3 - x - 4 = 0$ between 1 and 2, correct to 3 decimal places using the Newton Raphson method.

SECTION—B

3. (a) Solve the following system of linear equations using Gauss Elimination Method :

$$x + y + z = 3$$

$$2x + 3y + z = 6$$

$$x - y - z = -3$$

(b) Explain the matrix inversion method.

4. (a) Write the algorithm of Gauss Seidel method.

(b) Find the inverse of the following matrix using Gauss Jordan Method :

$$\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$$

SECTION—C

5. (a) Evaluate the following by trapezoidal rule taking $n = 4$.

$$\int_0^2 \frac{dx}{1 + x^4}$$

(b) Evaluate the following by using Simpson's 3/8 rule taking $h = 1/6$.

$$\int_0^1 \frac{dx}{1 + x^2}$$

6. (a) The following table gives the normal weight of a baby during the first six months of life. Estimate the weight of a baby at the age of 4 months.

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

(b) What is Interpolation? Write an algorithm of Lagrange Interpolation method.

SECTION—D

7. Which are various measures of Central Tendency? Write their merits and demerits.

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

Exam. Code : 121203
Subject Code : 502233

B.A./B.Sc. 3rd Sem. (Batch 2024-27/28) (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. Mention about environmental effects of extraction and exploitation of mineral resources. Discuss about any case study in relation to conflict over water.

2. Write note on the importance of food resources. What are the consequences of changes caused by agriculture and overgrazing?

SECTION—B

3. Give an introduction, types, characteristic features, structure, and function of the pond ecosystem.

4. (i) Discuss about *in situ* methods of conservation of biodiversity.

   (ii) Write differences between endangered species and endemic species.

SECTION—C

5. Give a detailed note on the Air (Prevention and Control of Pollution) Act, 1981.

6. Give a detailed account of the causes, effects, and control measures of climate change and global warming.

SECTION—D

7. Describe about HIV/AIDS. What are its preventive measures?

8. Write notes on :

   (i) Consequences of population explosion

   (ii) Family Welfare Programmes.

(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—ਓ

1. ਖਣਿਜ ਸਰੋਤਾਂ ਦੀ ਨਿਕਾਸੀ ਅਤੇ ਸ਼ੋਸ਼ਣ ਦੇ ਵਾਤਾਵਰਣ ਪ੍ਰਭਾਵਾਂ ਬਾਰੇ ਜ਼ਿਕਰ ਕਰੋ। ਪਾਣੀ ਉੱਤੇ ਟਕਰਾਅ ਦੇ ਸੰਬੰਧ ਵਿੱਚ ਕਿਸੇ ਵੀ ਕੇਸ ਸਟੱਡੀ ਬਾਰੇ ਚਰਚਾ ਕਰੋ।

2. ਭੋਜਨ ਸਰੋਤਾਂ ਦੀ ਮਹੱਤਤਾ 'ਤੇ ਨੋਟ ਲਿਖੋ। ਖੇਤੀਬਾੜੀ ਅਤੇ ਜ਼ਿਆਦਾ ਚਰਾਉਣ ਕਾਰਨ ਹੋਣ ਵਾਲੀਆਂ ਤਬਦੀਲੀਆਂ ਦੇ ਕੀ ਨਤੀਜੇ ਹੁੰਦੇ ਹਨ ?

ਭਾਗ—ਅ

3. ਤਲਾਅ ਵਾਤਾਵਰਣ ਪ੍ਰਣਾਲੀ ਦੀ ਜਾਣ-ਪਛਾਣ, ਕਿਸਮਾਂ, ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ, ਬਣਤਰ ਅਤੇ ਕਾਰਜ ਦਿਓ।

4. (i) ਜੈਵ ਵਿਭਿੰਨਤਾ ਦੀ ਸੰਭਾਲ ਦੇ *In situ* ਤਰੀਕਿਆਂ ਬਾਰੇ ਚਰਚਾ ਕਰੋ।

   (ii) ਲੁਪਤ ਹੋ ਰਹੀਆਂ ਪ੍ਰਜਾਤੀਆਂ ਅਤੇ ਸਥਾਨਕ ਪ੍ਰਜਾਤੀਆਂ ਵਿੱਚ ਅੰਤਰ ਲਿਖੋ।

ਭਾਗ—ਏ

5. ਹਵਾ (ਪ੍ਰਦੂਸ਼ਣ ਰੋਕਥਾਮ ਅਤੇ ਨਿਯੰਤਰਣ) ਐਕਟ, 1981 'ਤੇ ਇੱਕ ਵਿਸਤ੍ਰਿਤ ਨੋਟ ਦਿਓ।

6. ਜਲਵਾਯੂ ਪਰਿਵਰਤਨ ਅਤੇ ਗਲੋਬਲ ਵਾਰਮਿੰਗ ਦੇ ਕਾਰਨਾਂ, ਪ੍ਰਭਾਵਾਂ ਅਤੇ ਨਿਯੰਤਰਣ ਉਪਾਵਾਂ ਦਾ ਵਿਸਤ੍ਰਿਤ ਵੇਰਵਾ ਦਿਓ।

ਭਾਗ—ਸ

7. HIV/AIDS ਬਾਰੇ ਵਰਣਨ ਕਰੋ। ਇਸਦੇ ਰੋਕਥਾਮ ਉਪਾਅ ਕੀ ਹਨ ?

8. ਨਿਮਨਲਿਖਤ 'ਤੇ ਨੋਟ ਲਿਖੋ :

   (i) ਆਬਾਦੀ ਵਿਸਫੋਟ ਦੇ ਨਤੀਜੇ

   (ii) ਪਰਿਵਾਰ ਭਲਾਈ ਪ੍ਰੋਗਰਾਮ।

(Hindi Version)

नोट :– 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. खनिज संसाधनों के निष्कर्षण और दोहन के पर्यावरणीय प्रभावों का उल्लेख कीजिए। जल संघर्ष से संबंधित किसी केस स्टडी पर चर्चा कीजिए।

2. खाद्य संसाधनों के महत्व पर टिप्पणियाँ लिखिए। कृषि और अतिचारण के कारण होने वाले परिवर्तनों के क्या परिणाम हैं?

भाग–ख

3. तालाब पारिस्थितिकी तंत्र का परिचय, प्रकार, विशिष्ट विशेषताएँ, संरचना और कार्य बताइए।

4. (i) जैव विविधता के संरक्षण की यथा–स्थान विधियों पर चर्चा कीजिए।

   (ii) संकटापन्न प्रजातियों और स्थानिक प्रजातियों के बीच अंतर लिखिए।

भाग–ग

5. वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 पर विस्तृत टिप्पणी दीजिए।

6. जलवायु परिवर्तन और ग्लोबल वार्मिंग के कारणों, प्रभावों और नियंत्रण उपायों का विस्तृत विवरण दीजिए।

भाग–घ

7. एचआईवी/एड्स का वर्णन कीजिए। इसके निवारक उपाय क्या हैं?

8. नोट लिखें :

   (i) जनसंख्या विस्फोट के परिणाम

   (ii) परिवार कल्याण कार्यक्रमों।

Exam. Code : 121203
Subject Code : 502168

B.A./B.Sc. 3rd Semester (Batch 2024-27/28) (CBGS)

PUNJABI (Compulsory)–III

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. "ਸਭਿਆਚਾਰ ਤੇ ਸਾਹਿਤ" ਦਾ ਸਾਰ ਲਿਖੋ।
2. "ਕਾਹਨੂੰ ਲੱਭਦੇ ਮੱਲ ਅਖਾੜਿਆਂ ਦੇ" ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਲਿਖੋ।

ਭਾਗ—ਅ

3. "ਇਕ ਐਤਵਾਰ" ਇਕਾਂਗੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਲਿਖੋ।
4. "ਕੱਚ ਦਾ ਗਜਰਾ" ਇਕਾਂਗੀ ਦੇ ਪਾਤਰ-ਪ੍ਰਬੰਧ 'ਤੇ ਨੋਟ ਲਿਖੋ।

ਭਾਗ—ੲ

5. ਹੇਠ ਲਿਖੇ ਪੈਰ੍ਹੇ ਨੂੰ ਸੰਖੇਪ ਕਰਕੇ ਲਿਖੋ :

ਸਭ ਤੋਂ ਪਹਿਲਾਂ ਇਹ ਭਰਮ ਮਨ ਵਿੱਚੋਂ ਕੱਢ ਦਿਉ ਕਿ ਫਲਾਣਾ ਕੰਮ ਇੱਜ਼ਤ ਵਾਲਾ ਹੈ ਤੇ ਫਲਾਣਾ ਕਮੀਨਾ। ਹਰੇਕ ਕੰਮ ਇੱਜ਼ਤ ਵਾਲਾ ਬਣ ਸਕਦਾ ਹੈ। ਕੰਮ ਕਮੀਨੇ ਨਹੀਂ ਹੁੰਦੇ। ਕਰਨ ਵਾਲਾ ਉਸਨੂੰ ਚੰਗਾ ਜਾਂ ਮਾੜਾ ਕਰ ਦਿੰਦਾ ਹੈ। ਸਾਰੇ ਨੌਜਵਾਨ ਪੁਰਾਣੇ ਖਿਆਲਾਂ ਦੀ ਪੰਡ ਕਮਰ ਤੋਂ ਹੇਠਾਂ ਸੁੱਟ ਸਕਣ। ਜਿਹੜੇ ਕੰਮ ਲਈ ਉਨ੍ਹਾਂ ਦਾ ਮਨ ਰਚਿਤ ਹੁੰਦਾ ਹੈ ਉਸੇ ਕੰਮ ਵਿੱਚ ਸਿੱਖਿਆ ਹਾਸਲ ਕਰਨ। ਵਿਆਹ ਉਦੋਂ ਤਕ ਨਾ ਕਰਵਾਉਣ ਜਦੋਂ ਤਕ

ਚੰਗੇ ਗੁਜ਼ਾਰੇ ਜੋਗੀ ਯੋਗਤਾ ਪੈਦਾ ਨਹੀਂ ਹੋ ਜਾਂਦੀ। ਵਿਆਹ ਕਰਵਾਉਣ ਨਾਲੋਂ ਰੋਜ਼ੀ ਰੋਟੀ ਕਮਾਉਣ ਜੋਗਾ ਹੋਣਾ ਜ਼ਰੂਰੀ ਹੈ। ਜਿਥੇ ਰਹਿਣ ਮਿਲੇ ਉਥੇ ਰਹਿਣ ਜੋ ਕਰਨਾ ਮਿਲੇ ਕਰਨ। ਕਿਸੇ ਮੁਸੀਬਤ ਤੋਂ ਨਾ ਘਬਰਾਉਣ। ਈਰਖਾ, ਝੂਠ, ਫਰੇਬ ਨਿਕੰਮਿਆਂ ਦੀਆਂ ਕੁਸਿਫ਼ਤਾਂ ਹਨ। ਜਦੋਂ ਕੰਮ ਦਾ ਸ਼ੌਕ ਪੈ ਜਾਵੇ ਸਭ ਕੁਸਿਫ਼ਤਾਂ ਉੱਡ ਜਾਂਦੀਆਂ ਹਨ।

6. ਹੇਠ ਲਿਖੇ ਪੈਰ੍ਹੇ ਵਿਚਲੇ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖੋ :

ਸਾਹ ਆਪਨੀ ਕਾਰਜ ਕਿਰਆ ਤੋ ਇਕ ਰਾਹਗੀਰ ਜਾਪਦਾ ਹੈ। ਸਾਹ ਲੈਨ ਵਾਲੇ ਅੰਗ ਸ਼ਾਰੀ ਊਮਰ ਆਪਨੇ ਸਥਾਈ ਹੋਨ ਦਾ ਬਰਮ ਪਾਲਦੇ ਰਹਿਦੇ ਹਣ। ਅਸ਼ਲ ਚ ਸਾਹ ਦਾ ਪੈਡਾ ਅਪਾਰ ਹੈ। ਕੁਜ ਕੁ ਜੀਵਾ ਲਈ ਆਕਸ਼ੀਜ਼ਨ ਦੇ ਅਨੂ ਸਾਹ ਵਰਤਾਊਦੇ ਹਣ। ਕਜ ਜੀਵਾਣਆ ਲਈ ਆਕਸ਼ੀਜ਼ਨ ਦੀ ਅਨਹੋਦ ਹੀ ਸਾਹ ਦਾ ਕਮ ਕਰਦੀ ਹੈ। ਸਾਹ ਨ ਜਮਦਾ ਹੈ ਨਾ ਮਰਦਾ ਹੈ।

ਭਾਗ—ਸ

7. ਭਾਵੰਸ਼ ਨੂੰ ਪਰਿਭਾਸ਼ਤ ਕਰਦਿਆਂ ਇਸਦਾ ਵਰਗੀਕਰਨ ਕਰੋ।

8. ਉਪਵਾਕ ਨੂੰ ਪਰਿਭਾਸ਼ਤ ਕਰਦਿਆਂ ਇਸਦੀਆਂ ਕਿਸਮਾਂ ਨਿਰਧਾਰਤ ਕਰੋ।

Exam. Code : 121203
Subject Code : 502182

B.A./B.Sc. 3rd Semester (Batch 2024-27/28) (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 features of Indian agriculture. What is its importance in the modern world? 20

2. Critically examine the impact of Green Revolution. Did it lead to sustainable development? Give arguments to support your viewpoint. 20

SECTION—B

3. Write a detailed note on performance of Indian industry since liberalisation. What are the major hurdles in its growth? 20

4. Critically examine the latest industrial policy of India. 20

SECTION—C

5. Discuss the changes in composition of foreign trade in India since liberalization. Has it led to improvement in balance of payments situation of the country? 20

6. Define multinational corporations. What is the impact of MNCs on Indian economy? 20

SECTION—D

7. Discuss the causes and consequences of inflation in India. 20

8. Write a detailed critical note on existing tax structure of India. 20

(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—ਓ

1. ਭਾਰਤੀ ਖੇਤੀਬਾੜੀ ਦੀਆਂ ਵੱਖ-ਵੱਖ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ 'ਤੇ ਚਰਚਾ ਕਰੋ। ਆਧੁਨਿਕ ਸੰਸਾਰ ਵਿੱਚ ਇਸਦੀ ਮਹੱਤਤਾ ਕੀ ਹੈ ? 20

2. ਹਰੀ ਕ੍ਰਾਂਤੀ ਦੇ ਪ੍ਰਭਾਵ ਦੀ ਆਲੋਚਨਾਤਮਕ ਤੌਰ 'ਤੇ ਜਾਂਚ ਕਰੋ। ਕੀ ਇਸਨੇ ਟਿਕਾਊ ਵਿਕਾਸ ਵੱਲ ਅਗਵਾਈ ਕੀਤੀ ? ਆਪਣੇ ਦ੍ਰਿਸ਼ਟੀਕੋਣ ਦਾ ਸਮਰਥਨ ਕਰਨ ਲਈ ਦਲੀਲਾਂ ਦਿਓ। 20

ਭਾਗ—ਅ

3. ਉਦਾਰੀਕਰਨ ਤੋਂ ਬਾਅਦ ਭਾਰਤੀ ਉਦਯੋਗ ਦੇ ਪ੍ਰਦਰਸ਼ਨ 'ਤੇ ਇੱਕ ਵਿਸਤ੍ਰਿਤ ਨੋਟ ਲਿਖੋ। ਇਸਦੇ ਵਿਕਾਸ ਵਿੱਚ ਮੁੱਖ ਰੁਕਾਵਟਾਂ ਕੀ ਹਨ ? 20

4. ਭਾਰਤ ਦੀ ਨਵੀਨਤਮ ਉਦਯੋਗਿਕ ਨੀਤੀ ਦੀ ਆਲੋਚਨਾਤਮਕ ਤੌਰ 'ਤੇ ਜਾਂਚ ਕਰੋ। 20

ਭਾਗ—ਏ

5. ਉਦਾਰੀਕਰਨ ਤੋਂ ਬਾਅਦ ਭਾਰਤ ਵਿੱਚ ਵਿਦੇਸ਼ੀ ਵਪਾਰ ਦੀ ਬਣਤਰ ਵਿੱਚ ਆਈਆਂ ਤਬਦੀਲੀਆਂ 'ਤੇ ਚਰਚਾ ਕਰੋ। ਕੀ ਇਸ ਨਾਲ ਦੇਸ਼ ਦੇ ਭੁਗਤਾਨ ਸੰਤੁਲਨ ਦੀ ਸਥਿਤੀ ਵਿੱਚ ਸੁਧਾਰ ਹੋਇਆ ਹੈ ? 20

6. ਬਹੁ-ਰਾਸ਼ਟਰੀ ਕਾਰਪੋਰੇਸ਼ਨਾਂ ਨੂੰ ਪਰਿਭਾਸ਼ਿਤ ਕਰੋ। ਭਾਰਤੀ ਅਰਥਵਿਵਸਥਾ 'ਤੇ ਬਹੁ-ਰਾਸ਼ਟਰੀ ਕੰਪਨੀਆਂ ਦਾ ਕੀ ਪ੍ਰਭਾਵ ਹੈ ? 20

ਭਾਗ—ਸ

7. ਭਾਰਤ ਵਿੱਚ ਮਹਿੰਗਾਈ ਦੇ ਕਾਰਨਾਂ ਅਤੇ ਨਤੀਜਿਆਂ 'ਤੇ ਚਰਚਾ ਕਰੋ। 20

8. ਭਾਰਤ ਦੇ ਮੌਜੂਦਾ ਟੈਕਸ ਢਾਂਚੇ 'ਤੇ ਇੱਕ ਵਿਸਤ੍ਰਿਤ ਆਲੋਚਨਾਤਮਕ ਨੋਟ ਲਿਖੋ। 20

(Hindi Version)

नोट :— 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. भारतीय कृषि की विभिन्न विशेषताओं पर चर्चा कीजिए। आधुनिक विश्व में इसका क्या महत्व है? 20

2. हरित क्रांति के प्रभाव का आलोचनात्मक परीक्षण कीजिए। क्या इससे सतत विकास हुआ? अपने दृष्टिकोण के समर्थन में तर्क दीजिए। 20

भाग–ख

3. उदारीकरण के बाद से भारतीय उद्योग के प्रदर्शन पर एक विस्तृत टिप्पणी लिखिए। इसके विकास में प्रमुख बाधाएँ क्या हैं? 20

4. भारत की नवीनतम औद्योगिक नीति का आलोचनात्मक परीक्षण कीजिए। 20

भाग–ग

5. उदारीकरण के बाद से भारत में विदेशी व्यापार की संरचना में आए परिवर्तनों पर चर्चा कीजिए। क्या इससे देश के भुगतान संतुलन की स्थिति में सुधार हुआ है? 20

6. बहुराष्ट्रीय निगमों को परिभाषित कीजिए। भारतीय अर्थव्यवस्था पर बहुराष्ट्रीय कंपनियों का क्या प्रभाव है? 20

भाग–घ

7. भारत में मुद्रास्फीति के कारणों और परिणामों पर चर्चा कीजिए। 20

8. भारत की मौजूदा कर संरचना पर एक विस्तृत आलोचनात्मक टिप्पणी लिखिए। 20

Exam. Code : 121203
Subject Code : 800031

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

(CBGS) (Old Sylb)

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. All questions carry equal marks.

(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 a question cannot be chosen from different questions. All the questions carry equal marks.

SECTION—A

1. Do as directed:

   a. Complete the sentence with correct word:

   I've got nothing to do. I'm ..... (bored / boring)

   b. Put an adverb in the sentence. The first letters of the adverb are given:

   We had to wait for a long time but we didn't complain. We waited pat.....

c. Put in 'so,' or 'such,' or 'such a':

I was surprised that he looked ..... well after his recent illness.

d. Use your idea to complete the sentence. Use 'rather' + 'adjective':

The hotel we stayed at wasn't very good. I was .....

e. Complete the sentence using comparative form:

I was surprised we got here so quickly. I expected the trip to take .....

f. Complete the sentence using 'as ... as':

I was little nervous before the interview but usually I am a lot more nervous.

I wasn't .....

g. Complete the sentence using superlative and 'of' or 'in':

Spring is a very busy time for me. It is ..... the year.

h. Put 'during' or 'while':

My phone rang ..... we were having dinner.

i. Put 'at' or 'on' or 'in':

I have been invited to a wedding ..... 14th April.

j. Put 'by' or 'on' or 'in' or 'with':

Who is this man standing ..... the window? 20

2. Do as directed:

a. Complete the sentence with correct word:

The teacher's explanation was ..... Most of the students didn't understand it.

(confusing / confused)

b. Put an adverb in the sentence. The first letters of the adverb are given:

Mike keeps fit by playing tennis reg.....

c. Put in 'so,' or 'such,' or 'such a':

I think she works very hard. She looks ..... tired all the time.

d. Use your idea to complete the sentence. Use 'rather' + 'adjective':

I enjoyed the film, but it was .....

e. Complete the sentence using comparative form:

The hotel was surprisingly cheap. I expected it to be .....

f. Complete the sentence using 'as ... as':

I still feel bad, but I felt a lot worse earlier.

I don't .....

g. Complete the sentence using superlative and 'of' or 'in':

It is a very valuable painting. It is ..... the gallery.

h. Put 'during' or 'while':

There were many interruptions ..... the President's speech.

i. Put 'at' or 'on' or 'in':

Electricity prices are going up ..... October.

j. Put 'by' or 'on' or 'in' or 'with':

These photographs were taken ..... a friend of mine.

20

SECTION—B

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

Importance of Tourism Industry

OR

Negative Impact of Human Activities on Environment.

20

4. Do as directed:

a. Fill in correct preposition in the following sentence:

Amy is always full ..... energy.

b. Fill in correct preposition in the following sentence:

Kate is very fond ..... her younger brother.

c. Fill in correct preposition in the following sentence:

Did you hear ..... the fire at the hotel yesterday?

d. Fill in correct preposition in the following sentence:

I had a strange dream yesterday. What did you dream .....?

e. Complete the second sentence so that it means the same as first:

My problem is not the same as yours.

My problem is .....

f. Complete the following sentence using a verb in the correct form:

Here's the money you need. ..... me back when you can.

g. Complete the sentence using --- 'in' or 'into' or 'out' or 'out of':

As soon as we arrived at the hotel, we checked .....

h. Complete the sentence using --- a verb + 'on' or 'off':

Are you cold? Shall I get you a sweater .....?

i. Complete the sentence using --- a verb (in correct form) + 'down':

I stopped writing and ..... my pen.

j. Complete the following sentence using a verb in the correct form:

Be careful! That's an electricity fence ..... from it. 20

SECTION—C

5. Write the central theme and detailed summary of the poem, "To A Skylark." 20

6. From your reading of the poem "Virtue," describe the common fate of everything beautiful on earth. Also, explain what does the comparison of a virtuous soul to seasoned timber suggest and how a virtuous soul will survive when everything else is reduced to ashes. 20

SECTION—D

7. (a) On the basis of your reading of "Global Health" explain what is the state of world's health today? Why is it important for governments to monitor the health of their populations? 10

(b) Complete the sentences from the list of words given below:

project, demonstrate, awareness, potential, pursue, capacity, outcome, facilities, remote, ensure

i. The poorest regions of the world have the fewest hospitals, clinics, and other health care .....

ii. The medical students were encouraged to ..... their research on obesity in China next semester.

iii. Scientists are testing a new drug which has the ..... to cure certain types of diabetes.

iv. It is difficult for parents to ..... that their children are eating healthy foods while their children are away from home.

v. Health experts are trying to increase public ..... of the dangers of texting while driving. 5

(c) Give one word for the following definitions:

i. A signal that makes something clear .....

ii. A change in focus and direction .....

iii. Existing commonly; over a wide area .....

iv. To destroy something completely .....

v. To deal with a question or a problem 5

8. (a) On the basis of your reading of "Multicultural Societies," discuss what does culture mean. How does culture affect our lives? What do you see in a country that is described as "culturally diverse?" 10

(b) Give one word for the following definitions:

i. To increase in size or amount .....

ii. To vary .....

iii. The building of something .....

iv. Connections .....

v. Money paid for work 5

(c) Complete the passage with words given below:

contemporary, mobility, deport, prospects, take advantage of, the case, unskilled, unrest

The ..... workforce is very different from the workforce of 100 years ago. Perhaps the most important difference is its ..... The workers frequently move to other countries for better employment ..... This is particularly ..... with technology experts, who are in great demand all over the world. However, the ..... workers also move across borders to find work, often in factories or agriculture. 5

Exam. Code : 121203
Subject Code : 800035

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

(CBGS) (Old Sylb)

MATHEMATICS

Paper–I (Analysis)

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

I. (a) By definition, show that $\lim_{n\to\infty} \frac{3n}{n+5\sqrt{n}} = 3$. 10

(b) Prove that the sequence $\left\{\left(1+\frac{3}{n}\right)^n\right\}$ is monotonically increasing. 10

II. (a) Show that the sequence $\{a_n\}$, where

$a_n = 1+\frac{1}{2}+\frac{1}{3}+---+\frac{1}{n}$ does not converge, by showing that it is not a Cauchy sequence. 10

(b) Prove that the sequence $\left\{\frac{n^3}{n^3+1}\right\}$ is a Cauchy sequence. 10

SECTION—B

III. (a) Discuss the convergence or divergence of the following series :

$$\frac{2}{1^p}+\frac{3}{2^p}+\frac{4}{3^p}+\frac{5}{4^p}+-----$$ 10

(b) Show that $\sum_{n=2}^{\infty}\frac{1}{n(\log n)^p}$ is convergent iff $p > 1$. 10

IV. (a) Examine the convergence or divergence of the series $\sum_{n=1}^{\infty}\frac{(n-\log n)^n}{2^n n^n}$ using Cauchy's root test. 10

(b) Show that the following series is conditionally convergent :

$$\sum_{n=1}^{\infty}(-1)^{n-1}\left(\frac{1}{3n-1}\right)$$ 10

SECTION—C

V. (a) Given $f(x) = 1/x^2$ is defined on $[1,4]$, $P_1 = \{1,2,3,4\}$ and $P_2 = \left\{1, \frac{7}{4}, \frac{5}{2}, \frac{13}{4}, 4\right\}$ are two partitions of $[1,4]$. Verify $L(P_2, f) \leq L(P_1, f)$. 10

(b) Evaluate integral by calculating upper and lower integrals in the indicated integral :

$$f(x) = \sin x, \left[0, \frac{\pi}{2}\right].$$ 10

VI. (a) Let f be a function defined on [0,1] by

$$f(x) = \begin{cases} 1 & , x \neq \frac{1}{2} \\ 0 & , x = \frac{1}{2} \end{cases}$$

Show that $f \in R[0,1]$ and $\int_0^1 f(x)\,dx = 1$. 10

(b) If [x] stands for integral part of x, then show that

$$\int_1^2 [x^2]\,dx = 5 - \sqrt{2} - \sqrt{3}.$$ 10

SECTION—D

VII. (a) Examine the convergence of the integral

$$\int_0^\infty \frac{dx}{(1+x)^{\frac{2}{3}}}.$$ 10

(b) Show that, $\int_0^\infty \left(\frac{1}{1-x} - e^{-x}\right)\frac{1}{x}\,dx$ is convergent. 10

VIII. (a) Prove that $B(m,n) = \int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}\,dx$; m, n > 0. 10

(b) Evaluate $\frac{6\tau\left(\frac{8}{3}\right)}{5\tau\left(\frac{2}{3}\right)}$. 10

Exam. Code : 121203
Subject Code : 502186

B.A./B.Sc. 3rd Sem. (Batch 2024-27/28) (CBGS)

HISTORY

History of India (AD 1707-1947)

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. Describe the causes and significance of the Battle of Plassey. 20

2. Point out the political, socio-religious, and economic causes of the Uprising of 1857. 20

SECTION—B

3. Give an account of the development of modern industry in India under the British. What were the causes of its slow and lopsided growth? 20

4. Discuss the works and achievements of Arya Samaj in religious, social, and educational spheres. 20

SECTION—C

5. Discuss the rise of Revolutionary Terrorism in Bengal, Maharashtra, and Punjab in India in the early 20th century. 20

6. Describe the Non-Cooperation Movement launched by Gandhi ji. Why did he suspend this movement? 20

SECTION—D

7. Critically examine the main features of the Government of India Act, 1919. 20

8. Discuss the Quit India movement. What was the nature and impact of this movement? 20

(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—ਓ

1. ਪਲਾਸੀ ਦੀ ਲੜਾਈ (Battle of Plassey) ਦੇ ਕਾਰਨਾਂ ਅਤੇ ਮਹੱਤਵ ਦਾ ਵਰਨਣ ਕਰੋ। 20

2. 1857 ਈ. ਦੇ ਵਿਦਰੋਹ ਦੇ ਰਾਜਨੀਤਕ, ਸਮਾਜਿਕ-ਧਾਰਮਿਕ ਅਤੇ ਆਰਥਿਕ ਕਾਰਣਾਂ ਦਾ ਉਲੇਖ ਕਰੋ। 20

ਭਾਗ—ਅ

3. ਅੰਗਰੇਜਾਂ ਦੇ ਅਧੀਨ ਭਾਰਤ ਵਿੱਚ ਆਧੁਨਿਕ ਉਦਯੋਗਾਂ ਦੇ ਵਿਕਾਸ ਦਾ ਵੇਰਵਾ ਦਿਓ। ਇਸਦੇ ਮੱਧਮ ਅਤੇ ਅਸੰਤੁਲਿਤ ਵਿਕਾਸ ਦੇ ਕੀ ਕਾਰਣ ਸਨ ? 20

4. ਧਾਰਮਿਕ, ਸਮਾਜਿਕ ਅਤੇ ਵਿਦਿਅਕ ਖੇਤਰਾਂ ਵਿੱਚ ਆਰੀਆ ਸਮਾਜ ਦੇ ਕਾਰਜਾਂ ਅਤੇ ਪ੍ਰਾਪਤੀਆਂ ਦੀ ਚਰਚਾ ਕਰੋ। 20

ਭਾਗ—ਏ

5. 20ਵੀਂ ਸਦੀ ਦੇ ਆਰੰਭ ਵਿੱਚ ਭਾਰਤ ਅਤੇ ਖਾਸ ਤੌਰ ਤੇ ਬੰਗਾਲ, ਮਹਾਂਰਾਸ਼ਟਰ ਅਤੇ ਪੰਜਾਬ ਵਿੱਚ ਕ੍ਰਾਂਤੀਕਾਰੀ ਆਤੰਕਵਾਦ ਦੇ ਉਭਾਰ ਦੀ ਚਰਚਾ ਕਰੋ। 20

6. ਮਹਾਤਮਾ ਗਾਂਧੀ ਦੁਆਰਾ ਚਲਾਏ ਗਏ ਨਾ-ਮਿਲਵਰਤਨ ਅੰਦੋਲਨ ਦਾ ਵਰਨਣ ਕਰੋ। ਉਨ੍ਹਾਂ ਨੇ ਇਸ ਅੰਦੋਲਨ ਨੂੰ ਕਿਉਂ ਸਥਗਿਤ ਕੀਤਾ ? 20

ਭਾਗ—ਸ

7. 1919 ਈ. ਦੇ ਗੋਰਮਿੰਟ ਆਫ਼ ਇੰਡੀਆ ਐਕਟ ਦੀਆਂ ਮਹੱਤਵਪੂਰਨ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਦਾ ਆਲੋਚਨਾਤਮਕ ਪਰੀਖਣ ਕਰੋ। 20

8. ਭਾਰਤ ਛੱਡੋ ਅੰਦੋਲਨ ਦੀ ਚਰਚਾ ਕਰੋ। ਇਸ ਅੰਦੋਲਨ ਦਾ ਸਰੂਪ ਅਤੇ ਪ੍ਰਭਾਵ ਕੀ ਸੀ ? 20

(Hindi Version)

नोट :— 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. प्लासी की लड़ाई (Battle of Plassey) के कारणों और महत्व का वर्णन करें। 20

2. 1857 ई. के विद्रोह के राजनीतिक, सामाजिक–धार्मिक और आर्थिक कारणों का वर्णन करें। 20

भाग–ख

3. ब्रिटिश के अधीन भारत में आधुनिक उद्योगों (Modern Industry) के विकास का विवरण दें। इसके मध्यम और असंतुलित विकास के क्या कारण थे? 20

4. धार्मिक, सामाजिक और शैक्षिक क्षेत्रों में आर्य समाज के कार्यों और उपलब्धियों की चर्चा कीजिए। 20

भाग–ग

5. 20वीं शताब्दी के आरम्भ में भारत और विशेषकर बंगाल, महाराष्ट्र, और पंजाब में क्रांतिकारी आतंकवाद के उत्थान की चर्चा करें। 20

6. महात्मा गांधी जी के द्वारा चलाये गये असहयोग आन्दोलन का वर्णन करें। इस आन्दोलन को उन्होंने स्थगित क्यों किया? 20

भाग–घ

7. 1919 ई. के भारत सरकार अधिनियम की मुख्य विशेषताओं का आलोचनात्मक परीक्षण करें। 20

8. भारत छोड़ो आन्दोलन (Quit India Movement) की चर्चा करें। इस आन्दोलन के स्वरूप और प्रभाव क्या थे? 20

Exam. Code : 121203
Subject Code : 502192

B.A./B.Sc. 3rd Semester (Batch 2024-27/28) (CBGS)

MATHEMATICS

(Differential Equations)

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) Solve $x^2y\ dx - (x^3 - y^3)\ dy = 0$. 10

   (b) Solve : $\cos^2 x\ dy/dx + y = \tan x$. 10

2. Find the necessary and sufficient condition that the equation $Mdx + Ndy = 0$ (where M and N are functions of x and y with the condition that $\partial M/\partial y = \partial N/\partial x$ are continuous functions of x and y) may be exact. 20

SECTION—B

3. (a) Find the orthogonal trajectories of the family of conical circles $x^2 + y^2 + 2gx + c = 0$, g is parameter. 10

(b) If $d^4y/dx^4 - 4y = 0$, show that

$y = C_1\cos(ax) + C_2\sin(ax) + C_3\cosh(ax) + C_4\sinh(ax)$. 10

4. (a) Solve :

$d^2y/dx^2 - 4dy/dx + 4y = 8(x^2 + e\text{^}(2x) + \sin 2x)$. 10

(b) Show that the system of confocal conics $(x^2)/(a^2+\lambda) + (y^2)/(b^2 + \lambda) = 1$ is self-orthogonal. 10

SECTION—C

5. (a) Obtain the primitive and singular solution (if it exists) of the equation $xp^2 - 2yp + 4x = 0$. 10

(b) Solve and test for singular solution :

$p^3 - 4xpy + 8y^2 = 0$. 10

6. (a) Solve : $x^2d^2y/dx^2 + 4x\ dy/dx + 2y = x + \sin x$. 10

(b) Solve :

$(1 + x)^2\ d^2y/dx^2 + (1 + x)\ dy/dx + y = 4 \cos(\log(\sqrt{(1 + x)}))$. 10

SECTION—D

7. (a) Solve : $x^2(dy/dx)^2 - 2xy(dy/dx) + 2y^2 - x^2 = 0$. 10

(b) Solve: $4p^2x - (qx - k)^2 = 0$; k is parameter. 10

8. (a) Solve :

$dx/[x(y^2 - z^2)] = dy/y(z^2 - x^2)] = dz/[z(x^2 - y^2)]$. 10

(b) Solve : $y'' + x^2y = 1 + x + x^2$ in powers of x. 10

Exam. Code : 121203
Subject Code : 502200

B.A./B.Sc. 3rd Semester (Batch 2024-27/28) (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. (a) Find all the first order and second order partial derivatives of the function :

$U = f(x, y, z) = x^4 - 5xy^3 + 6x^2 + 2xz^2 - xyz$

(b) What are increasing, decreasing, and stationary functions? Explain. 15+5=20

2. (a) Show that $y = x + \frac{1}{x}$ has one maximum and one minimum value and the minimum value is more than the maximum value.

(b) Find all first order and second order partial derivatives of the following function :

$Z = 4x^3 + 7x^2y + xy^2 + y^3$ 10+10=20

SECTION—B

3. Evaluate :

(a) $\int x^{-n} . \log x \, dx$

(b) $\int \left(4x^3 - 9x^2 + 7x - 4\right) dx$ 10+10=20

4. For a monopolist, the demand law is $p = (6 - x)^2$ and the marginal cost is $MC = 14 + x$. Find the consumer's surplus. 20

SECTION—C

5. Explain the following with the help of examples :

(a) Square matrix and Diagonal matrix

(b) Adjoint of a matrix

(c) Rank of a matrix

(d) Symmetric matrix. 5×4=20

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

$x + 2y + 3z = 1$

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

$3x + 4y + 3z = 3$ 20

SECTION—D

7. The input-output coefficient matrix and final demand vector are given below :

$$\begin{bmatrix} 0.3 & 0.2 & 0.2 \\ 0.2 & 0.1 & 0.5 \\ 0.2 & 0.4 & 0.2 \end{bmatrix} \quad D = \begin{bmatrix} 80 \\ 30 \\ 50 \end{bmatrix}$$

Calculate the output level for the three sectors. 20

8. Solve the following LPP by graphic method :

Maximize $Z = 48x_1 + 40x_2$

subject to

$2x_1 + x_2 \leq 90$

$x_1 + 2x_2 \leq 80$

$x_1 + x_2 \leq 50$

$x_1, x_2 \geq 0$ 20