

Exam. Code : 103205
Subject Code: 1097

B.A./B.Sc. 5th Semester (Batch 2021-24)
ECONOMICS (Economics of Development)

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. Explain the Lewis theory of unlimited supply of labour.
2. What are the various measures of economic development ? Explain in detail.

SECTION—B

3. Critically explain the Harrod-Domar model.
4. Explain the concept of classical growth.

SECTION—C

5. Explain the Balanced theory of growth.

6. In what conditions export promotion measures should be used in a nation ? Explain various measures.

SECTION—D

7. Discuss in detail about the role of planning in underdeveloped countries.
8. What are the various techniques used for growth in development economy.

(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. ਕੰਮ ਦੀ ਅਸੀਮਿਤ ਸਪਲਾਈ ਦੇ ਲੇਵਿਸ ਸਿਧਾਂਤ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।
2. ਆਰਥਿਕ ਵਿਕਾਸ ਦੇ ਵੱਖ-ਵੱਖ ਉਪਾਅ ਕੀ ਹਨ ? ਵਿਸਥਾਰ ਵਿੱਚ ਸਮਝਾਓ।

ਭਾਗ—ਅ

3. ਹੈਰੋਡ-ਡੋਮਰ ਮਾਡਲ ਦੀ ਆਲੋਚਨਾਤਮਕ ਵਿਆਖਿਆ ਕਰੋ।
4. ਕਲਾਸੀਕਲ ਵਿਕਾਸ ਦੀ ਧਾਰਨਾ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।

ਭਾਗ—ੲ

5. ਵਿਕਾਸ ਦੇ ਸੰਤੁਲਿਤ ਸਿਧਾਂਤ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।
6. ਕਿਸੇ ਰਾਸ਼ਟਰ ਵਿੱਚ ਨਿਰਯਾਤ ਪ੍ਰੋਤਸਾਹਨ ਉਪਾਲ ਕਿਸੇ ਨਾਕਸ਼ੀ ਵਿੱਚ ਵਰਤੇ ਜਾਣੇ ਚਾਹੀਦੇ ਹਨ ? ਵੱਖ-ਵੱਖ ਉਪਾਲ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।

ਭਾਗ—ਸ

7. ਪਿਛਤੇ ਦੇਸ਼ਾਂ ਵਿੱਚ ਯੋਜਨਾਬੰਦੀ ਦੀ ਭੂਮਿਕਾ ਬਾਰੇ ਵਿਸਥਾਰ ਵਿੱਚ ਚਰਚਾ ਕਰੋ।
8. ਵਿਕਾਸ ਅਰਥਚਾਰੇ ਵਿੱਚ ਵਾਧੇ ਲਈ ਵਰਤੀਆਂ ਜਾਂਦੀਆਂ ਵੱਖ-ਵੱਖ ਤਕਨੀਕਾਂ ਕੀ ਹਨ ?

(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. श्रम की असीमित आपूर्ति के लुईस सिद्धांत की व्याख्या करें।
2. आर्थिक विकास के विभिन्न मापक क्या हैं ? विस्तार में व्याख्या करें।

भाग—ख

3. हैराड-डोमर मॉडल की आलोचनात्मक व्याख्या करें।
4. शास्त्रीय विकास की अवधारणा को समझाइये।

भाग—ग

5. वृद्धि के संतुलित सिद्धांत की व्याख्या करें।
6. किसी राष्ट्र में निर्यात अभिवृद्धि मापकों का प्रयोग किन परिस्थितियों में किया जाना चाहिए ? विभिन्न मापकों को बताइये।

भाग—घ

7. अविकसित देशों में नियोजन की भूमिका के बारे में विस्तार से चर्चा करें।
8. विकास अर्थव्यवस्था में वृद्धि के लिए उपयोग की जाने वाली विभिन्न तकनीकें क्या हैं ?

Exam. Code : 103205

Subject Code : 1111

B.A./B.Sc. 5th Semester (Batch 2021-24)

MATHEMATICS

Paper—II (Number Theory)

Time Allowed—3 Hours] [Maximum Marks—50

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) If $4x - y$ is a multiple of 3, show that

$$4x^2 + 7xy - 2y^2$$

is divisible by 9. 5

(b) Show that $3m^2 - 1$ is not a perfect square for any integer m . 5

II. (a) Evaluate $\gcd(198, 288, 512)$ and express it as linear combination of integer x, y, z . 5

(b) Find all solutions of $15x + 7y = 111$, in positive integers. 5

SECTION—B

III. (a) For any real number x , prove that

$$[x] + \left[x + \frac{1}{2} \right] = [2x],$$

$[x]$ is a greatest integer function. 5

(b) Find the highest power of 3 contained in $\underline{500}$. 5

IV. (a) If F and f are two number theoretic functions related by the formula $F(n) = \sum_{d|n} f(d)$, then prove

$$\text{that } f(n) = \sum_{d|n} \mu(d) F\left(\frac{n}{d}\right), \mu \text{ is Mobius function.}$$

5

(b) If $n = 2(2p - 1)$ where $p, 2p - 1$ both are prime > 2 , show that $\phi(n + 2) = \phi(n)$, ϕ is Euler phi function. 5

SECTION—C

V. (a) If $ac \equiv bc \pmod{m}$, then prove that $a \equiv b \pmod{\frac{m}{d}}$

where $d = \gcd(c, m)$. 5

(b) Find the remainder when 3^{40} is divided by 23. 5

VI. (a) Solve $140x \equiv 133 \pmod{301}$. 5

(b) Find the least positive integer x such that
 $x \equiv 3 \pmod{13}$, $x \equiv 7 \pmod{11}$, $x \equiv 5 \pmod{7}$.

5

SECTION—D

VII. (a) If $a^p \equiv b^p \pmod{p}$ for any prime p , then prove by Fermat's theorem :

(i) $a \equiv b \pmod{p}$

(ii) $a^p \equiv b^p \pmod{p^2}$. 5

(b) For an integer 'a' show that $a^{37} \equiv a \pmod{1729}$,
if $\gcd(a, 1729) = 1$. 5

VIII. (a) By Wilson's theorem, show that :

$18 \equiv -1 \pmod{437}$ 5

(b) Using numerical, encipher the word 'STUDY' and
decipher the word 'ERRN'. 5

Exam. Code : 103205

Subject Code : 1110

B.A./B.Sc. 5th Semester (Batch 2021-24)

MATHEMATICS

Paper—I (Dynamics)

Time Allowed—3 Hours] [Maximum Marks—50

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) A point moving with uniform acceleration in a straight line describes equal distances in time t_1, t_2, t_3 ; show that

$$\frac{1}{t_1} - \frac{1}{t_2} + \frac{1}{t_3} = \frac{1}{t_1 + t_2 + t_3}$$

- (b) A stone is dropped from an elevator moving up at the rate of 6 m/sec and reaches the bottom of the shaft in 3 seconds. How high was the elevator when stone was released ? 5,5

- II. (a) A 150 kg man uses a rope to descend from a window, the rope has a breaking strength of 120 kg. What is the maximum time he can use the rope, if the distance to be covered is 20 m ?
- (b) Two smooth inclined planes of inclination 30° and 60° respectively are placed back to back and string passes over a smooth pulley at the top, joins masses m_1 and m_2 lying on the planes. Find the acceleration of either mass, the tension in the string and the reactions of the planes. 5,5

SECTION—B

- III. (a) A constant force $P = 50$ kg acts on the 150 kg block A, but the angle varies according to the law $\theta = \frac{\pi t}{60}$, where θ is in radians and t is in seconds. Motion of A starts when $t = 0$ and $\theta = 0$. Find the velocity and displacement of A after 15 seconds.
- (b) A particle of mass m is acted upon by a force $m\mu \left(x + \frac{a^4}{x^3} \right)$ towards the origin. If it starts from rest at a distance a from the origin, show that it will reach the origin after time $\frac{\pi}{4\sqrt{\mu}}$. 5,5

- IV. (a) A light elastic string with modulus of elasticity λ is stretched to double its length and is tied to two fixed points distant $2a$ apart. A particle of mass m , tied to its middle point, is displaced along the line of string through a distance equal to half of its distance from the fixed point and released. Prove that the time of complete oscillation is

$$\pi\sqrt{\frac{am}{\lambda}} \text{ and maximum velocity acquired is } \sqrt{\frac{a\lambda}{m}}.$$

- (b) Show that a particle executing S.H.M. requires one sixth of its period to move from the position of maximum displacement to one in which the displacement is half the amplitude. 5,5

SECTION—C

- V. (a) A particle of mass m is projected from a fixed point with velocity u in a direction making an angle $\alpha \left(\neq \frac{\pi}{2} \right)$ with the horizontal. Neglecting the air resistance, find its motion and show that its path is a parabola.
- (b) Two seconds after its projection, a projectile is travelling in a direction inclined at 30° to the horizon. After one more second, it is traveling horizontally. Determine the magnitude and direction of its initial velocity. 6,4

VI. (a) Find relation between angular velocity and velocity of a particle moving along any plane curve.

(b) In an oscillatory pendulum, the tension in the string when the bob is in its lowest position is n times the weight of the bob. Prove that the angle of the swing on each side of the vertical is

$$\cos^{-1}\left(\frac{3-n}{2}\right). \quad 5,5$$

SECTION—D

VII. (a) Prove that the work done in stretching an elastic string is equal to the product of the extension and mean of the initial and final tensions.

(b) A car weighting 300 kg is accelerating at 6 m/sec^2 up an incline of 1 in 100, the resistance being 10 gm-weight per kg-wt. Find the power exerted by the engine when the speed is 65 m/sec. 5,5

VIII. Define conservative forces. If a particle is moving under a system of conservative forces, then prove that the sum of its kinetic and potential energies at any instant remains constant throughout the motion. 10

Exam. Code : 103205

Subject Code: 1119

B.A./B.Sc. 5th Semester (Batch 2021-24)

QUANTITATIVE TECHNIQUES

(Quantitative Techniques-V)

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. Distinguish between an estimate and an estimator. Also discuss in detail, the properties of a good estimator. 20
2. Explain the following terms :
 - (i) Power of Test
 - (ii) Critical Region
 - (iii) Type I and Type II Errors
 - (iv) Null and Alternative Hypothesis. 20

SECTION—B

3. Define student's t-statistic and derive its chief properties. 20

4. Write down the probability distribution function of χ^2 (Chi-square) distribution. Also derive its mean, variance and mode. 20

SECTION—C

5. A die is thrown 180 times with the following results :

No. Turned up	1	2	3	4	5	6	Total
Frequency	25	35	40	22	32	26	180

20

6. Two independent samples of 8 and 7 items gave the following values :

Sample A: 9 11 13 11 15 9 12 14

Sample B: 10 12 10 14 9 8 10

Examine whether the difference between the means of two samples is significance at 5% level of significance. 20

SECTION—D

7. What is analysis of variance technique ? Discuss its main assumptions. Also distinguish between one way and two way ANOVA techniques. 20
8. The following table gives the yields of four varieties of wheat grown in 3 plots :

Plots	Varieties			
	A	B	C	D
1	200	230	250	300
2	190	270	300	270
3	240	150	145	180

Is there any significant difference in the production of these varieties ? 20

Exam. Code : 103205

Subject Code : 1089

B.A./B.Sc. 5th Semester (Batch 2021-24)

COMPUTER SCIENCE

(Database Management System & Oracle)

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. Describe the term DBMS and its advantages. Draw and explain the detailed system architecture of DBMS.
2. Discuss the main characteristics of the database approach and specify how it differs from traditional file system. Explain the importance of avoiding NULL values in a database.

SECTION—B

3. Explain in detail the Relational, Hierarchical and network models for an example data base design.
4. What is the need of normalization ? Explain BCNF, 1NF, 2NF and 4NF normal forms.

SECTION—C

5. Describe the concept of Referential Integrity. List and explain the common data types available in SQL.
6. By considering an example describe various data control and update operations in SQL.

SECTION—D

7. Why the concurrency control is required in data bases ? Explain various concurrency control mechanisms.
8. Write short notes on the following :—
 - (a) Big Data Analytics
 - (b) NoSQL
 - (c) Database Security.

Exam. Code : 103205

Subject Code: 1084

B.A./B.Sc. 5th Semester (Batch 2021-24)

PUNJABI (Compulsory)

Time Allowed—3 Hours]

[Maximum Marks—50

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. 'ਏਕਲਵਯ' ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ ਦੱਸੋ। 10
2. 'ਅਰਜਨ ਛੇੜ ਗਡੀਰਨਾ' ਕਹਾਣੀ ਦਾ ਸਾਰ ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿੱਚ ਲਿਖੋ। 10

ਭਾਗ—ਅ

3. 'ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ' ਨਾਵਲ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਸੰਖੇਪ ਵਿੱਚ ਲਿਖੋ। 10
4. ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾਵਾਂ ਉੱਪਰ ਨੋਟ ਲਿਖੋ। 10

ਭਾਗ—ੲ

5. 'ਸੋਸ਼ਲ ਮੀਡੀਆ ਵਰ ਕਿ ਸਰਾਪ' ਵਿਸ਼ੇ ਉੱਪਰ ਪੈਰਾ ਰਚਨਾ ਕਰੋ। 10

6. ਹੇਠ ਲਿਖੇ ਪੈਰੂ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਕਰੋ :

In Sikh history the name of Rani Sda Kaur shines as a star. She was a woman whose wisdom was equal to her courage. She was fearless in war and cool in the time of danger. She was also respected by everybody for her noble character. Though she became a widow at an early age she never even thought of marrying again. Everyone praised her for her faithfulness to the memory of her husband.

10

ਭਾਗ—ਸ

7. ਸਵਰ ਧੁਨੀਆਂ ਦਾ ਵਰਗੀਕਰਨ ਕਰੋ। 10

8. ਮੇਲ ਤੋਂ ਕੀ ਭਾਵ ਹੈ ? ਪੰਜਾਬੀ ਵਾਕ ਵਿੱਚ ਵਿਆਕਰਣਕ ਇਕਾਈਆਂ ਦੇ ਮੇਲ ਉੱਪਰ ਚਰਚਾ ਕਰੋ। 10

Exam. Code : 103205

Subject Code: 1083

B.A./B.Sc. 5th Semester (Batch 2021-24)

ENGLISH (Compulsory)

Paper : ENC-301

Time Allowed—3 Hours]

[Maximum Marks—50

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 the theme of *All My Sons*. 10
2. Discuss the title of *All My Sons*. 10

SECTION—B

3. Critically analyze Matthew Arnold's poem *Dover Beach*. 10
4. Critically analyze William Wordsworth's poem *The World is Too Much with Us*. 10

SECTION—C

5. Critically analyze W.H. Auden's poem *The Unknown Citizen*. 10
6. Discuss Ted Hughes' *The Thought Fox*. 10

SECTION—D

7. Write a letter to the editor of The Tribune highlighting the problem of noise pollution in your locality. 10
8. Write a resume for the post of CA in Multi National Company. 10