ਭਾਗ—ੲ

5. (ੳ) ਪੰਜਾਬ ਦੇ ਕਿਸੇ ਇੱਕ ਇਤਿਹਾਸਕ ਨਾਇਕ ਜਾਂ ਵਿੱਦਿਆ ਵਿਚਾਰੀ ਤਾਂ ਪਰਉਪਕਾਰੀ ਵਿਸ਼ੇ 'ਤੇ ਲੇਖ ਰਚਨਾ ਕਰੋ।

   (ਅ) ਕਾਰ ਵੇਚਣ ਸੰਬੰਧੀ ਜਾਂ ਕਾਲਜ ਦੀ ਕੰਟੀਨ ਠੇਕੇ 'ਤੇ ਚੜਾਉਣ ਸੰਬੰਧੀ ਅਖ਼ਬਾਰਾਂ ਨੂੰ ਇਸ਼ਤਿਹਾਰ ਲਿਖੋ।

6. (ੳ) ਸਿੱਖਿਆ ਖੇਤਰ ਵਿੱਚ ਇੰਟਰਨੈੱਟ ਦੀ ਮਹੱਤਤਾ ਜਾਂ ਧਰਤੀ ਹੇਠਲੇ ਪਾਣੀ ਦਾ ਸੰਕਟ ਵਿਸ਼ੇ 'ਤੇ ਲੇਖ ਰਚਨਾ ਕਰੋ।

   (ਅ) ਘਰ ਦੀ ਨਿਲਾਮੀ ਜਾਂ ਗੁੰਮਸ਼ੁਦਾ ਦੀ ਭਾਲ ਸੰਬੰਧੀ ਅਖ਼ਬਾਰ ਨੂੰ ਇਸ਼ਤਿਹਾਰ ਲਿਖੋ।

ਭਾਗ—ਸ

7. ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਬਾਰੇ ਤੁਸੀਂ ਕੀ ਜਾਣਦੇ ਹੋ ? ਬਿਆਨ ਕਰੋ।

8. ਸ਼ਬਦ ਜੋੜ ਕਿਸ ਨੂੰ ਕਹਿੰਦੇ ਹਨ ? ਪੰਜਾਬੀ ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮਾਂ ਬਾਰੇ ਵਿਸਥਾਰਪੂਰਵਕ ਚਾਨਣਾ ਪਾਓ।

B.A./B.Sc. 4th Semester (Batch 2021-24)

ECONOMICS

(International Economics and Public Finance)

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 in detail the comparative cost theory of International trade. What are its limitations ?

2. Explain in detail the various concepts of terms of trade. Also, state their limitations.

SECTION—B

3. State the various components of balance of payments by using an illustration.

4. Explain in detail the devaluation approach for the correction of deficit in the balance of payments.

SECTION—C

5. Explain the nature, scope and relevance of study of public finance for a student of economics.

6. Define public expenditure. Also explain its effect on the system of production in an economy.

SECTION—D

7. State the types and concepts of taxes. Also, explain the canons of taxation in detail.

8. What do you understand by tax shifting ? Explain in detail any theory of tax shifting.

(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. ਅੰਤਰਰਾਸ਼ਟਰੀ ਵਪਾਰ ਦੇ ਤੁਲਨਾਤਮਕ ਲਾਗਤ ਸਿਧਾਂਤ ਦੀ ਵਿਸਥਾਰ ਵਿੱਚ ਵਿਆਖਿਆ ਕਰੋ। ਇਸ ਦੀਆਂ ਸੀਮਾਵਾਂ ਕੀ ਹਨ ?

2. ਵਪਾਰ ਦੀਆਂ ਸ਼ਰਤਾਂ ਦੀਆਂ ਵਿਭਿੰਨ ਧਾਰਨਾਵਾਂ ਦੀ ਵਿਸਥਾਰ ਵਿੱਚ ਵਿਆਖਿਆ ਕਰੋ। ਨਾਲ ਹੀ, ਉਨ੍ਹਾਂ ਦੀਆਂ ਸੀਮਾਵਾਂ ਦੱਸੋ।

ਭਾਗ—ਅ

3. ਇੱਕ ਦ੍ਰਿਸ਼ਟਾਂਤ ਦੀ ਵਰਤੋਂ ਕਰਕੇ ਭੁਗਤਾਨ ਸੰਤੁਲਨ ਦੇ ਵੱਖ-ਵੱਖ ਘਟਕਾਂ ਨੂੰ ਦੱਸੋ।

4. ਭੁਗਤਾਨ ਸੰਤੁਲਨ ਵਿੱਚ ਘਾਟੇ ਨੂੰ ਠੀਕ ਕਰਨ ਲਈ ਡਿਵੈਲਯੂਏਸ਼ਨ ਪਹੁੰਚ ਬਾਰੇ ਵਿਸਥਾਰ ਵਿੱਚ ਦੱਸੋ।

ਭਾਗ–ੲ

5. ਅਰਥਸ਼ਾਸਤਰ ਦੇ ਵਿਦਿਆਰਥੀ ਲਈ ਜਨਤਕ ਵਿੱਤ ਦੇ ਅਧਿਐਨ ਦੀ ਪ੍ਰਕਿਰਤੀ, ਦਾਇਰੇ ਅਤੇ ਸਾਰਥਕਤਾ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।

6. ਜਨਤਕ ਖਰਚੇ ਨੂੰ ਪਰਿਭਾਸ਼ਿਤ ਕਰੋ। ਅਰਥਵਿਵਸਥਾ ਵਿੱਚ ਉਤਪਾਦਨ ਪ੍ਰਣਾਲੀ ਉੱਤੇ ਇਸਦੇ ਪ੍ਰਭਾਵ ਦੀ ਵਿਆਖਿਆ ਵੀ ਕਰੋ।

ਭਾਗ–ਸ

7. ਕਰਾਂ ਦੀਆਂ ਕਿਸਮਾਂ ਅਤੇ ਧਾਰਨਾਵਾਂ ਦੱਸੋ। ਨਾਲ ਹੀ, ਕਰਾਧਾਨ ਦੇ ਸਿਧਾਂਤਾਂ ਨੂੰ ਵਿਸਥਾਰ ਵਿੱਚ ਸਮਝਾਓ।

8. ਕਰ ਬਦਲਣ ਨੂੰ ਤੁਸੀਂ ਕੀ ਸਮਝਦੇ ਹੋ ? ਕਰ ਬਦਲਣ ਦੇ ਕਿਸੇ ਵੀ ਸਿਧਾਂਤ ਨੂੰ ਵਿਸਥਾਰ ਵਿੱਚ ਦੱਸੋ।

(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. अंतर्राष्ट्रीय व्यापार के तुलनात्मक लागत सिद्धांत को विस्तार से समझाइए। इसकी सीमाएं क्या हैं ?

2. व्यापार की शर्तों की विभिन्न अवधारणाओं को विस्तार से समझाइए। साथ ही उनकी सीमाएं भी बताएं।

भाग—ख

3. भुगतान संतुलन के विभिन्न घटकों को एक उदाहरण द्वारा बताइए।

4. भुगतान संतुलन में घाटे के सुधार के लिए अवमूल्यन दृष्टिकोण को विस्तार से समझाइए।

5. अर्थशास्त्र के एक छात्र के लिए सार्वजनिक वित्त के अध्ययन की प्रकृति, कार्यक्षेत्र और प्रासंगिकता की व्याख्या करें।

6. सार्वजनिक व्यय को परिभाषित कीजिए। किसी अर्थव्यवस्था में उत्पादन प्रणाली पर इसके प्रभाव की व्याख्या भी कीजिए।

7. करों के प्रकार और अवधारणाएँ बताइए। कराधान के सिद्धांतों को भी विस्तार से समझाइए।

8. कर स्थानान्तरण से आप क्या समझते हैं ? कर स्थानान्तरण के किसी भी सिद्धांत की विस्तार में व्याख्या कीजिए।

B.A./B.Sc. 4th Semester (Batch 2021-24)

ENGLISH (Compulsory)

Paper - ENC-251

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

Do as directed.

1. Put the verb into the correct form, present simple or past simple, active or passive.

    (i)   The company is not independent. It _____ (own) by a much larger company.

    (ii) It's a big factory. Five hundred people _____ (employ) there.

Complete the sentences using being + the given verb in the correct form.

(iii) I am an adult. I don't like _____ a child. (treat)

(iv) We went to the party without _____. (invite)

Read the situations and complete the sentences using where.

(v) You work in a factory. The factory is going to close down next month. You tell a friend.

The_____ is going to close down next month.

(vi) You play football in a park on Sundays. You show a friend the park. You say :

This is the _____ on Sundays.

Put in that or what where necessary.

(vii) Why do you blame me for everything _____ goes wrong ?

(viii) I won't be able to do much, but I will do _____ I can.

Make one sentence from two. Use who/that/which.

(ix) A building was destroyed in the fire. It has now been rebuilt.

(x) Some people were arrested. They have now been released. 1×10

2. Put in must or can't :

(i) That restaurant _____ be very good. It is always empty.

(ii) That restaurant _____ be very good. It is always full of people.

Read the situation and make sentences from the words in brackets. Use might.

(iii) I can't find my umbrella. Have you seen it ?

(it/be/in the car) _____

(iv) Why didn't John answer the door bell ? I am sure he was at home at that time. (he/go/to the bed early)

Use the words in brackets to complete these sentences. Use if _____ should _____ .

(v) We have no jobs at present. (the situation/change)

If _____ , we will contact you.

(vi) I think everything will be ok. (there/be/any problems)

If _____ , I am sure we will be able to solve them.

Which is correct ?

(vii) I don't mind if you come home late unless/as long as you come in quietly.

(viii) I am going now unless/provided you want me to stay.

Use your own ideas to complete these sentences.

(ix) It started to rain during _____.

(x) What are you going to do while _____.   1×10

SECTION—B

3. Why do the swans fill the poet's heart with sadness in the poem 'The Wild Swans At Lake Coole' ?   10

4. What is the central Idea of 'Ah, Are You Digging On My Grave' ?   10

SECTION—C

5. Write the words which are similar in meaning to the following.

   (i)   clear and firm

   (ii) a formal international agreement

   (iii) the natural features of land

(iv) happening repeatedly but not necessarily frequently

(v) incomplete agreement

(vi) the protection of natural resources

(vii) the state of no longer existing

(viii) chemicals used to kill insects

(ix) to reach a decision after careful thought

(x) to return to an earlier and better condition. 1×10

6. Complete the sentences with words given below. These words replace the words in parentheses, which are similar in meaning.

abandon, adversely, contention, induce, substantial, accumulation, attributable, curb, pose, undeniable.

(i) The question of which nations should cut their greenhouse gas emissions remains a matter of (disagreement) _____ .

(ii) Most scientists believe that it is still possible to (limit) _____ the effects of deforestation if we improve our management of the world's forests.

(iii) There is (unquestionable) _____ evidence that polar ice caps are beginning to shrink.

(iv) Some politicians argue that developing countries should share responsibility for the (build up) _____ of greenhouse gases.

(v) Rising sea levels (present) _____ a threat to inhabitants of coastal areas.

(vi) During the hurricane, many people had to (leave) _____ their homes.

(vii) The company put their refrigerators on sale in order to (persuade) _____ customers to buy them.

(viii) The heat wave (badly) _____ affected all the farms in the area.

(ix) It costs a/an (considerable) _____ amount of money to buy a car that has a gas electric engine.

(x) Many people believe that the recent warm winters in North America are (caused by) _____ to global warming.   1×10

SECTION—D

7. When does Language Learning Begin ?   10

8. What are the advantages of Multilingualism ?   10

B.A./B.Sc. 4th Semester (Batch 2021-24)

MATHEMATICS

(Solid Geometry)

Paper—II

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) Find the equation of the right circular cylinder of radius 2 whose axis is the line $\dfrac{x-1}{2} = y-2 = \dfrac{z-3}{2}$. 5

(b) A cylinder cuts the plane $z = 0$ in the curve $x^2 + \dfrac{y^2}{4} = \dfrac{1}{4}$, and has its axis parallel to $3x = -6z$. Find its equation. 5

II. (a) Obtain the equation of right circular cylinder described on the circle through the points $(1, 0, 0)$, $(0, 1, 0)$, $(0, 0, 1)$ as the guiding circle. 5

(b) Find the equation of elliptic cylinder whose generator is parallel to the z-axis and which intersects the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$, $z = 0$. 5

SECTION—B

III. (a) The plane $\dfrac{x}{a} + \dfrac{y}{b} + \dfrac{z}{c} = 1$ meets the co-ordinate axes in A, B, C. Prove that the equation to the cone generated by the line drawn from O to meet the circle ABC is

$$yz\left(\dfrac{b}{c} + \dfrac{c}{b}\right) + zx\left(\dfrac{c}{a} + \dfrac{a}{c}\right) + xy\left(\dfrac{a}{b} + \dfrac{b}{a}\right) = 0.$$ 5

(b) Find the value of λ if the plane λx + y + z = 0 cuts the cone xy + yz + zx = 0 in perpendicular lines. 5

IV. (a) Show that $x^2 - y^2 + z^2 - 2x + 4y + 6z + 6 = 0$ represents a right circular cone whose vertex is the point (1, 2, –3) whose axis is parallel to OY and whose semi-vertical angle is 45°. 5

(b) Find the equation of the plane which touches the cone $x^2 + 2y^2 - 3z^2 - 2yz + 5zx + 3xy = 0$ along the generators whose direction numbers are <1, 1, –1> 5

SECTION—C

V. Prove that :

$5x^2 - 16y^2 + 5z^2 + 8yz - 14zx + 8xy + 4x + 20y + 4z - 24 = 0$ represents hyperbolic paraboloid.

10

VI. (a) Write down the equation of the surface of revolution obtained by rotating the curve $y^2 + 9z^2 = 36$, $x = 0$ about the z-axis.

5

(b) Find the locus of the chords of the conicoid $ax^2 + by^2 + cz^2 = 1$ which are bisected at the points (x_1, y_1, z_1).

5

SECTION—D

VII. (a) Find the locus of points from which three mutually perpendicular tangent lines can be drawn to the conicoid $ax^2 + by^2 + cz^2 = 1$.

5

(b) The normal at any point P of the ellipsoid $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$ meets the principal planes in G_1, G_2, G_3. Show that $PG_1 : PG_2 : PG_3 = a^2 : b^2 : c^2$.

5

VIII. Prove that the normals from (α, β, γ) to paraboloid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2z \text{ lie on the cone}$$

$$\frac{\alpha}{x - \alpha} - \frac{\beta}{y - \beta} + \frac{a^2 - b^2}{z - \gamma} = 0.$$

10

Exam. Code : 103204
Subject Code : 1105

B.A./B.Sc. 4ᵗʰ Semester (Batch 2021-24)
MATHEMATICS
(Statics & Vector Calculus)
Paper—I

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. (a) P is the point in the plane of $\triangle ABC$ and I is incentre. Show that the resultant of the force represented by $\overrightarrow{PA} \sin A$, $\overrightarrow{PB} \sin B$, $\overrightarrow{PC} \sin C$, is

   $$\overrightarrow{PI} \, 4 \cos\frac{A}{2} \cos\frac{B}{2} \cos\frac{C}{2}.$$

   (b) State and prove converse of Lami's theorem.

2. (a) The resultant of two parallel forces P and Q passes through the point C. When P is increased by R and Q by S, the resultant still passes through C and also when Q, R replace P, Q respectively.

   Show that $S = R - \dfrac{(Q-R)^2}{P-Q}$.

(b) Three parallel forces of magnitudes L, M, N act at vertices P, Q, R respectively of $\triangle$PQR. Prove that their centre is centroid of $\triangle$ if L = M = N.

SECTION—B

3. (a) A uniform ladder of length ℓ rest on rough horizontal ground with its upper end projecting slightly over a smooth horizontal rail at height α. If the ladder is about to slip and λ is angle of friction with the ground, show that $\lambda = \tan^{-1} \dfrac{\alpha\sqrt{\ell^2 - \alpha^2}}{\ell^2 + \alpha^2}$.

    (b) Find the centre of gravity of a lamina in form of a sector of circle subtending angle 2λ at the centre.

4. (a) One side of rectangle is twice of other and on longer side an equilateral triangle is described. Find the centre of gravity of the lamina formed by rectangle and the triangle.

    (b) A uniform solid consists of a cone of semi vertical angle $\dfrac{\pi}{4}$ cemented on hemisphere on the same base. Show that centre of gravity of the body divides the central axis in the ratio 7 : 5.

SECTION—C

5. (a) Define solenoidal and irrotational vectors. Show that vector field given by

$$\vec{F} = (z^2 + 2x + 3y)\hat{i} + (3x + 2y + z)\hat{j} + (y + 2zx)\hat{k}$$

is irrotational but not solenoidal.

(b) If $\vec{F} = (3x^2 + 6y)\hat{i} - 14yz\hat{j} + 20xz^2\hat{k}$ then evaluate $\int_C \vec{F}.d\vec{r}$ from $(0, 0, 0)$ to $(1, 1, 1)$ along the path $x = t$, $y = t^2$, $z = t^3$.

6. (a) If $\vec{F} = (2x^2 - 3z)\hat{i} - 2xy\hat{j} - 4x\hat{k}$, evaluate $\iiint_V \nabla \times \vec{F}.dV$ where V is the region bounded by the coordinate planes and plane $2x + 2y + z = 4$.

(b) If $\vec{a} = \sin\theta\,\hat{i} + \cos\theta\,\hat{j} + \theta\hat{k}$, $\vec{b} = \cos\theta\,\hat{i} - \sin\theta\,\hat{j} - 3\hat{k}$ and $\vec{c} = 2\hat{i} + 3\hat{j} - 3\hat{k}$. Find :

$$\frac{d}{d\theta}\{\vec{a} \times (\vec{b} \times \vec{c})\} \text{ at } \theta = \frac{\pi}{2}.$$

SECTION—D

7. (a) State and prove Gauss divergence theorem.

(b) Verify Green's theorem in the plane for

$$\oint_C [(x^2 - xy^3)dx + (y^2 - 2xy)dy]$$

where C is the square bonded by $x = 0$, $y = 0$, $x = 2$, $y = 2$.

8. (a) If $\vec{F} = (y, z, x)$ and S is the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$ and C is boundary, show that $\oint_C \vec{F}.d\vec{r} = \iint_S \text{curl}\,\vec{F}, \vec{n}dS$.

   (b) Show that $\oint_C \vec{r}.d\vec{r} = 0$.

B.A./B.Sc. 4ᵗʰ Semester (Batch 2021-24)

QUANTITATIVE TECHNIQUES

(Quantitative Techniques-IV)

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) Discuss the procedure to fit modified exponential curve.

   (b) What to you mean by partial correlation coefficient ? Determine partial correlation coefficient $r_{12.3}$ and multiple correlation coefficient $R_{1.23}$ from the following data :

   $r_{12} = 0.5; r_{13} = 0.7; r_{23} = 0.6.$ 10+10=20

2. For the following data, fit multiple linear regression equation of X_1 on X_2 and X_3 :

X_1	3	5	6	8	12	14
X_2	16	10	7	4	3	2
X_3	90	72	54	42	30	12

20

SECTION—B

3. (a) State and prove Bayes' theorem of probability.