



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Experimental Psychology

Course Code: APSY-471

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- i. Define reinforcement. What are the schedules of reinforcement?
- ii. Define motivation and explain its underline theoretical perspectives.
- iii. Define perception. Explain perceptual constancies in detail.
- iv. Discuss reasoning and decision-making process and their role in everyday life.
- v. Define memory. What are the various methods used for the measurement of human memory?
- vi. Define threshold. Discuss absolute and differential threshold in detail.

Q.2. Answer the following questions.

(3x10=30)

- i. Define learning. What are the basic factors involved in learning and performance?
- ii. What is the difference between classical and operant conditioning?
- iii. Discuss problem solving cycle in detail.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (10x3=30)

- 1) Discuss the importance of counselling psychology in schools and work places?
- 2) Describe the role of behaviorism in shaping the scientific methods used in psychology?
- 3) Discuss how health psychology addresses the relationship between behavior and physical health?
- 4) Explain the difference between cross-sectional and longitudinal studies?
- 5) What is the principal of beneficence in clinical research ethics?
- 6) What are key characteristics of an effective clinical psychologist?
- 7) Discuss the key skills and techniques required for conducting an effective clinical interview?
- 8) Discuss the role of standardized scales and inventories in clinical assessment providing examples such as MMPI or Beck Depression Inventory?
- 9) Explain the techniques of token economy and its effectiveness in reinforcing desired behaviors?
- 10) What is discrimination and generalization, providing example of stimulus discrimination in everyday life?

Q.2. Answer the following questions. (3x10=30)

- 1) What is Behavior Chaining, how does it support learning example behaviors. Also differentiate between forward chaining and backward chaining with example?
- 2) Explain the following in detail
 - Activity scheduling and graded task analysis
 - Relaxation Exercises
 - Modeling
- 3) Define behavior Therapy with its primary focus, also highlight contributions from key figures like Pavlov, B.F Skinner and Albert Bandura?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6×5=30)

السؤال الأول: أجب عن الأسئلة الآتية بإيجاز (درج ذیل سوالات کے عربی میں مختصر جوابات دیجیے)

1. ما المراد بالشعراء المخضرمين؟
2. لخص خطبة سيدنا عثمان بن عفان رضي الله عنه.
3. اكتب خمسة أسطر في ترجمة شاعر الرسول ﷺ.
4. عرف بالكتاب "كليلة ودمنة" في خمسة أسطر.
5. في أي عصر عاش البحري؟
6. هل تعد الخنساء من الشعراء الأمويين؟

السؤال الثاني: ترجم الأبيات التالية إلى الأردية وشرحها مع ذكر قائلها (درج ذیل ابیات میں سے کسی ایک کا اردو میں ترجمہ و تشریح کریں۔ نیز شاعر کا نام بھی لکھیں)

لِدُوا لِلْمَوْتِ وَابْنُوا لِلْخَرَابِ
فَكُلُّكُمْ يَصِيرُ إِلَى ذَهَابِ
لَنْ تَبْنِي وَتَحْنُ إِلَى تُرَابِ
نَصِيرُ كَمَا خَلَقْنَا مِنْ تُرَابِ

(أو يا)

طَوِيلَ الْجِدَادِ رَفِيعَ الْعِمَادِ
سَادَ عَشِيرَتَهُ أَمْرَدَا
إِذَا الْقَوْمُ مَدَّوْا بِأَيْدِيهِمْ
إِلَى الْمَجْدِ مَدُّ إِلَيْهِ يَدَا

السؤال الثالث: اكتب مقالا حول أحد من العناوين التالية: (درج ذیل میں سے کسی ایک عنوان پر عربی میں نوٹ لکھیں)

- (1) عبد الله بن الحنفية
- (2) إحياء علوم الدين
- (3) عمر بن الخطاب رضي الله عنه

السؤال الرابع: ترجم إحدى الخطبتين إلى الأردية وشرحها مع ذكر قائلها (درج ذیل میں سے کسی ایک خطبے کا اردو میں ترجمہ و تشریح کریں)

اور خطیب کا نام بھی لکھیں

أيها الناس، من أراد أن يسأل عن القرآن فليأت أبي بن كعب، ومن أراد أن يسأل عن الفرائض فليأت زيد بن ثابت، ومن أراد أن يسأل عن الفقه فليأت معاذ بن جبل، ومن أراد أن يسأل عن المال فليأتني؛ فإن الله جعلني له خازنا وقاسما.

(أو يا)

أيها الناس: اسمعوا وعوا: من عاش مات، ومن مات فات، وكل ما هو آت آت، ليل داج، وغار ساج، وسماء ذات أبراج، ونجوم تهر، وبحار ترخر، وجبال مرساء، وأرض مدحاة، وأنهار مجرة.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: Small Business Management

Course Code: BBA-401

Roll No.

Time: 3 Hrs.

Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

1. Elaborate different factors affecting industry or business?
2. Why trend is toward Self-Employment in the world?
3. Distinguish between Franchise Fee and Royalty Fee.
4. Discuss Estate Planning Techniques.
5. Describe Niche Marketing.
6. Why is Planning so important to small businesses?

Answer the following questions. (3x10=30)

Q.2 What is Small Business? Explain current Challenges to small businesses in Pakistan.

Q.3 Explain the eight steps in the Creative Selling Process.

Q.4 What are the two most important forms of Franchising? Describe each.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: Pakistan Economy

Course Code: BBA-402

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

i) Differentiate between Balance of Payment and Balance of trade.

بیلنس آف پیمنٹ اور بیلنس آف ٹریڈ کے درمیان فرق کریں۔

ii) Explain the classification of the social sector of Pakistan?

پاکستان کے سماجی شعبے کی درجہ بندی کی وضاحت کریں؟

iii) Explain the major responsibility of central bank.

مرکزی بینک کی اہم ذمہ داری کی وضاحت کریں۔

iv) Describe four factor affecting development of Pakistan .

پاکستان کی ترقی کو متاثر کرنے والے چار عوامل بیان کریں۔

v) Do you think that mechanization is necessary for the development of agriculture sector in Pakistan?

کیا آپ سمجھتے ہیں کہ پاکستان میں زرعی شعبے کی ترقی کے لیے میکانائزیشن ضروری ہے؟

vi) What is the green revolution, and how has it impacted the growth of the agriculture sector of Pakistan?

سبز انقلاب کیا ہے، اور اس نے پاکستان کے زرعی شعبے کی ترقی پر کیا اثر ڈالا ہے؟

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے مفصل جوابات تحریر کریں۔

1. Explain the modes of transportation of Pakistan and role in domestic and foreign trade.

پاکستان کے نقل و حمل کے طریقوں اور ملکی اور غیر ملکی تجارت میں کردار کی وضاحت کریں۔

2. Explain the importance and decade-wise role of small –scale and cottage industries of Pakistan in employment creation.

روزگار کے مواقع پیدا کرنے میں پاکستان کی چھوٹی اور کٹنج صنعتوں کی اہمیت اور دہائی وار کردار کی وضاحت کریں۔

3. What are the causes of persistent deficit in Pakistan's Balance of payment? Suggest remedial measures which can help to overcome the problems.

پاکستان کے بیلنس آف پیمنٹ میں مسلسل خسارے کی وجوہات کیا ہیں؟ ایسے تدارکاتی اقدامات تجویز کریں جن سے مسائل پر قابو پانے میں مدد مل سکے۔

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED****Q.1. Solve the following:****(5x6=30)**

- (i) Differentiate $x = y \sin y$ w.r.t x to find $\frac{dy}{dx}$.
- (ii) Find the area between the curve $y = x(x-1)(x+1)$ and x-axis.
- (iii) Let $f(x, y) = 4 + \sqrt{xy}$. Find the first order partial derivative $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$.
- (iv) Evaluate the integrals $\int x \sin^2 x dx$.
- (v) Use numerical integration with $n = 4$ to approximate $\int_0^3 \sqrt{3-x} dx$.

Q.2. Solve the following:**(5x6=30)**

- (a) If $y = \tan(p \tan^{-1} x)$, then show that $(1+x^2)y' - p(1+y^2) = 0$.
- (b) If $x = a \cos \theta$, $y = a \sin \theta$ then find first and second order derivatives $\frac{y}{dx}$ and $\frac{d^2y}{dx^2}$.
- (c) Evaluate the definite integrals $\int_1^2 \frac{x}{x^2+1} dx$.
- (d) A random variable X has probability density function $f(x) = kx(1-x)$, if $x \in [0, 1]$, $f(x) = 0$ if $x \notin [0, 1]$. Find k and $P(\frac{1}{3} \leq x \leq \frac{2}{3})$.
- (e) Estimate the linear regression line $y = ax + b$ by using the method of least squares for the data given below. Estimate the value of y when $x = 30$.

x	3	5	6	9	10	12	15	20	22	28
y	10	12	15	18	20	22	27	30	32	34



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (10x3=30)

- i. What is the margin of safety?
- ii. Describe the situation when it may be appropriate to use linear programming.
- iii. Describe the three steps in solving a linear programming problem.
- iv. How do managers cost products or services using ABC?
- v. When should managers use ABC system?
- vi. What roles do management accountant perform?
- vii. Enumerate some responsibilities of management accountant.
- viii. Define incremental cost and sunk cost.
- ix. "All future costs are relevant in decision making." Do you agree? Why?
- x. What is the contribution margin?

Answer the following questions. (3x10=30)

Q.2 Asad Company is a retailer for video disks. The projected net income for the current year is Rs. 400,000 based on the sales volume of 400,000 videodisks. Company has been selling the disks for Rs. 32 each. The variable costs consist of the Rs. 20 per unit purchase price of the disks and handling cost of Rs. 4 per disk. Company's annual fixed costs are Rs. 1,200,000.

Required:

- a. Compute the company's break-even point for the current year in number of videodisks.
- b. What will be the company's net income for the current year if there is a 12% increase in projected units sales volume.
- c. What volume of sales in rupee must company achieve in the coming years to maintain the same net income as projected for the current year if the unit-selling price remains at Rs. 32?
- d. In order to cover a 20% increase in the disks purchase price for the coming year and still maintain the current contribution margin ratio. What selling price per disk must company establish for the coming year?

Q.3 Mahnoor company is currently manufacturing part named KLOC, producing 8,000 units annually. The part used in the production of several products made by the company. The cost per unit for KLOC is as follows:

Direct materials	Rs. 60.00
Direct labour	Rs. 30.00
Variable overhead	Rs. 20.00
Fixed overhead	<u>Rs. 25.00</u>
Total	<u>Rs. 135.00</u>

Of the total fixed overhead assigned to KLOC, Rs. 48,000 is direct fixed overhead and the remainder is common fixed overhead. An outside supplier has offered to sell the part to company for Rs. 120. There is no alternative use of the facilities currently used to produce the part.

Required: Should company make or buy KLOC?

Q.4 FM Company manufactures soft drinks cans. A unit of production is a packet of 12 dozen cans. The production engineering staff and the controller have set the following standards.

Direct Labour	15 minutes @ Rs. 20 per hour
Direct Material	5 kg @ Rs. 40 per kg

Actual material purchases amounted to 220,000 kgs at Rs. 41 per kg. Actual costs incurred in the production of 40,000 units were as follows:

Direct Labour	Rs. 205,000 for 10,200 hours
Direct Material	Rs. 7,995,000 for 195,000 kgs

Required: Use the variance formulas to compute the direct material price and quantity variance and direct labour rate and efficiency variances. Indicate whether each variance is favourable or unfavourable.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

- I. What is a cash flow forecast? How does it help in maintaining liquidity of a company.
- II. Differentiate between fundamental and technical analysis?
- III. Which people are highly interested in profitability ratio of a company.
- IV. What is a horizontal financial statement analysis.
- V. Which cash outflows are included in financing activities.
- VI. Which activities are included in a cash flow statement?
- VII. What are the five types of financial statements?
- VIII. The sale of a fixed asset falls in which type of cash flow activity?
- IX. Which ratio is an indicator of long-term solvency of a company?
- X. What is the different between Earning per share (EPS) and Dividend per share (DPS)?
- XI. State three objectives of ratio analysis.
- XII. Write down any three problems encountered while analyzing financial statement of an organization.
- XIII. What is the non-operating Income?
- XIV. How many methods are used to present assets and liabilities in the financial statements of a company? Name them.
- XV. What is the concept of diversity with respect to investing activities of a company.

Answer the following questions.

(3x10=30)

Q.No.2: From the following particulars extracted from the books of Sunshine Ltd. compute the following ratios and comment:

- a) Current Ratio b) Acid Test Ratio c) Stock Turnover ratio d) Debtors turnover ratio
- e) Creditors turnover Ratio f) Average Debt Collection Period

	1-1-2002	31-12-2002
		Rs. Rs.
Bills Receivable		30,000 60,000
Bills Payable		60,000 30,000
Sundry Debtors		120,000 150,000
Sundry Creditors		75,000 105,000
Stock in trade		96,000 144,000

Additional information:

On 31-12-2002, there were assets: Building Rs. 200,000, Cash Rs. 120,000, Cash at bank Rs. 96,000/-

Cash purchases Rs. 138,000 and Purchases Returns were Rs. 18000/-

Cash sales Rs. 150,000 and sales returns were Rs. 6000/-

Rate of gross profit is 25% on sales and actual gross profit was Rs. 150,000/-

Q.No.3: From the following information, prepare the Balance Sheet of Abdullah Ltd. Showing the details of working:

Paid up capital	Rs. 50,000
Plant and Machinery	Rs. 1,25,000
Total Sales (p.a.)	Rs. 5,00,000
Gross Profit	25%
Annual Credit Sales	80% of net sales
Current Ratio	2
Inventory Turnover	4
Fixed Assets Turnover	2
Sales Returns	20% of sales
Average collection period	73 days
Bank Credit to trade credit	2
Cash to Inventory	1 : 15
Total debt to current Liabilities	3

Q.No.4: Discuss in details the limitations of Ratio Analysis



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Strategic Human Resource Management

Course Code: BBA-408

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

1. Recruitment vs. Selection
2. Organizational Development
3. Payroll Management
4. Social Media Recruiting
5. HR Ethics & Legal Compliance
6. Workforce Planning
7. Performance Appraisal
8. Job Placement
9. Employee Motivation
10. Change Management
11. Performance Appraisal
12. Training & Development
13. Job Description vs. Job Specification
14. Recruitment vs. Selection
15. Performance Management

Answer the following questions.

(3x10=30)

Q. 2. How can SHRM practices be adapted for a changing technological landscape?

Q.3. Describe the role of HR in driving organizational strategy. Discuss specific examples of how HR can contribute to a company's competitive advantage.

Q.4. Discuss the key components of a successful talent management strategy. How can organizations attract, develop, and retain top talent in a competitive market?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short note on the following:

(6x5=30)

- I. Define organizational culture and explain its importance in fostering innovation.
- II. Briefly discuss the role of OD practitioners in diagnosing organizational challenges.
- III. What are the main characteristics of a successful organizational transformation?
- IV. Briefly explain the three phases of organizational change as proposed by Kurt Lewin.
- V. Explain the importance of employee involvement in creating a climate for change.
- VI. What is the difference between organizational development and management development?

Answer the following questions:

(3x10=30)

Q2. Discuss the general model of planned change and how it can be applied to improve workplace productivity.

Q3. Explain the role of performance management in driving organizational effectiveness and achieving strategic goals.

Q4. Discuss the concept of action research in the context of organizational development.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Describe and draw the following labeled diagrams: (15x2=30)

1. Differentiate between receptical and conceptacles
2. Auxospore and Cell division
3. Vegetative and Sexual reproduction
4. Aplanospore and Zoospore formation
5. Branchlets and Stipulodes
6. Asexual reproduction
7. Tuber formation
8. Protonema
9. Globule in *Chara*
10. Cyanophyta and bacillariophyta
11. Chlorophyta and Rhodophyta
12. Auxospore
13. Oospore formation
14. Archigonium in *Riccia*
15. Sporophyte stage

Q.2. Answer the following questions. (3x10=30)

- i. Write down the gametophytic stage of *Anthoceros*
- ii. Briefly describe the economic importance of Hepaticopsida
- iii. Write down the general characters of Phaeophyta.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Plant Physiology and Development

Course Code: BOT-403A

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Explain the following:

(6x5=30)

- I. Differentiate between PSI and PSII.
- II. Draw and explain the CAM pathway.
- III. Explain oxidative pentose phosphate pathway.
- IV. Briefly explain the assimilation of inorganic nutrient (Nitrogen) in plants.
- V. Draw the Krebs cycle.
- VI. Calculate the energy output of Glycolysis in plants.

Answer the following questions.

(3x10=30)

- Q. 2. Explain in detail the electron and proton transport through thylakoid protein-pigment complexes.
- Q. 3. Explain in detail the Mechanism of Glycolysis in plants.
- Q.4. Explain in detail the mechanism of phloem transport with reference to phloem loading and unloading.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- I. Explain Mechanics of Writing. Name its factors. What is the goal of mechanics of writing?
- II. What are benefits of a Written Research Plan? What general issues are to be considered when developing a research plan?
- III. Define Hypothesis. How is it formulated?
- IV. What is the importance of Review of the Literature for Quantitative Research Plans?
- V. Discuss the core characteristics of research. Why are these characteristics essential for ensuring the credibility and utility of research?
- VI. What criticism is placed on qualitative methods in education research?

Q.2. Answer the following questions. (3x10=30)

- I. What are Research Objectives? Give Key characteristics of research objectives.
- II. Compare and contrast research papers and theses in terms of structure, objectives, and scope. How does the writing process differ for these two types of academic documents?
- III. Identify and discuss the major ethical challenges researchers face. How can these challenges be mitigated?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(10x3=30)

- i. AMMONIFICATION
- ii. SALINE SODIC SOIL
- iii. HARMFUL SYMBIONTS
- iv. HOMEOSTASIS
- v. PARENT MATERIAL
- vi. ECOLOGICAL INDICATORS
- vii. ALLUVIAL SOILS
- viii. DENITRIFICATION
- ix. BENEFICIAL SYMBIONTS
- x. COLLUVIAL SOILS

Q.2. Answer the following questions.

(3x10=30)

1. Describe the methods of reclamation for SALINE and WATER LOGGED soils.
2. Write about the impact of PLANT-MICROBE and MICROBE-MICROBE INTERACTIONS on soil fertility.
3. What is the role of MICROORGANISMS in mineral transformation?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – Spring 2025

Roll No.

Paper: Feature, Column & Editorial Writing (Theory & Practice)

Course Code: BSCS-307

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions.

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

i. Does Column reflect columnist opinion? Discuss.

(الف) کیا کالم کسی بھی کالم نویس کی ذاتی سوچ کا عکاس ہوتا ہے؟

ii. Define difference between Editorial & Editorial Notes.

(ب) ادارہ اور شذرات میں فرق بیان کریں۔

iii. What are the major types of Features?

(ج) فیچر کی اہم اقسام بیان کریں۔

iv. What kind of suggestion do you give to new comers in feature writings for newspaper?

(د) آپ کسی بھی اخبار کے لیے فیچر نگاری کرنیوالے نئے فیچر نگار کو کیا تجاویز دیں گے؟

v. Explain in detail how a columnist plays his/her role to shape the opinion of society?

(ه) معاشرے کی سوچ تبدیل کرنے میں کالم نویس کس طرح اپنا کردار ادا کرتا ہے؟ بیان کریں۔

vi. How to write a profile feature article?

(و) پروفائل فیچر آرٹیکل کیسے لکھا جاتا ہے؟

Q.2 Answer the following questions.

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے جوابات تحریر کریں۔

i. What characteristics a columnist needs to write humor Columnists?

(الف) مزاحیہ کالم لکھنے کے لیے کالم نویس کو کونسی خصوصیات درکار ہیں؟

ii. Unlike the reporter, the editorialist is not restricted to events. Explain it.

(ب) رپورٹر کے برعکس ادارہ نویس واقعات کا پابند نہیں ہوتا دلائل دیں۔

iii. Write a short note on various types of columns.

(ج) کالم کی مختلف اقسام پر نوٹ لکھیں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: TV News Reporting and Production

Course Code: BSCS-407

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions:

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

1. What is the use of Graphics and Animation in TV News Production?

1۔ ٹی وی نیوز پروڈکشن میں گرافکس اور انیمیشن کے استعمال پر روشنی ڈالیں۔

2. What is Agenda Setting in News?

2۔ نیوز میں ایجنڈا سیٹنگ سے کیا مراد ہے؟

3. What is Synchronization and why it is important?

3۔ سینکرونائزیشن یعنی مطابقت پذیری سے کیا مراد ہے اور یہ کیوں اہم ہے؟

4. What is Docu-Drama?

4۔ ڈاکو ڈرامہ سے کیا مراد ہے؟

5. What is a Curtain Raiser?

5۔ کورٹین ریزر سے کیا مراد ہے؟

6. What is the difference between Intro & Extro in a story?

6۔ نیوز سٹوری میں انٹرو اور ایکسٹرو سے کیا مراد ہے؟

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے جوابات تحریر کریں۔

1. What are the qualities of a good reporter? How a Reporter starts working on newly assigned Beat?

1۔ ایک اچھے رپورٹر میں کیا خوبیاں ہونی چاہئے؟ ایک رپورٹر نئی دی گئی بیٹ پر کام کا آغاز کیسے کرتا ہے؟

2. How do you see the Breaking News Culture in TV Channels? Do you think our Electronic Media is following the Media Ethics?

2۔ ہمارے ٹی وی چینلوں میں بریکنگ نیوز کے کچھ کو آپ کس تناظر سے دیکھتے ہیں؟ کیا آپ سمجھتے ہیں کہ ہمارا الیکٹرانک میڈیا ضابطہ اخلاق پر عمل پیرا ہے؟

3. What is the significance of visuals in TV Journalism? Describe various types of shots used in News Package.

3۔ ٹی وی جرنلزم میں بصری مواد Visuals کی کیا اہمیت ہے؟ ایک نیوز پیکیج میں استعمال ہونے والے مختلف شاٹس پر روشنی ڈالیں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Advertising-I

Course Code: BSCS-408

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions:

(6x5=30)

سوال نمبر: 1۔ درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

1. Make a sketch of a typical advertising agency.

ایک عام اشتہاری ایجنسی کا خاکہ بنائیں

2. Differentiate between print, outdoor, and digital advertising.

پرنٹ، آؤٹ ڈور، اور ڈیجیٹل اشتہارات کے درمیان فرق کریں۔

3. What is media buying in advertising?

اشتہار سازی میں میڈیا کی خریداری کی وضاحت کریں۔

4. Digital advertising has reduced the print media advertising scope? Please comment.

ڈیجیٹل ایڈورٹائزنگ نے پرنٹ میڈیا ایڈورٹائزنگ کی گنجائش کو کم کر دیا ہے؟ تبصرہ کریں

5. How advertising can influence the policy of media organizations?

اشتہار سازی میڈیا کی پالیسی کو کیسے متاثر کر سکتی ہے؟

6. Briefly explain the structure of an advertising copy.

اشتہاری کاپی کی ساخت کی مختصر وضاحت کریں۔

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر: 2۔ درج ذیل سوالات کے تفصیلی جوابات تحریر کریں۔

1. Is advertising beneficial primarily for manufacturers, consumers, or both? Support your opinion with relevant examples and arguments.

کیا اشتہارات بنیادی طور پر مینوفیکچررز، صارفین، یا دونوں کے لیے فائدہ مند ہیں؟ متعلقہ مثالوں اور دلائل سے اپنی رائے کی تائید کریں۔

2. Describe different skills required for becoming an effective advertising copywriter.

ایک موثر اشتہاری کاپی رائٹر بننے کے لیے درکار مختلف مہارتوں کی وضاحت کریں

3. Discuss in detail the significance of the AIDA Model in advertising.

اشتہار سازی میں AIDA ماڈل کی اہمیت پر تفصیلاً گفتگو کریں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: Public Relations-I

Course Code: BSCS-409

Time: 3 Hrs.

Marks: 60

Roll No.

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions:

(6x5=30)

سوال نمبر: 1۔ مندرجہ ذیل سوالات کے مختصر جوابات لکھیں۔

1. Describe opinion leaders in the context of Public Relations.

عوامی تعلقات کے تناظر میں رائے عامہ کے رہنماؤں کی وضاحت کریں۔

2. What is meant by Corporate Communications?

کارپوریٹ کمیونیکیشن سے کیا مراد ہے؟

3. Describe CSR (Corporate Social Responsibility).

(CSR) کارپوریٹ سماجی ذمہ داری کی وضاحت کریں۔

4. How is Public Relations different from Advertising?

تعلقات عامہ ایڈورٹائزنگ سے کیسے مختلف ہے؟

5. Differentiate between a Press Release and a Handout.

پریس ریلیز اور ہینڈ آؤٹ کے درمیان فرق کریں۔

6. Write about important duties of a Public Relations officer.

تعلقات عامہ کے افسر کے اہم فرائض کے بارے میں لکھیں۔

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر: 2۔ مندرجہ ذیل سوالات کے تفصیلی جوابات لکھیں۔

1) What are the most effective Crisis Management Strategies? Explain.

کرائسز مینجمنٹ کی سب سے مؤثر حکمت عملی کیا ہیں؟ وضاحت کریں۔

2) Public Relations prove to be helpful in overall management of corporate personality of an organization – Substantiate.

ثابت کریں تعلقات عامہ کسی ادارے کی کارپوریٹ پرسنلٹی کے مجموعی انتظام میں مددگار ثابت ہوتے ہیں۔

3) What are target audiences in PR and what are the ways to reach them?

تعلقات عامہ میں ٹارگٹ اوڈینس کیا ہیں اور ان تک پہنچنے کے طریقے کیا ہیں؟



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

- i. لسانیات سے کیا مراد ہے کسی ایک تعریف کے حوالے سے وضاحت کیجیے
- ii. مصوتوں (vowels) اور مصمتوں (consonants) کی وضاحت کیجئے۔
- iii. پابند اور آزاد مارفیم کی وضاحت کیجئے۔
- iv. ترکیب (Phrase) اور جملے (Sentence) میں کیا فرق ہے؟
- v. تعلقیات (Affixes) کی کتنی اقسام ہوتی ہیں؟ مثالوں سے واضح کیجئے۔
- vi. مجاز مرسل کیا ہے، مثالوں سے واضح کیجئے۔

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے تفصیلی جوابات تحریر کریں۔

- i. صوتیات سے کیا مراد ہے تفصیلی نوٹ لکھیے۔
- ii. ڈاکٹر شوکت سبزواری کے نظریات کا جائزہ لیجئے۔
- iii. مستشرقین نے اردو قواعد و لغات مرتب کرنے میں اہم کردار ادا کیا تاہم یہ تردید کیجئے۔



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(15x2=30)

- I. Define acid number and how it determines the quality of an oil.
- II. Summarize some important functions of cholesterol in the body.
- III. Why do fats have thermal insulation properties?
- IV. How rancidity occurs in fats?
- V. Why glycine is not optically active?
- VI. Elaborate peptide bond formation by giving the equation.
- VII. Name any four techniques that may be employed to separate proteins.
- VIII. What is an isoelectric point?
- IX. Write a short note on the isoenzyme.
- X. Discuss the effect of pH change on enzyme activity.
- XI. Define the Michaelis-Menton constant (k_m).
- XII. Differentiate competitive and non-competitive inhibition in enzymes.
- XIII. Justify that the respiratory quotient of carbohydrates is 1.
- XIV. Define fiber (in nutrition) and give its dietary sources.
- XV. Briefly discuss RDA(recommended dietary allowance).

Answer the following questions.

- Q.2. (a) Give in detail the biological importance of lipids. (5)**
(b) Discuss any five factors affecting BMR (basal metabolic rate). (5)
- Q.3. (a) How amino acids are classified on the basis of their polarity? (5)**
(b) Discuss the α -helix structure of proteins in detail. (5)
- Q.4. (a) Give a description of six major classes of enzymes in sequence. (6)**
(b) Explain the salient features of an active site of enzymes. (4)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

1. What is meant by the term Bio-amplification?
2. How methane is transferred in air?
3. Why is it important to measure the BOD of water?
4. Explain physical and chemical effects of aerosols?
5. What are the effects of chloroflourocarbons on the ozone layer?
6. What is acid rain and how is it formed?
7. Define indoor air pollution and briefly explain any two indoor air pollutants.
8. Define the term POLAR VERTEX.
9. How do fertilizers affect the quality of waterways?
10. Differentiate between point and non -point sources with respect to water pollution.
11. What are the harmful effects of lead in waterways?
12. Briefly explain environmental degradation and its effects on human health and productivity.
13. How can industrial pollutants be minimized?
14. What is Green Chemistry and give its significance?
15. Briefly explain tropopause and lapse rate.

Answer the following questions.

- Q. 2** (a) List the anthropogenic and natural sources of NO_x pollution also discuss its effects. (5)
(b) Give the mechanism of Green House effect. (5)
- Q. 3** (a) Give environmental consequences related to fossil fuel burning? (5)
(b) Discuss the effects of acid rain on agriculture and human health? (5)
- Q 4** (a) What are detergents and give its classification? (5)
(b) What is ozone depletion and what are the biological consequences? (5)



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Inorganic Chemistry (Sp. Theory-II)

Course Code: CHEM-407

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

1. Define and explain the concept of close-packed anions in metal oxides with an example.
2. Discuss the structure of magnetite (Fe_3O_4) and its magnetic properties.
3. Describe the reactions that occur in molten salts using NaCl and KCl as examples.
4. Explain the role of bromine trifluoride (BrF_3) as a solvent in inorganic reactions.
5. Explain the application of artificial radioactivity in the production of medical isotopes like Technetium-99m.
6. Write a short note on the law of successive disintegration in radioactive decay.

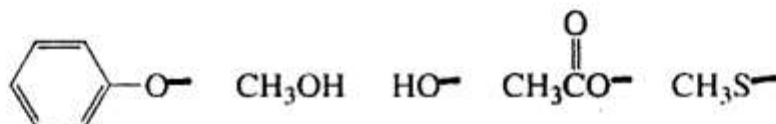
Q.2. Answer the following questions.

(3x10=30)

1. Describe the structure and properties of perovskites. Discuss their applications in electronics and superconductivity.
2. Compare the solvent properties and types of reactions that occur in liquid ammonia and water.
3. Explain the concept of the half-life and average life period of a radioactive substance. Discuss the mathematical relationship between them.

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED****Q.1. Answer the following short questions: (5x6=30)**

- I. If 2-fluoropentane were to undergo an E1 reaction, would you expect the major product to be the one predicted by Zaitsev's rule? Explain.
- II. List the following species in order of decreasing nucleophilicity in an aqueous solution. Justify your answer.



- III. How would you expect the ratio of substitution product to elimination product formed from the reaction of propyl bromide with CH_3O^- in methanol to change when the nucleophile is changed to CH_3O^- ?
- IV. What is kinetic deuterium isotopic effect? Give example.
- V. How can you convert OH group into better leaving group? Explain two methods with mechanism.

Answer the following questions.

Q. NO. 2. Which isomer reacts more rapidly in an E2 reaction, *cis*-1-bromo-4-*tert*-butylcyclohexane or *trans*-1-bromo-4-*tert*-butylcyclohexane? Explain your choice. [4]

Q. No. 3. Briefly explain the following reactions with examples. [4]

I. E1cB

II. Pyrolytic elimination

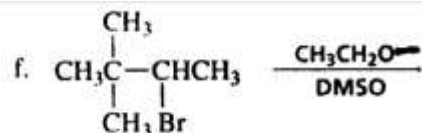
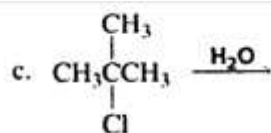
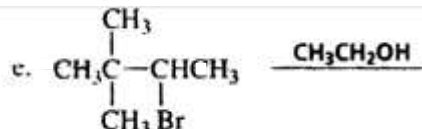
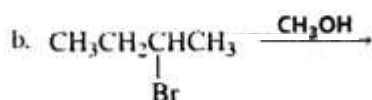
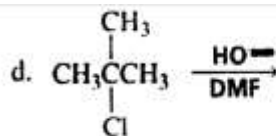
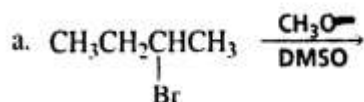
Q. NO. 4. What products (including stereoisomers if applicable) would be formed from the reaction of following compounds with OH^- under $\text{S}_\text{N}2/\text{E}2$ conditions and under $\text{S}_\text{N}1/\text{E}1$ conditions?

- I. 3-bromo-3-methylpentane II. 3-bromo-2-methylpentane [6]

Q. NO. 5. For each of the following reactions, [12]

I. Indicate whether elimination will occur via an E2 or an E1 reaction.

II. Give the major elimination product of each reaction, ignoring stereoisomers.



Q. NO. 6. Explain with the suitable example that aromatic rings at β position can participate as neighboring group in aliphatic nucleophilic substitution reactions. [4]

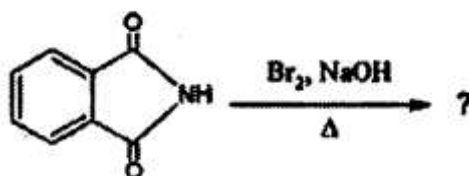


THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- Outline two methods for synthesis of thiophene with mechanism.
- Electrophilic attack in the thiophene takes place preferably at 2-position. Justify the statement.
- Among *p*-chlorophenyl and *para*-methoxyphenyl which group has greater migratory aptitude in pinacol rearrangement? Justify your answer.
- Complete following reaction with mechanism.



- p*-Xylene undergoes nitration much faster than benzene. Use resonance forms of the sigma complex to explain this accelerated rate.
- When bromine is added to two beakers, one containing phenyl isopropyl ether and the other containing cyclohexene, the bromine color in both beakers disappears. What observation could you make while performing this test that would allow you to distinguish the alkene from the aryl ether?

Answer the following questions.

Q. No. 2 i. Give an account on Fries Rearrangement?(5)

- Explain why aryl groups have far greater migratory aptitude than alkyl groups and hydrogen in Wagner-Meerwein rearrangement? (5)

Q. No. 3 At which position does the substitution occur for the following reaction?
Explain your answer and give one examples for each case. (10)

- Electrophilic substitution reaction of Pyrrole
- Electrophilic substitution reaction of pyridine

Q. No. 4. In an aqueous solution containing sodium bicarbonate, aniline reacts quickly with bromine to give 2,4,6-tribromoaniline. Nitration of aniline requires very strong conditions, however, and the yields (mostly *m*-nitroaniline) are poor. (a) What conditions are used for nitration, and what form of aniline is present under these conditions? (b) Explain why nitration of aniline is so sluggish and why it gives mostly *meta* substitution. (c) Although nitration of aniline is slow and gives mostly *meta* substitution, nitration of acetanilide goes quickly and gives mostly *para* substitution. Use resonance forms to explain this difference in reactivity. (10)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (15x2=30)

- i. Define van deemter equation?**
- ii. What are the characteristics of Ideal reference electrode?**
- iii. Differentiate between WCOT and SCOT columns in GC.**
- iv. What is Eddy diffusion?**
- v. Write down the principles of TGA and DTA.**
- vi. Differentiate between GSC and GIC.**
- vii. What are the advantages of thermal conductivity detector.**
- viii. What are the disadvantages of H₂ as carrier gas in gas chromatography?**
- ix. Define retention time on what factors does it depend?**
- x. What is alkaline error in potentiometry.**
- xi. What is glass transition temperature?**
- xii. Write a note on gas sensing probes?**
- xiii. Describe principle of HPLC.**
- xiv. Write a note on gas sensing probes?**
- xv. How is calomel electrode potential.**

Answer the following questions. (3x10=30)

Q.2: a) Explain mobile phase delivery system?

b) Write down the applications of Nernst equation?

Q.3: a) Write a note on open tubular columns in gas chromatography?

b) Write down the application of differential scanning calorimetry(DSC).

Q.4: a) Write down the applications of TGA curves.

b) Discuss various types of columns in HPLC.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

1. What are the limitations of IR spectroscopy?
2. What is the difference between IR and FTIR?
3. What are overtones in IR Spectroscopy?
4. What is interferometer in IR spectroscopy?
5. What is Rayleigh scattering in Spectroscopy?
6. Define the basic principle of UV/Vis spectroscopy.
7. What is the difference between red and blue effect?
8. Enlist the reasons for fundamental deviations from Beer-Lambert's Law.
9. What is Molar extinction Co-efficient in Beer Lambert Law? What are its units?
10. What is the effect of conjugation on absorption maximum of a compound?
11. Outline the basic principle of UV/Vis Spectroscopy.
12. What is plasma?
13. Enlist the applications of fluorescence spectroscopy.
14. Define the basic principle of Atomic fluorescence spectroscopy.
15. Compare the working efficiencies of spectrophotometer and Spectrofluorometer.

Answer the following questions.

(3x10=30)

Q2.

- a) Describe the working principle of FTIR Spectrometer.
- b) Compare Raman with IR spectroscopy.

Q3.

- a) Outline the working principle of Double-beam spectrophotometer with the help of diagram.
- b) What are the applications of Beer-Lambert Law?

Q4.

- a) Describe the factors affecting phenomenon of Fluorescence.
- b) Describe the working principle of ICPES.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

1. What do you understand about migration?
2. What are products of refining?
3. Briefly explain about fractional distillation.
4. What do you understand about cracking?
5. What is meant by polymerization in crude oil processing?
6. Briefly explain the soda pulping?
7. Why non-fibrous materials are removed in paper manufacturing?
8. Briefly describe environmental issues due to paper industry waste.
9. What is difference between delignification and bleaching?
10. What are paper finishing operations?
11. Write the chemical equation and conditions for the production of ammonia.
12. Give examples of potash fertilizers?
13. Write down the chemical reaction of ammonia and carbon dioxide.
14. Differentiate between micro & macro nutrients.
15. Name few natural organic fertilizers.

Q.2. Answer the following questions.

(6x5=30)

1. Describe the composition of crude petroleum.
2. What is catalytic reforming and why it is used?
3. Briefly explain different variety of raw materials used for paper manufacturing.
4. Explain the Sulphite process in paper manufacturing.
5. What is the function of phosphatic fertilizers, also describe difference between calcium superphosphate and triple superphosphate?
6. Describe different types of nitrogenous fertilizers; write raw materials used for their manufacturing.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Insurance & Risk Management

Course Code: COMM-403

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- a) What is property risk? Explain losses or costs associated with this risk.
- b) Define insurance and explain fortuitous losses with three examples.
- c) Explain pre-loss and post-loss objectives of risk management.
- d) Define insurable interest and explain its objectives.
- e) Briefly illustrate exclusions to the insurance contract.
- f) What is underwriting? Explain the statement of underwriting policy.

Q.2. Answer the following questions.

(3x10=30)

- (1). Define personal risk and explain its various types with examples.
- (2). What is the principle of utmost good faith? Explain its three doctrines with examples.
- (3). Define insurable risk and explain six characteristics of an ideally insurable risk.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- i. Define 'Managerial Economics'.
- ii. What is Arc Elasticity? Give an example to show how it is calculated.
- iii. What is the sign (normally) of the coefficient of income elasticity of demand? Why?
- iv. What is meant by demand forecasting?
- v. Why do we portray less elastic demand under Monopoly situation?
- vi. What is linear programming?

Q.2. Answer the following questions. (3x10=30)

- a. Discuss the nature and scope of Managerial Economics
- b. What is Perfect Competition? Describe how price and output are determined under such market?
- c. Describe the optimum factor combination with the help of ISO-Cost Approach.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Management Accounting

Course Code: COMM-405

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

1. Direct costing method
2. Absorption costing method
3. Explain the purposes of factory overhead variances
4. What is meant by the term cost volume-profit relationship
5. Give names of different factory overhead variances
6. Distinguish between period costs and product costs.

Answer the following questions.

(2x15=30)

Q.2 The sales and volume data for the Zeeshan ltd. is given below:

Model Boot	Budgetd			Actual		
	Sales Volume	Sales Price	Cost per unit	Sales Volume	Sales Price	Cost Per Unit
Product X	6,000	Rs. 70	Rs. 55	6500	Rs. 85	Rs. 40
Product Y	6500	80	30	5800	75	32

Required:

1. The price and volume variances for sales and cost.
2. The sales mix and final sales volume variances.

Q.3 Shahid Ltd. uses process cost system. The costs of department-2 for the month of September were as follows:

Cost from department-1 Rs 180000

Cost added by the department:

Material 60000

Labor 50000

Factory overhead 45000

The following information was also obtained from department-2:

Units received 45000

Units transferred out 42000

Units still in process 2000

Normal Loss units 1000

Units in process were completed 60% with respect to material and 50% with respect to labor and overhead.

Required:

- a) Cost of Production Report for the month of September of Department-2



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short Questions. (6x5=30)

- Assumptions of ANOVA.
- Regression Analysis.
- Procedure of testing intercept parameter (α) in simple regression
- Procedure of Kruskal Wallis test.
- Non-parametric tests and its disadvantages.
- Discuss contingency table and Chi-square statistic.

Answer the following Questions. (2x15=30)

Q.2. Three varieties of potatoes are planted each on four plots of ground of the same size and type and each variety is treated with four different fertilizers. The yields are follows

Variety	Fertilizer			
	1	2	3	4
1	19	22	26	26
2	25	19	23	25
3	17	18	22	24

Perform Two way analysis of variance and draw conclusions.

Q.3. Twelve dogs were fed on diet A and 15 on diet B. The gains in weights for the individuals dogs wise as follows:

A: 24, 29, 27, 33, 23, 24, 12, 31, 23, 29, 30, 34,

B: 43, 33, 21, 07, 46, 30, 39, 29, 31, 34, 17, 20, 34, 28, 21

Test the equality of population means assuming gains in weights in normally distribution with unequal population variances.

Q.4. The amounts of chemical compound (y) which dissolved in 100 grams of water at various temperature (x) were recorded as follows:

X	0	15	30	45	60	75
Y	7	12	23	30	42	44

Compute two regression Co-efficients and then correlation coefficient.

Q.5. Compute Chi-square and test whether the two attributes are independent.

Attributes	A ₁	A ₂	A ₃
B ₁	135	175	90
B ₂	215	325	60

Q.6. An experimenter wants to determine the effectiveness of a certain reducing diet. 12 persons were put on diet. Their weights before and after they tried the diet are as:

Before: 202 154 183 180 228 164 130 165 175 245 237 163

After: 195 150 178 199 220 157 135 180 198 206 227 155

Use the sign test to test the hypothesis that the diet is not effective against that it is effective



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

1. Differentiate 'project' and 'program' with examples?
2. In short, explain "triple constraints"?
3. Explain 'Initiating' phase of Project Management Life Cycle in short?
4. List the heads of 'Proposal' document?
5. Explain the purpose to conduct "Critical Path Method (CPM)" analysis?
6. Define 'risk' with example?

Q.2. Answer the following questions.

(3x10=30)

1. Explain the complete process of to conduct "Program Evaluation Review Technique (PERT)" by taking an example?
2. Explain the inputs, tools and techniques, and outputs of "project scope management"?
3. Why is Earned Value Analysis (EVA) conducted. Explain the concepts of "Earned Value (EV)", "Planned Value (PV)", and "Actual Cost (AC)" by taking examples?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- 1) Write a complete procedure with commands to recover a datafile without a backup.
- 2) Explain Row ID and storage of a record in a DB block.
- 3) Differentiate between index and index organized table
- 4) Write command to add new file 2 in tablespace TS1 and delete the old file 1?
- 5) Write startup phases of database with diagram.
- 6) What is the difference between Direct export and conventional export when using export utility.

Q.2. Answer the following questions. (5x6=30)

- 1) Mr. Farhan is working as DBA in ABC (Pvt) Ltd. He has successfully updated the payroll database today (31 Jan 2008). Unfortunately, some other user has dropped the table space containing the salary table having the important information at 11:15 PM. Write down steps and commands which will be implemented by Mr. Farhan to recover the important tables.
 - 2) Explain working of redo log files with diagram.
 - 3) Create a user Farhan and assign him one system privilege and one object privilege. **(commands only)**
 - 4) Draw and Differentiate between extended RowID and Index entry.
 - 5) Write down the recovery (Rollforward and Rollback) Procedure with diagram.
-



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

1. Given the production function $Q = f(K, L) = 200K^{0.3}L^{0.7}$. Find MP_L and MP_K .
2. Why is the price elasticity of demand typically greater for an industry than for a single firm in the industry?
3. A firm in a perfectly competitive market has a marginal cost function $MC = 10 + 2Q$. If the market price is \$25, what is the firm's profit-maximizing output level?
4. Explain the concept of opportunity cost and its significance in production decision-making.
5. What is meant by demand estimation? What are the problems involved in the process demand estimation?
6. What is meant by decision making process? Write down its different steps.

Answer the following questions.

Q. No. 2 If **Operating Leverage ratio** is higher, the more leveraged the firm is said to be. Elaborate your answer with the help of; (10)

- A. Mathematical derivation
- B. Required Diagrams.

Q. No. 3 Explain how price and output is determined in Monopoly. (10)

Q. No. 4 Suppose that **Sandwich (Brand X)** of cafeteria of Punjab University is facing following demand function: $Q_x = 1.5 - 3.0P_x + 0.8I + 2.0P_y - 0.6P_b + 1.2A$

Where Q_x = Sales of **sandwich** brand X in campus in thousands.

- P_x = Rs. 2 (Price of **sandwich** brand X in hundreds of rupees per sandwich)
 I = Rs. 2.5 (Students' Pocket money in hundreds of rupees.
 P_y = Rs. 1.8 (Price of the competitive of sandwich such as **Samosa** (Brand Y) in hundreds of rupees per **samosa**.)
 P_b = Rs. 0.5 (Price of bread used in sandwich, in hundreds of rupees.)
 A = Rs.1 (Advertising expenditures for sandwich brand X in hundreds of rupees.)

- a). Determine what effect a price increase in **sandwich** would have on total revenue of **cafeteria**? (4)
- b). Evaluate how sale of **sandwich** would change during a period of **rising pocket money** of students? (3)
- c). Assess the probable impact if price of competing product **samosa** is increased? (3)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

01 Discuss with examples how political economists view decision-making differently from traditional economists or political scientists?

02 Discuss how real-world examples help illustrate the interaction of political decisions, market forces, and public interests?

03 How do societies organize collective action in the absence of central authority? Discuss this question in light of the creation of property rights in the anarchic West during the 1800s.

04 What is the "dilemma of the commons," and how does it challenge efficient collective decision-making?

05 Discuss how political economists account for costs, benefits, and resource allocation in non-monetary terms

06 Define and differentiate between public goods, public bads, common-pool resources, and exclusive clubs?

Q.2. Answer the following questions. (3x10=30)

01 Explain the Principal-Agent Problem in the context of collective decision-making. How does this theory help us understand the challenges of governance and institutional performance?

02 Critically evaluate the challenges of implementing economic and political reforms in Pakistan in light of the Seven Pillars of Good Governance.

03 Discuss the political economy of patronage in developing countries, with a particular focus on Pakistan. How does patronage impact economic development, governance quality, and the implementation of reforms?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers to the following concepts. (6x5=30)

- i. What is employee engagement? Give two benefits for organizations.
- ii. Explain two types of management styles used in HRD.
- iii. How do training programs help employees grow in their careers?
- iv. What role does HRD play in managing workplace changes?
- v. What are two key advantages of diversity training in companies?
- vi. Describe how ethical policies affect HR development.

Q.2. Write detailed answers to the following questions. (3x10=30)

- i. Why is leadership training important for employees?
- ii. Explain a simple conflict resolution technique used in HRD.
- iii. How does effective talent management improve employee satisfaction?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Money, Banking & Financial Institutions Course Code: ECON-332

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- i. What is the role of financial institutions in financial markets.
- ii. Discuss the implications of debt equity ratio.
- iii. Compare and contrast the expected returns on domestic and foreign assets.
- iv. What do you understand by interest rate risks. Explain with example.
- v. Differentiate between sterilized and unsterilized interventions using relevant examples.
- vi. Briefly discuss quantity theory of money with its assumptions.

Q.2. Answer the following questions. (3x10=30)

1. Discuss role and functions of SMEDA in the growth of short and medium level organizations of Pakistan.
2. Discuss different dividend growth models of common stocks.
3. Discuss in detail the implications of financial regulations on economic growth.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Econometrics – II

Course Code: ECON-405A

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- Explain dummy variable trap in categorical regression.
- Discuss order and rank condition of identification.
- Explain VAR model.
- Explain assumptions of classical linear regression model.
- Explain fixed effects and random effects models in panel data estimation.
- Differentiate between OLS and GLS method.

Answer the following questions.

(3x10=30)

Q.2 When 2SLS can be used to solve simultaneous equation system? Briefly discuss steps involved in estimation through 2SLS. What are advantages of 2SLS over ILS and OLS?

Q.3 Write note on unit root tests, co-integration method and error correction model.

Q.4 From the following data

a) Estimate the model by Matrix approach $Y = \beta_1 + \beta_2 X + \mu$

Y	70.5	65.5	90.0	95.0	110.0	115.5	120.4	140.6	155.4	150.5
X	80.5	100.3	120.4	140.4	160.5	180.6	200.5	220.5	240.5	260.5



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Public Sector Economics

Course Code: ECON-411

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- i. Distinguish between public goods and private goods.
- ii. Discuss the role of government in allocating resources.
- iii. Explain the term "budget deficit."
- iv. What is the difference between a Progressive tax and a Degressive tax?
- v. Discuss the factors influencing public expenditure.
- vi. What is the principle of maximum social advantage in public finance?

Answer the following questions.

(3x10=30)

- i. Discuss the different types of taxes, their merits and demerits.
- ii. Critically evaluate the causes and consequences of market failure.
- iii. Discuss the factors influencing public expenditure and its impact on the economy.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Major Issues in Pakistan's Economy

Course Code: ECON-414

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- i. Agricultural Tax in Pakistan.**
- ii. What are the hurdles in domestic resource mobilization in Pakistan?**
- iii. Briefly explain agriculture vs industry debate**
- iv. Discuss impacts of WTO on Pakistan economy**
- v. What measures can be taken for human resource development in Pakistan?**
- vi. What is the justification of foreign aid?**

Q.2. Answer the following questions. (3x10=30)

- 1. Highlight the importance of industrial sector in Pakistan economy. What are the major causes of its backwardness in Pakistan and what can be done to uplift this sector?**
- 2. What are the main causes of rising external debt in Pakistan? How can Pakistan come out of this acute problem? Explain.**
- 3. What are the sources of inflation in Pakistan? What steps are required to bring the situation under control?**



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Development Economics-II

Course Code: ECON-415

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- i What role do women play in the agricultural sector?
- ii What are the main economic features of sharecropping?
- iii Evaluate the role foreign direct investment (FDI) in less developed countries.
- iv Differentiate between developed and developing countries?
- v What are the primary approaches to mitigating climate change?
- vi What is difference between economic growth and economic development?

Q.2. Answer the following questions. (3x10=30)

- i. What environmental challenges arise from urban development?
- ii. What are the five basic questions about trade and development?
- iii. Examine the role of relative factor endowments in determining international specialization.

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED****Q.1. Answer the following short questions:****(6x5=30)**

- I.** A dam project in Pakistan needs to import turbines worth \$200,000. The OER is PKR 315 per USD, and the FX premium is 10%. What is the total PKR cost of the turbines?
- II.** A farming project imports ploughing machinery worth \$400,000. The OER is PKR 320 per USD, and the SCF is 0.85. Calculate the adjusted cost in PKR.
- III.** A solar energy project costs \$1,500,000. The government provides 70%, and the remainder is financed through a loan at a 6% interest rate for 5 years. What is the total interest payable?
- IV.** A textile factory project has domestic costs of \$300,000 and generates foreign exchange earnings of \$450,000. What is the Domestic Resource Cost (DRC)?
- V.** A bridge construction project costs \$500,000 and is expected to reduce transportation costs by \$800,000 over 10 years. Assess its cost-effectiveness by calculating the cost-to-benefit ratio.
- VI.** A project to develop canals costs \$600,000 over 4 years. How would the government allocate and capitalize the costs over this period?

Answer the following questions.**(3x10=30)**

Q. 2. Find the Net Present Value (NPV) of the stream of costs and benefits, if the discount rate is 12%. (10)

Year	Costs	Benefits
1	13	0
2	12	0
3	6	0
4	3	35
5	2	25

Q. 3. Find the Benefit to Cost Ratio (BCR) of the stream of costs and benefits in Q. 2., if the discount rate is 12%. (10)

Q. 4. Find the Internal Rate of Return (IRR) of the stream of costs and benefits in Q. 2. (10)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- 1. What is the 'Marshall-Lerner Condition' and how does it affect the balance of payments?**
- 2. Explain the term 'Euro-Dollar' and its significance in the international financial markets.**
- 3. Describe the 'Price Adjustment Mechanism' in the context of correcting balance of payments disequilibria.**
- 4. What are the main causes of balance of payments disequilibria, and what corrective measures can a country take?**
- 5. How does the WTO contribute to liberalization and what is its role in managing balance of payments issues?**
- 6. What is the 'Optimum Quantity of Reserves' in the context of managing a country's foreign exchange reserves?**

Q.2. Answer the following questions. (3x10=30)

- 1. Discuss the key factors that determine exchange rates in both fixed and floating systems, including the role of interest rates, inflation, and government interventions.**
- 2. Analyze the effects of labor movement restrictions on international finance, and discuss the economic and welfare impacts of international labor mobility.**
- 3. Explain the concept of 'Risk and Return' in international capital flow, and discuss the role of international financial institutions in managing crises such as the ASEAN crisis.**



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Islamic Banking and Finance

Course Code: ECON-435

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- i. How does Islamic banking tend to impact economic development?
- ii. Differentiate between Participatory and Non-participatory modes of Islamic finance.
- iii. What are the key Conditions of parallel Salam?
- iv. Explain Sukuk Bonds and its significance.
- v. Explain Wakalah (Agency) and its significance.
- vi. Discuss application of Istisna in modern Islamic Banking.

Q.2. Answer the following questions. (3x10=30)

- i. What is meant by Riba? Further, briefly explain the different kinds of Riba.
- ii. What is the difference between Murabaha and Salam transaction? Further, briefly explain purpose of use of both modes.
- iii. In Pakistan, Islamic banks use KIBOR i.e. an interest-based benchmark to determine profit sharing ratios. In this context, how these banks can be said to be Islamic when they base conventional benchmark?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: The World Economic History

Course Code: ECON-436

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- i. What role did colonialism play in shaping world economic history?
- ii. What were the key economic innovations of the Song Dynasty (Sung Miracle)?
- iii. How did World War II reshape nationalist thoughts and movements across the world?
- iv. What were the economic impacts of Japan's rapid modernization?
- v. What were the key characteristics of the first global economy?
- vi. What is the concept of "Big Push" industrialization?

Answer the following questions. (3x10=30)

- Q2.** How did the Second Industrial Revolution contribute to urbanization and social change in Europe and the United States?
- Q3.** How did the manorial and feudal systems contribute to the European economy in the medieval era?
- Q4.** How did the spread of industrialization impact labor systems, urbanization, and social structures in industrializing nations?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers to the following concepts. (6x5=30)

- 1-What is strategic action of a firm?
- 2-What is Edgeworth box and Pareto optimally?
- 3- Briefly describe the Envelope Theorem?
- 4- What is an Efficient Allocation?
- 5- Differentiate between social justice and social optimum?
- 6- Briefly describe Walrasian Equilibrium?

Q.2. Write detailed answers to the following questions. (3x10=30)

- 1- Explain Kakutani fixed point theorem in detail?
- 2- Explain the first and second fundamental theorem of welfare in real word?
- 3- Is competitive markets Pareto efficient, explain in detail?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – Spring 2025

Roll No.

Paper: Political Science-III

Course Code: EDE-165

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جواب تحریر کریں۔

i. Define the role of King in British Political System.

i. برطانیہ کے سیاسی نظام میں بادشاہ کے کردار کی وضاحت کریں۔

ii. Write a note on British Cabinet.

ii. برطانوی کابینہ پر نوٹ لکھیں۔

iii. Define Federal System of U.S.A.

iii. امریکہ کے وفاقی نظام کی وضاحت کریں۔

iv. Write down the Law making Process in U.S.A.

iv. امریکہ میں قانون سازی کا طریقہ کار لکھیں۔

v. Write down Two features of Switzerland Constitution.

v. سوئٹزرلینڈ کے آئین کی دو خصوصیات لکھیں۔

vi. The Federal Legislature of Switzerland.

vi. سوئٹزرلینڈ کی وفاقی مقننہ

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے تفصیلاً جوابات تحریر کریں۔

i. Write down the Process of British House of Common.

i. برطانوی دارالعلوم کے اختیارات لکھیں۔

ii. Separation of Power in U.S.A.

ii. امریکہ میں علیحدگی اختیارات

iii. Write down the History of Swiss Constitution.

iii. سوئس آئین کی تاریخ لکھیں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Technical Writing and Presentation Skills

Course Code: EDE-327

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following:

(6x5=30)

- 1) Write three applications of technical writing.
- 2) What makes technical writing, technical in nature?
- 3) Define technical writing.
- 4) What are the components of technical writing?
- 5) Differentiate between oral and power-point presentation.
- 6) Differentiate between essays and technical writing.

Q.2. Write long answers to the following:

(3x10=30)

- 1) Why a resume is cited as an example of technical writing? Explain this in detail with examples.
- 2) Explain in detail the components of technical writing.
- 3) Why is technical writing preferred in formal writing?



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers to the following concepts. (6x5=30)

- 1. Explain the function of R.java in Android applications. How is it generated and used?**
- 2. What are event handlers in Android? Illustrate with an example how to handle a button click.**
- 3. Differentiate between explicit and implicit intents. Provide use-case examples for both.**
- 4. What are Android widgets? Describe any two commonly used widgets with usage.**
- 5. Explain the steps to create and use a SQLite database in an Android app.**
- 6. What is the Android Native Development Kit (NDK)? Why and when should it be used?**

Q.2. Write detailed answers to the following questions. (3x10=30)

- 1. Create an Android app that retrieves a list of posts from a web API in JSON format and displays them using a RecyclerView. Provide code and explain the flow.**
- 2. Design a mobile app with two activities. First activity takes user input; second activity displays it. Explain Intent usage and Activity transitions with code.**
- 3. Develop an app using Android's Notification Manager to display notifications at specific time intervals. Include dynamic notification content and action handling.**



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

1. You want to summarize sales trends from last year to include in a report. Would you use machine learning or descriptive statistics? Justify your answer with valid reasoning.
2. Name two popular techniques for dimensionality reduction and explain their working shortly.
3. What is the main difference between K-Means and Hierarchical clustering?
4. Why is it important to keep test data separate from training and validation data?
5. How can regularization help in preventing overfitting?
6. How does underfitting differ from overfitting?

Answer the following questions.

(3x10=30)

1. Given a CSV file marks.csv with the structure (Rollno, Marks_Math, Marks_Science, Marks_English), write a Python program to calculate the average marks for each student and add a new column Average.
2. Write a Python program that creates a NumPy array with integers from 1 to 20. Reshapes it into a 4x5 matrix, prints the shape, size, and data type of the array. Calculates and prints the sum of all elements.
3. Given a DataFrame with product prices:

```
data = {  
    'Product': ['Pencil', 'Notebook', 'Eraser'],  
    'Price': [10, 50, 5]  
}
```


Write a function to apply 18% tax to each price. Use `.apply()` to create a new column PriceWithTax.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following questions.

(3x5=15)

1. What information is brought by Creon in Oedipus Rex?
2. Discuss the use of disguise In Twelfth Night by Shakespeare. Give one example.
3. Draw similarities between Krogstad and Nora in Ibsen's play, A Doll's House?

Q.2. Answer the following questions.

(3x15=45)

1. Discuss Macbeth's visions and hallucinations. What role do they play in the development of his character?
2. The tragedy in Marlow's plays is always the tragedy of an individual. How far is it applicable to Doctor Faustus?
3. Comment on the theme of deception in Shakespeare's Twelfth Night?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – Spring 2025

Paper: Fantasy

Course Code: ENG-310

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(3x5=15)

1. How does Tolkien create tension in "Riddles in the Dark"?
2. Comment on the significance of Professor Quirrel's character in *Harry Potter and the Sorcerer's Stone*.
3. How is the role of imagination explored in "The Door in the Wall"?

Q.2. Answer the following questions.

(3x15=45)

1. Isaac Asimov is hinting at a post human future in "Robbie". Discuss.
2. Stephen King's "Word Processor of the Gods" is a story about the consequential reality of human choices. Elaborate.
3. Explore some of the common concerns between science fiction and fantasy?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: 20th Century British Literature Poetry & Drama

Course Code: ENG-401

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(3x5=15)

- i. What is the central theme in 'Byzantium'?
- ii. What do you know about the poem 'Wodwo'?
- iii. What is the significance of the title 'The Wasteland'?

Q.2. Answer the following questions:

(3x15=45)

- i. How does 'Waiting for Godot' explore the search for meaning in life?
- ii. How do the characters in 'The Sea' evolve throughout the play?
- iii. What is the symbolic meaning of the 'Mountain Language' in the play?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: 20th Century Fiction & Prose

Course Code: ENG-402

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(3x5=15)

1. What do the caves symbolize in Forster's "A Passage to India"?
2. How is the stream of consciousness used in Woolf's "The Haunted House"?
3. Why does Marlowe lie about Kurtz's final words?

Answer the following questions.

(3x15=45)

- Q2. Kurtz's last words were "The horror! The horror". Critically examine this quotation in the light of the thematic concerns of "The Heart of Darkness".
- Q3. Trace the elements of mysticism in "A Passage to India".
- Q4. How is "A Portrait of the Artist as a Young Man" a modernist novel?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: American Literature

Course Code: ENG-403

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(3x5=15)

1. "The Writer" by Richard Wilbur is about the struggles that come with the process of writing. Discuss?
2. Which complex emotions have been discussed by Plath in "Daddy"?
3. How "A Rose for Emily" is about loneliness and decay?

Q.2. Answer the following questions:

(3x15=45)

1. What are the main ideas discussed in "Leaves of Grass—Song of Myself"?
2. How Mary's addiction, Jamie's failures, and Edmund's illness affect the family structure?
3. How *Death of a Salesman* is a commentary on the illusion of the American Dream?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: South Asian Literature

Course Code: ENG-404

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(3x5=15)

1. What is ultimate fate of Rani and Appanna in “Naag Mandala” ?
2. Is Changez reluctant fundamentalist?
3. What role does nature play in “Wedding in the Flood” ?

Q.2. Answer the following questions.

(3x15=45)

1. Critically evaluate the poem “The Far Thing” by Maki Kureishi.
2. How does Arundhati Roy show in “God of Small Things” that women suffer endlessly in a man-dominated society?
3. “Naag Mandala” is a play about Rani’s deification. Give a reasoned answer.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: Research Methodology

Course Code: ENG-405

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(3x5=15)

- i. Differentiate between Primary and Secondary sources data.
- ii. What is the difference between translation and transliteration?
- iii. Describe the functions of Literature Review.

Q.2. Answer the following questions.

(3x15=45)

- i. Write a note on the various aspects of Qualitative method of Research.
- ii. What is Survey? Discuss the major forms of Survey in detail.
- iii. What is Research Problem? Explain the steps in formulating Research Problem.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

- i. What is Campaniform sensilla?
- ii. What are plasmocytes?
- iii. What are chemoreceptors?
- iv. Differentiate between Decticous and Adepticous pupae?
- v. What are aggregation pheromones?
- vi. Enlist 2 functions of Tentorium?
- vii. What is Johnston's organ?
- viii. What are cystocytes?
- ix. What are tympanal organs?
- x. What is spermatheca?
- xi. What are lac glands?
- xii. Differentiate between ocelli and compound eyes?
- xiii. What is scape?
- xiv. What is obligate thelytoky?
- xv. Differentiate between merocrine and holocrine secretions?

Q.2. Answer the following questions.

(3x10=30)

- I). Write a detailed note on mouthparts of insects?**
- II). Write a detailed note on different methods of sound production in insects?**
- III). Discuss circulatory system of insects?**



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- i. Pelleted food
- ii. Lung(s) in fish
- iii. Hygiene of fish culture facilities
- iv. Role of temperature and photoperiod in breeding
- v. Animal origin fish feed ingredients
- vi. Aquarium fish behavior

Answer the following questions.

(3x10=30)

Q.2 Write a detailed note on Swimbladder as hydrostatic organ.

Q.3 Discuss Kidney in fishes with suitable sketches

Q.4 Give a comprehensive note on arterial system in fishes.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: General Microbiology

Course Code: ES-71

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- I. Describe scope of microbiology.
- II. Describe structure and chemical composition of bacterial cell wall.
- III. Give classification of animal viruses.
- IV. Describe various types of bacteriological media.
- V. Give importance of various methods for the estimation of bacterial growth.
- VI. Enlist and briefly describe colonial characteristics to identify bacteria.

Q.2. Answer the following questions. (3x10=30)

- I. Describe in-detail the morphology and fine structure of bacteria.
- II. Give biological and economic importance of microalgae.
- III. Describe different methods for the estimation of bacterial growth.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – Spring 2025

Roll No.

Paper: Later Mughals and British India (1707-1857) Course Code: HIS-304

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

- i. *Muntakhib-ul-Lubab*
- ii. Causes of the Battle of Plassey
- iii. Karen Leonard's 'Great Firm' theory of the Decline of the Mughal Empire
- iv. Bahadur Shah-I
- v. The Doctrine of Lapse
- vi. Jihad Movement

Answer the following questions.

(2x15=30)

Q.2. Critically evaluate the role of Shah Wali's Movement in the reformation of Indian Muslim society during the Eighteenth century.

Q.3. Write a detailed essay on the causes of the 1857 War of independence.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – Spring 2025

Roll No.

Paper: History of Europe (1453-1789)

Course Code: HIS-305

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

- i. Leonardo da Vinci
- ii. The Peace of Augsburg, 1555
- iii. Role of Denmark in the Thirty Years War
- iv. John Calvin
- v. Causes of the conflict between James I and the English Parliament
- vi. Peter the Great of Russia

Answer the following questions.

(2x15=30)

- Q.2. What is meant by Enlightenment? Discuss in detail how the Enlightenment political thinkers helped laid the foundation of a new political system in Europe.**
- Q.3. Write a detailed essay on the expansion of Prussian under Frederick the Great.**



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – Spring 2025

Roll No.

Paper: International Relations (1919-1989)

Course Code: HIS-308

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions.

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جواب تحریر کریں۔

i. Explain the importance of International Relations as Subject?

i۔ بین الاقوامی تعلقات کی اہمیت بطور مضمون واضح کریں۔

ii. How Soviet Union was disintegrated into pieces?

ii۔ سویت یونین کیسے ٹکڑے ٹکڑے ہوئی؟

iii. Discuss the Cold War and its Impacts?

iii۔ سرد جنگ اور اس کے اثرات بیان کریں۔

iv. For What Purpose Arab League was made?

iv۔ عرب لیگ کن مقاصد کے حصول کے لیے بنائی گئی؟

v. What is the Importance of Central Asian States in International Politics?

v۔ بین الاقوامی سیاست میں وسطی ایشیائی ممالک کی کیا اہمیت ہے؟

vi. What kind of role United Nations played in Disarmament?

vi۔ تخفیف اسلحہ میں اقوام متحدہ نے کیا کردار ادا کیا؟

Answer the following questions.

(2x15=30)

درج ذیل سوالات کے تفصیلاً جوابات تحریر کریں۔

Q 2. Highlight the importance points of Iran Iraq War?

سوال نمبر 2: ایران عراق جنگ کے اہم نکات پر روشنی ڈالیں۔

Q 3. Write in Critical Essay on the Role of Non-Aligned Movement in International Relations.

سوال نمبر 3: بین الاقوامی تعلقات میں غیر جانبدار تحریک کے کردار پر ایک تنقیدی نوٹ لکھیں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: History of Ottoman Empire (1288-1924)

Course Code: HIS-403

Time: 3 Hrs.

Marks: 60

Roll No.

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers of the following:

(6x5=30)

سوال نمبر 1: مندرجہ ذیل سوالات کے مختصر جوابات تحریر کریں۔

- | | |
|-------------------------------|---------------------|
| A. Ottoman I | عثمان اول |
| B. Significance of Adrianople | ایڈریانوپل کی اہمیت |
| C. Battle of Angora | جنگد انگورا |
| D. Janissary | یٹیاچی |
| E. Sultan Muhammad II | سلطان محمد دوم |
| F. The Cyprus Issue | مسئلہ قبرص |

Q.2. Answer the following questions.

(2x15=30)

سوال نمبر 2: مندرجہ ذیل سوالات کے تفصیلی جوابات تحریر کریں۔

- A. Discuss the Foreign Policy of Sultan Murad I.
B. Critically examine the Causes & Repercussions of the Battle of Angora.

- مراد اول کی خارجہ پالیسی پر بحث کیجیے۔
- جنگد انگورا کے اسباب اور اثرات کا تنقیدی جائزہ لیجیے۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Common Sports Injuries, Treatment & Rehabilitation (Maj.6)

Course Code: HPE-401

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Explain the following terms.

(5x6=30)

- (a) Prevention of injuries through equipment
- (b) Cramps
- (c) Strain
- (d) Soreness
- (e) Upper limb Injuries

Answer the following questions.

(3x10=30)

Q no 2 Define mechanism of injury (mou) also write down its importance

Q no 3 Define injury? Why rehabilitation has a great importance in sports?

Q no 4 Explain in detail Warm-up & Warm down? Also explain why warm down is more important than warm-up?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Role of Media in Sports (Elective 3)

Course Code: HPE-403

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short and comprehensive explanation of the following. (6x5=30)

- i. Golden Triangle**
- ii. Advantages of the magazine**
- iii. Points to be considered in Sports writing**
- iv. Sports Journalism**
- v. Purposes of the Advertising**
- vi. Pamphlets**

Q.2. Answer the following questions. (3x10=30)

- i. Define Journalism? Elaborate careers in Sports Journalism.**
- ii. Give your views on Sports Globalization.**
- iii. Elaborate Sports photography in detail.**



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

1. Describe the essential qualities of a good coach with examples.
2. Compare and contrast skill, technique, and ability, and discuss their importance in sports training.
3. How can a coaching philosophy influence a coach's approach towards athletes and competitions?
4. Discuss the role of mental training in preparing athletes for high-pressure competitions.
5. Explain the role of warming up and cooling down in enhancing performance and preventing injuries.
6. Highlight the importance of skill-related fitness components in sports performance.

Q.2. Answer the following questions.

(3x10=30)

1. Explain the stages of skill development and discuss the role of feedback in mastering sports skills.
2. Critically analyze how a coach can balance personal coaching style with team requirements for success.
3. Design a training plan for football that addresses pre-season and in-season needs.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Research Project

Course Code: HPE-405

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions. (6x5=30)

- i. Highlight all the Basic Components of Research Project.
- ii. Define Research Question and Hypothesis?
- iii. Explain Significance of the Problem?
- iv. What is SMART Criteria with Reference to writing objectives of the Problem?
- v. Define Research Problem?
- vi. Explain Sample Size and Sample Unit?

Q.2. Answer the following questions. (3x10=30)

- i. Comprehensively explain Interview as a Tool for Data Collection in Research?
- ii. Write down the Basic Criteria for Selecting Research Problem and Writing Research Questions?
- iii. Select a Topic of Your Own Choice and Develop a Mini Proposal on It?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Specialization in one game (Elective 2)

Course Code: HPE-406

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(15x2=30)

- i. What is the maximum number of players in field?
- ii. What is the shape of hockey field?
- iii. What is the shape of hockey stick head?
- iv. Which is the international governing body of hockey?
- v. What is scooping in hockey?
- vi. What is the duration of hockey match?
- vii. What is mean by hitting in hockey?
- viii. What is an advantage of toss winning?
- ix. Write the names of goal keeper's equipment?
- x. What is the primary objective of goal keeper in match?
- xi. What is distance of penalty spot from goal line?
- xii. Write the weight of hockey ball?
- xiii. In penalty shootout, how many players from each team participate?
- xiv. What is the meaning of FIH?
- xv. What is term used, where a player uses his body to block the ball in hockey?

Q.2. Answer the following questions.

(3x10=30)

- i. Draw the complete hockey field with all measurements?
- ii. Define "push" in hockey?
- iii. What is penalty corner in hockey?



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Comparative Study of Religions-I

Course Code: ISE-401

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

- i. ہندو ویدوں کا تعارف تحریر کریں۔
- ii. گوتم بدھ کے حالات زندگی بیان کریں۔
- iii. آریہ سماج کی سماجی اصلاحات تحریر کریں۔
- iv. ہندوؤں کی کتاب مہابھارت کا تعارف تحریر کریں۔
- v. دین اور مذہب میں کیا فرق ہے دین و مذہب کی ضرورت اور اہمیت تحریر کریں۔
- vi. مسلمانوں کی تقابلی ادیان میں خدمات اور کتب کا تعارف تحریر کیجئے۔

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے مفصل جوابات تحریر کریں۔

- i. کنفیو شس ازم کا تعارف اور اس کے پانچ رابطے بیان کریں۔
- ii. زرتشت ازم کا تعارف اور اس کی تعلیمات بیان کریں۔
- iii. ہندومت میں تری مورتی کا کیا تصور ہے؟ اور اس کا اسلامی تصور توحید سے تقابلی جائزہ پیش کریں۔



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات دیجئے۔

- 1۔ معیشت اور اخلاق کا باہمی تعلق واضح کریں۔
- 2۔ معاشیات کی مختلف اقسام لکھیں۔
- 3۔ اسلامی معیشت پر لکھی جانے والی پانچ کتب کے نام لکھیں۔
- 4۔ غیر مسلم مفکرین کے ہاں معیشت کی مختلف تعریفیں لکھیں۔
- 5۔ زمین کی مختلف اقسام کے نام لکھیں۔
- 6۔ عشر اور عشور کا فرق واضح کریں۔

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے تفصیلی جوابات دیجئے۔

1. معاشیات کے لادینی اور اسلامی تصورات کا موازنہ کریں۔
2. حصول دولت اور صرف دولت کے ممنوع ذرائع کی وضاحت کریں۔
3. اسلامی معیشت کے بنیادی تصورات لکھیں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: History & Principles of Tafsir

Course Code: ISE-403

Time: 3 Hrs.

Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(10x3=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

۱۔ تفسیر القرآن بالقرآن کی مثالوں سے وضاحت کیجیے۔

۲۔ فقہی تفسیری رجحان سے کیا مراد ہے؟ دو نمائندہ تفسیروں کے نام تحریر کیجیے۔

۳۔ تفسیر بالرأے کی تعریف اور دو اقسام بیان کیجیے۔

۴۔ مفسر کے لیے ضروری علوم میں سے چار کی مختصر وضاحت کیجیے۔

۵۔ أمثال القرآن سے کیا مراد ہے؟ دو مثالوں سے وضاحت کیجیے۔

۶۔ الفوز الکبیر کی روشنی میں علم الاحکام کی وضاحت کیجیے۔

۷۔ تفسیر القرآن العظیم از ابن کثیر کی دو خصوصیات بیان کیجیے؟

۸۔ قرآنی اسلوب میں ایجاز سے کیا مراد ہے؟

۹۔ عہد نبوی کی دو تفسیری خصوصیات بیان کیجیے۔

۱۰۔ اسباب نزول سے واقفیت کیوں ضروری ہے؟

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے مفصل جوابات تحریر کریں۔

I۔ تفسیر کے مآخذ پر نوٹ لکھیے۔

II۔ النسخ فی القرآن پر تفصیلی نوٹ تحریر کیجیے۔

III۔ جامع البیان از ابن جریر طبری کی خصوصیات بیان کیجیے۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Modern Tools of Research

Course Code: ISE-404

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

1. تحقیق پر ایک اردو اور انگریزی میں جامع تعریف تحریر کیجیے۔
2. اصول درایت سے کیا مراد ہے؟ تحقیق میں اصول درایت کی ضرورت و اہمیت مختصراً بیان کیجیے۔
3. تحقیق میں فرضیہ سے کیا مراد ہے۔ ایک مثال سے وضاحت کیجیے۔
4. موضوع تحقیق کا انتخاب کیسے کیا جاتا ہے؟ وضاحت کیجیے۔
5. سروے تحقیق کی وضاحت کیجیے۔ نیز تحقیق میں اس کی ضرورت و اہمیت مختصراً بیان کیجیے۔
6. "ختمہ"، "اقتباس" اور حواشی کی وضاحت کیجیے۔

(3x10=30)

درج ذیل سوالات کے مفصل جوابات تحریر کریں۔

- سوال نمبر 2: اسلامی اور مغربی اصول تحقیق کا تقابلی جائزہ پیش کیجیے۔
- سوال نمبر 2: دستاویزی تحقیق سے کیا مراد ہے؟ اس کی اقسام اور طریقہ کار پر روشنی ڈالیے۔
- سوال نمبر 3: محقق کے علمی و اخلاقی اوصاف پر تفصیلاً بحث کیجیے۔



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

- 1 Using the rules of exponentiation of cardinal numbers, prove that $c^c = 2^c$.
- 2 Prove that two different initial segments of a well-ordered sets cannot be similar.
- 3 Show that right distributive law of multiplication over addition does not hold in ordinal numbers, in general.
- 4 Prove that in an ordered set first and last elements, if exists, are unique.
- 5 Consider the set \mathbb{Q} of rational numbers and its subset $A = \{x | x \in \mathbb{Q}; x^3 < 3\}$
 - i. Does A have a upper bound?
 - ii. Does A have a lower bound?
 - iii. Does $\sup(A)$ exists?
 - iv. Does $\inf(A)$ exists?
- 6 Prove that if n is finite cardinal number then
 - i. $n + \aleph_0 = \aleph_0$
 - ii. $c + c = c$.

Q.2. Solve the following:

(5x6=30)

- 1 State and prove Cantor's theorem.
- 2 Prove that $[0,1] \approx (0,1)$.
- 3 Let A be a well-ordered set and $S(A)$ be the set of all initial segments of A . Let $S(A)$ be ordered by set inclusion then prove that A is similar to $S(A)$.
- 4 Prove that axiom of choice is equivalent to Zermelo's postulate.
- 5 Let S be a subset of a well ordered set A with the following two properties
 - i. $a_0 \in S$, where a_0 is the first element of A .
 - ii. If for any $a \in A$, $s(a) \subseteq S$, then $a \in S$.Then S is the entire set A , that is $S = A$



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

- (i) Form the partial differential equation by eliminating the arbitrary function f from $f(ax + by + cz, x^2 + y^2 + z^2) = 0$.
- (ii) Solve $ydx + (z - y)dy + xdz = 0$ subject to the condition $2x - y - z = 1$.
- (iv) Solve $(D_x D_y + D_x - D_y - 1)z = xy$.
- (v) Classify PDE $2z_{xx} - 4z_{xy} - 6z_{yy} + z_x = 0$ and find its canonical form.
- (vi) Define linear operator. Show that the operators $\frac{\partial^2}{\partial x^2} - \frac{1}{k} \frac{\partial}{\partial t}$ and $\frac{\partial^2}{\partial x^2} - \frac{1}{k} \frac{\partial^2}{\partial t^2}$, where k is constant are linear operators.

Solve the following:

(3x10=30)

Q.2 Find the temperature distribution $u(x, t)$ in the bar of "L", whose ends are kept insulated, and

$$\text{whose initial temperature is } u(x, 0) = f(x) = \begin{cases} x & \text{if } 0 < x < L/2 \\ 0 & \text{if } L/2 < x < L \end{cases}$$

Q.3 Use d'Alembert's solution of one-dimensional wave equation to solve

$$\frac{\partial^2 u}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}; u(0, t) = 0; u(a, t) = 0; u(x, 0) = f(x); u_t(x, 0) = g(x)$$

Q.4 Solve the BVP

$$u_{xx} + u_{yy} = 0, \quad 0 < x < a, \quad 0 < y < b$$

$$u(x, 0) = f_1(x), \quad u(x, b) = f_2(x), \quad u(0, y) = 0, \quad u(a, y) = 0$$

$$\text{where } f_1(x) = f_2(x) = \begin{cases} \frac{2x}{a}, & 0 < x < \frac{a}{2} \\ 2\left(\frac{a-x}{a}\right), & \frac{a}{2} < x < a \end{cases}$$

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED****Q.1. Solve the following:****(5x6=30)**

- (i). Derive the Gauss's Forward Interpolation Formula.
(ii). Differentiate between truncation error, inherent error and round off error.
(iii). Approximate $f(0.05)$ from the following table using interpolation technique.

x	0.0	0.2	0.4	0.6	0.8
$f(x)$	1.000	1.22140	1.49182	1.82212	2.22554

- (iv). Prove (a) $\mu^2 = 1 + \frac{\delta^2}{4}$ (b) $\frac{2+\Delta}{2\sqrt{1+\Delta}} = \mu$
(v). Find the missing value in the following table:

x	16	18	20	22	24	26
y	43	89	-	155	268	388

Solve the following:

Q2. Find the root of the equation $x^4 - x - 10 = 0$ by secant method correct to three decimal places. (8)

Q(3) Apply Gauss Elimination method to solve the system of equations. (7)

$$3.15x - 1.96y + 3.85z = 12.95$$

$$2.13x + 5.12y - 2.89z = -8.61$$

$$5.92x + 3.05y + 2.15z = 6.88$$

Q.4) Solve the following system of equations using Gauss-Jacobi method correct to 3 decimal places. Apply only six iterations. (8)

$$12x_1 - 2x_2 + 3x_3 = 9$$

$$2x_1 + 15x_2 - 5x_3 = 4$$

$$4x_1 - x_2 + 13x_3 = 6$$

Q(5) Use Lagrange's interpolation formula to find the value of y at $x=2$ (7)

x	0	1	3	4
y	-2	0	6	12



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Mathematical Statistics-I

Course Code: MATH-404

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

(i)	If A and B are independent events then show that \bar{A} and \bar{B} are also independent in sample space S.
(ii)	Find first three moments about mean for a Binomial distribution
(iii)	Suppose that airplane engines operate independently and fail with probability equal to 0.4. Assuming that a plane makes a safe flight if at least one half of its engine run, determine whether a 4 engine plane is safer than the 2 engine plane justify your answer
(iv)	Show that the Poisson distribution is the limiting case of Binomial distribution for large n and small p.
(v)	A Card is drawn at random from a deck of ordinary playing cards. What is the probability that it is a face card or a king?
(vi)	Show that if N becomes infinitely large, then Hyper-Geometric distribution tends to binomial distribution.

Solve the following:

(3x10=30)

Q.2	Find the moment generating function of the Normal Distribution?
Q.3	Show that for the Binomial distribution $\mu_{r+1} = pq (nr\mu_{r-1} + \frac{d}{dp}\mu_r)$, also Find μ_2, μ_3 .
Q.4	An Urn contains 3 Red, 2 Blue and 3 Green balls. 2 balls are selected at random from it. If X denotes the number of red balls and Y denotes the number of Blue balls selected, then find 1) The joint probability function f(X, Y) 2) $P(X + Y \leq 1)$



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

- 1) Write a program to convert pounds to kilograms. (5)
- 2) (a) Pick incorrect constants from the following (2.5)
(i) 45,235 (ii) -342 (iii) x34789 (iv) 5678
(b) Pick incorrect identifier from the following (2.5)
(i) @count (ii) 2nd (iii) temp (iv) theta
- 3) Write Fortran 90 equivalents for each of the following expressions (5)
(i) $\frac{1}{c\sqrt{2ye}\sqrt{43(y-x)^2}}$ (ii) $\text{Log}_e(x+y) + |a^{1/2} + b^{1/2}|$.
- 4) Read the following program and explain what it does. Trace it with yard=30 (5)

```

Program yard-feet
Implicit None
Integer::yard, feet, inch
Read*, yard
feet=3*yard
inch=12*feet
Print*, "feet=", feet, "inches=", inch
End Program yard-feet

```
- 5) Explain Goto statement of fortran with at least one example. (5)
- 6) Find out the errors, if any, in the following statements. (5)
Also write its correct form.
 - (i) If ($w \geq c$)
then $y = x + y$
else $y = y - x$
EndIf
 - (ii) If ($a > b$) then
If ($c > d$) then
 $y = z$
else
 $y = y - z$
EndIf

Q.2. Solve the following:

(i)	Given a point (x, y), write a program to find out if it lies on the x -axis, y -axis or at the origin.	(7)
(ii)	Given an integer, write a program to reverse and print it.	(7)
(iii)	Describe different structure of Do statements with at least one example.	(8)
(iv)	Given an octal number (a number in base 8) of arbitrary length. Write a program to find its decimal equivalent.	(8)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

1. Let \mathbb{R} be an integral domain. Then show that units of $\mathbb{R}[a]$ are precisely units of \mathbb{R} .
2. Show that $\mathbb{Z}[i\sqrt{5}]$ is not a unique factorization domain.
3. Is $\mathbb{Z}[x]$ principal ideal domain? Discuss.
4. Show that a finite extension field E of a field F is an algebraic extension of F .
5. Let $\alpha = \sqrt{1 + \sqrt{3}} \in \mathbb{R}$, show that α is algebraic of degree 4 over \mathbb{Q} .
6. Show that the product of two ideals of a ring R is an ideal of \mathbb{R} .

Q.2. Solve the following:

(3x10=30)

- 1) Let E be a simple extension $F[\alpha]$ of a field F and let α be algebraic over F . Let the degree of $\text{irr}(\alpha, F)$ be $n \geq 1$. Then show that every element β of $E = F[\alpha]$ can be uniquely expressed in the form of $\beta = b_0 + b_1\alpha + \cdots + b_{n-1}\alpha^{n-1}$ where $b_i \in F$.
- 2) Show that every principal ideal domain is unique factorization domain.
- 3) In $\mathbb{Z}[i]$, find $\text{GCD}(9 - 5i, -9 + 13i)$.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Number Theory-I

Course Code: MATH-408

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

(I)	Show that if $a^3 b^2$ then $a b$. Dose $a^2 b^3$ imply $a b$.
(II)	Show that every integer of the form $n^4 + 4$, with $n > 1$, is composite.
(III)	Prove that for each value of a , the congruence $a^{21} \equiv a \pmod{15}$ exists.
(IV)	If 658792, then find $\tau(n)$, $\varphi(n)$, $\sigma(n)$, and $\omega(n)$.
(V)	Prove that τ and σ are multiplicative functions.
(VI)	Find all solutions in integers of $(6x + 15y)(8x + 7y) = 129$.

Solve the following:

(5x6=30)

Q2	Show that if n is a positive integer and $\gcd(a, n) = 1$, then $a^{\varphi(n)} \equiv 1 \pmod{n}$.
Q3	Determine all the primitive roots of the primes $p = 7, 13$, and 17 .
Q4	Solve the system of linear congruence's $x \equiv 2 \pmod{3}$, $x \equiv 3 \pmod{8}$, $x \equiv 5 \pmod{7}$.
Q5	Show that $31 (4(29!) + 5!)$.
Q6	State and prove Euler's theorem.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

- Solve graphically: Maximize $Z = 10x + 30y$ subject to $x + 3y \leq 18$, $2x + y \leq 10$, $x \geq 0$, $y \geq 0$.
- Write the main steps of simplex method.
- Solve using M-technique: Maximize $Z = 3X_1 + 2X_2$ subject to $X_1 - X_2 \geq 4$, $-X_1 + 2X_2 \leq 2$, $X_1 + X_2 \geq 5$, $X_1, X_2 \geq 0$.
- Define the following terms in linear programming:
 - Feasible region
 - Objective function
 - Constraints
 - Optimal solution
- Consider the primal linear programming problem: Maximize $Z = 4X_1 + 5X_2$ subject to the constraints $3X_1 + 2X_2 \leq 12$, $X_1 + 3X_2 \leq 9$, $X_1, X_2 \geq 0$. Write dual of this problem. Give solution of the dual by solving the primal problem.
- What is a transportation problem in operations research? Name the methods used to find the initial basic feasible solution of a transportation problem.

Q.2. Solve the following:

(3x10=30)

- A company has three warehouses W_1, W_2, W_3 and three retailers R_1, R_2, R_3 . The supply and demand at the warehouses and retailers, along with the transportation cost per unit are given below.

From / To	R_1	R_2	R_3	Supply
W_1	4	6	5	10
W_2	7	5	8	20
W_3	6	8	4	15
Demand	12	18	15	45

- Use the least cost method to obtain an initial feasible solution.
 - Apply the uv -method to find the optimal solution.
- Consider the linear programming problem: Maximize $Z = 5X_1 + 4X_2$ subject to constraints $3X_1 + 2X_2 \leq 18$, $2X_1 + 3X_2 \leq 12$, $X_1 \geq 0$, $X_2 \geq 0$. Solve the problem using the simplex method and find the effect on the optimal solution if the coefficient of X_1 in the objective function increases by 2 units.
 - Solve the following LPP by two-phase method: Maximize $Z = 4X_1 + 3X_2 + 5X_3$ subject to the constraints $X_1 + X_2 + X_3 \geq 5$, $2X_1 + X_2 + 3X_3 \geq 8$, $X_1 + 2X_2 + X_3 \geq 6$, $X_1, X_2, X_3 \geq 0$.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(5x6=30)

1. Find an affine transformation which maps the points (0,0), (1,0), (0,1) onto the points (5,0), (0,5) and (0,6), respectively.

2. Find the missing term in the following table

x	1	2	3	4	5	6	7
$f(x)$	2	4	8	-----	32	64	128

3. Drive the normal equation for finding the least-squares power fit $y = Ax^2$.

4. Find the least-squares parabola for the four points (-3, 3), (0, 1), (2, 1) and (4, 3).

5. Show that translation is distance preserving transformation.

Q.2. Solve the following:

(3x10=30)

1. Prove that Euclidean transformation is an equivalence relation.

2. Determine the image of circle $x^2 + y^2 = 16$, under the transformation of stretching along y -axis by factor 3.

3. For the given set of data, find the least-squares curve for $f(x) = Ax^2$

x_k	y_k
1	0.6
2	1.9
3	4.3
4	7.6
5	12.6



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

- (i) In a test, the absolute pressure was changed from 2 MPa to 4 MPa, the volume decreases from 1500 cm^3 to 1488 cm^3 . Determine the bulk modulus of elasticity.
- (ii) What is stream tube? Find the strength of the stream tube.
- (iii) Define vorticity vector and derive the vorticity vector in cylindrical form for two dimensional motion.
- (iv) Define the types of external forces and prove the law of hydrodynamic pressure.
- (v) A two dimensional fluid motion is specified in the Lagrangian system by the equations $x = x_0 e^{kt}$, $y = y_0 e^{-kt}$. Find the path of the particle and expression for velocity components in Eulerian system.
- (vi) Calculate the velocity potential and stream function for a two dimensional source.

Solve the following:

(3x10=30)

- Q. 2** Prove that for an inviscid incompressible fluid, the circulation around any closed curve moving with the fluid remains constant at all times provided that external forces are conservative.
- Q. 3** Derive the following equation of motion: $\frac{1}{2}V^2 + \Omega + \int \frac{dp}{\rho} = c$. Also, discuss its special cases.
- Q. 4** The velocity potential for a certain two dimensional incompressible irrotational fluid flow is $\phi = x + \frac{1}{2} \ln(x^2 + y^2)$, by converting it in polar coordinates, evaluate the following:
 - (i) Stream function
 - (ii) Equipotential lines and Streamlines
 - (iii) Stagnation points
 - (iv) Complex velocity potential

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED****Q.1. Answer the following short questions:****(6x5=30)**

- (i) What is the origin of isospin and strangeness number? How are these quantum numbers assigned to various hadrons? Also discuss their corresponding conservation laws.
- (ii) What are Feynman diagrams? What is their use in Particle Physics? Write down the equation for β^- -decay and draw its corresponding Feynman diagram.
- (iii) Write down the 4 Maxwell's equations and derive their equation of continuity.
- (iv) Discuss why α_s is known as running coupling in QCD while α_e is taken as a constant in QED? Also comment on quark confinement and asymptotic freedom.
- (v) What is quark model? How does this model explain the observed spectrum of hadrons (baryons and mesons)? Discuss the concept of color charge.
- (vi) Define the time reversal operator. Show that the time reversal operator is antilinear and antiunitary.

Answer the following questions.**Question 2:****(7 + 3 = 10)**

(a): What are strangeness changing weak interactions. Give their example. Discuss in detail how the theory of weak interactions was modified to describe strangeness-changing weak interactions?

(b): What is the Eightfold way? Use it to arrange 8 spin-1/2 baryons.

Question 3:**(5 + 5 = 10)**

(a): Show that conservation of angular momentum is a consequence of isotropy of space.

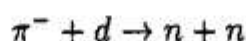
(b): Show that four Maxwell equations are equivalent to the following field equation in Lorentz gauge.

$$\square^2 A^\mu = J^\mu$$

Question 4:**(10)**

What is parity? What do we mean by intrinsic parity and extrinsic parity of a particle?

Determine the intrinsic parity of pion (π^-) by considering the reaction:





THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(15x2=30)

- (a) State the postulate of the Free electron Fermi Gas?
- (b) Do electrons have zero kinetic energy at 0 K? If not, why?
- (c) How can one predict the type of material from the band structure and number of electrons filling the structure?
- (d) Plot the distribution density ρ in the lattice for $|\psi_+|^2$ and $|\psi_-|^2$, and for a pure travelling wave.
- (e) What are the failures of free electron model?
- (f) What is the difference between mass and effective mass?
- (g) Differentiate between direct and indirect band gap materials?
- (h) Plot and describe the optical absorption curves for the direct and indirect band gap materials.
- (i) State the postulates for the existence of energy band gaps in solids.
- (j) Distinguish between intrinsic and extrinsic semiconductors.
- (k) Describe briefly the intrinsic mobility.
- (l) What is meant by cyclotron frequency? Give its mathematical expression.
- (m) Define Bloch function. What does it represent physically?
- (n) What is physical meaning of Fermi temperature?
- (o) Write the Expression of the Fermi Dirac Distribution Function and calculate its classical limit.

Answer the following questions.

- | | | |
|----------|--|-----|
| Q. 2(a): | Explain motion of a charged particle in a magnetic field. Define cyclotron frequency and give its mathematical formula. | (5) |
| (b) | State The Hall Effect . Derive its mathematical expression. On what factors does Hall coefficient depend? | (5) |
| Q. 3(a): | State Bloch theorem and show that probability of finding the electrons is the same everywhere. Also calculate the total number of allowed k-values in the first Brillouin's zone. | (5) |
| (b): | Describe briefly the band structure of alkali metals and the noble metals . | (5) |
| Q. 4(a): | Derive an expression for the Hall coefficient for an intrinsic semiconductor in terms of mobility of electrons and holes and the density of carrier. | (5) |
| (b): | Derive equation of motion of holes in a crystal and explain how holes move in k- space. | (5) |



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Astrophysics

Course Code: PHYS-4103

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- I. Briefly explain the terms (a) Hubble's Law (b) Milky way galaxy.
- II. What is dark matter, and why is it important in the study of astrophysics?
- III. Describe the difference between a black hole and a neutron star.
- IV. What is the primary source of energy for main-sequence stars?
- V. Describe classes of stars based on their spectral radiancy.
- VI. Explain the concept of cosmic microwave background radiation.

Answer the following questions. (3x10=30)

Q2: Explain the concept of a black hole and its characteristics.

Q3: Discuss the detection and characterization of exoplanets, including the transit method, radial velocity method, and direct imaging.

Q4: Describe the differences between spiral, elliptical and irregular galaxies. Write a note on Milky Way Galaxy.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

(i)- Define electric dipole and show that value of electric potential due to a dipole of charges separated by a distance l at a point $P(\vec{r})$ is,

$$V = \frac{1}{4\pi\epsilon_0} \frac{3(\vec{r} - \vec{r}') \cdot \vec{p}}{|\vec{r} - \vec{r}'|^3}$$

where p being dipole moment.

(ii)- Find the expression $\rho = \rho_0 e^{-t/t_c}$ for case of electrostatic equilibrium of a conductor, where ρ & t_c are volume charge density and relaxation time respectively. Also define relaxation time.

(iii)- Two long cylindrical shells of radii r_1 and r_2 are arranged coaxially and are charged to the potentials V_1 and V_2 respectively. Find the potential at points between the cylindrical shells.

(iv)- Prove that total charge enclosed in a dielectric fluid will be reduced to $\frac{1}{k}$ times the total free charge, where k is dielectric constant of the sphere.

(v)- State Ampere's circuital law and derive it by using concept of vector potential.

(vi)- Find magnetic field due to the flow of uniform current in a long straight wire.

Answer the following questions.

(3x10=30)

(a)- Prove that most general solution to Laplace equation in spherical polar coordinates is given by,

$$V(r, \theta) = \sum_{l=0}^{\infty} \left(A_l r^l + \frac{B_l}{r^{l+1}} \right) P_l(\cos\theta)$$

where symbols have usual meanings.

(b)- Consider a finite dielectric material characterized at each point \vec{r}' by a polarization $\vec{P}(\vec{r}')$. The polarization gives rise to an electric field. Calculate this field at exterior point $A(\vec{r})$ in form,

$$\vec{E}(\vec{r}) = \frac{1}{4\pi\epsilon_0} \int_{S'} \frac{\sigma_b(\vec{r} - \vec{r}')}{|\vec{r} - \vec{r}'|^3} da' + \frac{1}{4\pi\epsilon_0} \int_{V'} \frac{\rho_b(\vec{r} - \vec{r}')}{|\vec{r} - \vec{r}'|^3} dv'$$

where σ_b and ρ_b are surface and volume charge densities due to polarization charges.

(c)- Using Biot-Savart law, find magnetic induction due to current flowing in a circular loop along its axis.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (15x2=30)

1. What is the matrix representation of an operator in quantum mechanics? Write down the mathematical expression for matrix element of an operator.
2. Define identical particles in quantum mechanics and explain why their indistinguishability is important.
3. Write down the spin-half operators S_x , S_y , and S_z . Discuss their properties.
4. What is exchange degeneracy, and how does it arise in systems of identical particles?
5. Explain the symmetrization postulate for bosons and fermions. What is its physical significance?
6. Discuss the difference between symmetric and antisymmetric wavefunctions for a system of identical particles.
7. State and explain the Pauli exclusion principle for fermions. How does it affect the electronic structure of atoms?
8. Briefly explain the time-independent perturbation theory for the non-degenerate case. How is the first-order energy correction calculated?
9. Describe the degenerate perturbation theory. How does it differ from the non-degenerate case?
10. Explain the Zeeman effect and its significance in quantum mechanics.
11. Discuss the WKB approximation and how it is used to solve quantum mechanical problems.
12. Explain the variational method and how it is applied to approximate the ground state energy of a system.
13. Discuss the key concepts of time-dependent perturbation theory. How is it used to study transitions between quantum states?
14. State and explain the terms in Fermi's Golden Rule.
15. What is partial wave analysis in scattering theory? How is it used to solve scattering problems?

Q.2. Answer the following questions. (3x10=30)

1. Discuss the basic principles of scattering theory. Derive the Born approximation for the scattering amplitude and explain its physical implications.
2. Derive and discuss the perturbation theory for a system with degenerate energy levels. How do degeneracies affect the first-order corrections to the energy levels and wavefunctions?
3. Explain in detail the concepts of identical particles, exchange degeneracy, and the symmetrization postulate. Write down the wavefunctions of N identical bosons and fermions.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers of the following:

(6x5=30)

- (i) Explain the shape of a nucleus with a large negative electric quadrupole moment.
- (ii) All observed deuterons are known to have spin-parity 1^+ . What possible values of spin and orbital angular momentum quantum numbers explain this observation?
- (iii) Why does a proton have different spin magnetic dipole moment than an electron even though their spin and magnitude of electric charge is same?
- (iv) Give angular momentum and parity selection rules for alpha-decay.
- (v) Give two differences between Shell model and collective model of Nuclei.
- (vi) How could we include the velocity dependence of nuclear force in the nuclear potential?

Q.2. Answer the following questions.

- (i) (a) Consider a nucleus with mass number 'A' having several isotopes. Find the isotope with least mass and, hence, maximum binding energy. Start with the semi-empirical mass formula.
- (b) Why do nuclei undergo α -decay? Derive the decay rate assuming that the α particle and daughter nucleus are preformed inside a nucleus. [05+05]
- (ii) (a) What are the nuclear characteristics indicating their shell structure? How would you choose a suitable potential for shell model? [05]
- (b) If the energy of a single-particle state in the absence of spin-orbit splitting is E_0 , find the energies of the two members of the spin-orbit doublet and show that the difference in energy increases linearly with the orbital angular momentum of the state. [05]
- (iii) (a) What are the Q values of β^\pm -decay and electron capture process. Which of these processes is energetically least demanding? [05]
- (b) The isotope ^{113}Cd captures a very low-energy neutron, leading to an excited state of ^{114}Cd , which emits a γ ray leading directly to the ^{114}Cd ground state. Find the energy of the γ ray, neglecting the nuclear recoil. Calculate the kinetic energy of the recoiling ^{114}Cd . [$m(^{113}\text{Cd})=112.904400$ u , $m(^{114}\text{Cd})= 113.903357$ u , $m_n=1.00866501$ u] [05]



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- (i) What is the Eightfold Way? Use this theory to arrange the 8 lightest baryons into a baryon octet.
- (ii) Differentiate between leptonic, semi-leptonic and hadronic weak interactions with the help of examples.
- (iii) What are Feynman diagrams? Why are they important? Differentiate between internal lines and external lines in a Feynman diagram with the help of an example.
- (iv) Describe the Quark model. What is its origin? Explain why color charge is assigned to quarks?
- (v) Define and differentiate between parity, C-parity and G-parity operations. What are their corresponding eigen values?
- (vi) Discuss tau-theta puzzle which led to the assumption of parity violation in weak interactions.

Answer the following questions.

(3x10=30)

Question 2:

Describe the phenomena of vacuum polarization in QED and QCD. How the vacuum polarization implies the variation of coupling of electromagnetic (α_e) and strong interaction (α_s) with distance or energy of the interacting particles?

Question 3:

What are gauge transformations? Write down the Coulomb and Lorentz-Gauge conditions. Show that four Maxwell equations are equivalent to the following field equation in Lorentz gauge.

$$\square^2 A^\mu = J^\mu$$

Question 4:

What is isospin? Discuss isospin symmetry. Using Isospin symmetry find the ratios of the cross sections of the following processes

$$\pi^- + p \rightarrow K^+ + \Sigma^-$$

$$\pi^+ + p \rightarrow K^+ + \Sigma^+$$

$$\pi^- + p \rightarrow K^0 + \Sigma^0$$



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers of the following: (10x3=30)

- i. Differentiate between covariant and contravariant vector representation.
- ii. Show that $1 fm = 5 GeV^{-1}$ by using Natural system of units.
- iii. How Pauli and Weiskopf suggest the negative energy solution for Klein-Gordon Equation?
- iv. Show that $\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu = 2 g^{\mu\nu}$
- v. What kind of mesons are explained by Klein Gordon equation using Pauli and Weiskopf interpretation, write their names and justify?
- vi. Show that γ^0 is hermitian and γ^k is anti-hermitian, where $k = 1,2,3$
- vii. Why wave function satisfying Klein-Gordon equation is a scalar wave function?
- viii. Show that $(\sigma \cdot p)^2 = |p|^2$
- ix. Write down α and β matrices in Dirac Pauli and Weyl representation.
- x. Define Helicity operator.

Answer the following questions.

Q No. 2 Find the solution of Klein-Gordon equation using charge density and charge current density interpretations? (10)

Q No. 3. Investigate the transformation properties of the following bilinear expressions consisting of Dirac spinors:

$$(1) \bar{\psi} \gamma_5 \gamma_\mu \psi, (2) \bar{\psi} \gamma_\mu \psi, (3) \bar{\psi} \psi, (4) \bar{\psi} \gamma_5 \psi, \quad (2.5 \times 4)$$

Q No. 4. Derive Dirac equation in Electromagnetic Field. (10)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(15x2=30)

- i. Define nanomaterials.
- ii. Classify nanomaterials based on their dimensions and give one example of each.
- iii. Why do nanoparticles have a large surface-to-volume ratio?
- iv. What are nanocomposites?
- v. How can nanomaterials be dangerous for humans or the environment?
- vi. How do top-down and bottom-up methods differ in synthesizing nanomaterials?
- vii. What is photolithography?
- viii. Differentiate between a scanning electron microscope (SEM) and an optical microscope.
- ix. Provide examples of solution-based synthesis methods.
- x. Give four examples of nanodevices.
- xi. What is the application of UV-Vis spectroscopy?
- xii. Define sputtering.
- xiii. What is photodetector?
- xiv. What are energy storage devices? Give examples.
- xv. Describe the sol-gel technique.

Q.2. Answer the following questions.

- i. (a) How do nanoscale effects influence the physical and chemical properties of nanomaterials?
Briefly explain your answer. (5)
(b) Describe in detail any two applications of nanomaterials. (5)
- ii. (a) What is the hydrothermal process? Explain the synthesis procedure and the main factors affecting the morphology of nanomaterials. (5)
(b) Write a note on the Electron Beam Evaporation (EBE) technique. (5)
- iii. (a) What is X-ray diffraction (XRD) technique? How is it utilized to determine the structural parameters of a material? (4)
(b) Explain the key information gained about a material through the use of the following techniques;
 - Scanning Electron Microscopy (SEM)
 - Fourier Transform Infrared Spectroscopy (FTIR)
 - X-ray Photoelectron Spectroscopy (XPS) (6)

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED****Q.1. Give short answers of the following:****(6x5=30)**

- a) Differentiate between distinguishable and indistinguishable particles. Also give some examples.
- b) The Fermi-Dirac distribution function is given by, $f(\epsilon) = \frac{1}{e^{\frac{(\epsilon-\mu)}{kT}} + 1}$, where μ and k are chemical potential and Boltzmann constant respectively. Explain the conditions in which $f(\epsilon)$ has the value between 0 and 1.
- c) Entropy of a natural system always increases. Explain this statement with the help of any two examples.
- d) State the Stephen Boltzmann law and show that total energy of photons gas per unit volume is directly proportional to fourth power of absolute temperature.
- e) Define fermions and bosons. Differentiate between Fermi Dirac statistics and Bose Einstein statistics.
- f) Show that $U = - \tau^2 \frac{\partial}{\partial \tau} \left(\frac{F}{\tau} \right)$, where F being the Helmholtz free energy.

Answer the following questions.**Q.2**

- a) State and prove Liouville's theorem. Also mention its importance.
- b) Discuss the condition for a system having two compartments to be in mechanical equilibrium.

(5+5)**Q.3**

- a) Define photon gas. Derive Bose-Einstein distribution function.
- b) What is Bose –Einstein Condensation? Under what conditions it is formed?

(6+4)**Q.4**

- a) Derive an expression for entropy of the ideal gas treating it as a system of microcanonical ensemble.
- b) What is Gibb's Paradox? How can it be resolved?

(6+4)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- What is meant by magnon? Also, discuss the concept of quantization of magnon wave.
- Show graphically how magnetic susceptibility varies with temperature in ferromagnets, paramagnets, diamagnets and antiferromagnets.
- Explain temperature dependence of saturation magnetization (M_s) in ferromagnets. Plot M_s versus temperature curve to support answer.
- What is the origin of magnetostatic anisotropy? Discuss its effect on hysteresis curve.
- Establish a mathematical relation between induced magnetic field B and applied magnetic field H that describe magnetization behavior of a material in general.
- What is meant by supermagnetism? Draw hysteresis curves to show how superparamagnetic behavior differs from ferromagnetic behavior?

Answer the following questions.

Q.2

- For a spin system, establish the Bloch equations: $dM_x/dt = \gamma(M \times B_a)_x - M_x/T_2$, $dM_y/dt = \gamma(M \times B_a)_y - M_y/T_2$ and $dM_z/dt = \gamma(M \times B_a)_z + (M_0 - M_z)/T_1$, where T_1 and T_2 is the longitudinal and transverse relaxation time, respectively. (6)
- Determine the frequency of free precession of a spin-system in an applied static field $B_a = B_0$ along z -direction and $M_z = M_0$. (4)

Q.3 Derive a dispersion relation for a magnon wave propagating in ferromagnetic lattice. (10)

Q.4 Derive an expression to calculate the fractional change in magnetization $\frac{\Delta M}{M(0)}$ if thermal excitation of magnons occurs at temperature T . (10)



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- I. What is meant by the *range-energy relationship*? Use a graphical explanation to support your answer.
- II. Describe the process of *photoelectric absorption*, including all the steps involved in this fundamental interaction.
- III. How would you evaluate *PET/CT scanning*? Discuss its common uses and limitations to support your answer.
- IV. What is *pair production*, and how is it applied in medical physics?
- V. Explain the concepts of *brachytherapy* and *unsealed source therapy* in radiation treatment.
- VI. Discuss the *photoelectric effect*, where a photon disappears through interaction with a tightly bound electron.

Q.2. Answer the following questions. (3x10=30)

- I. How can neutrons be categorized based on their energy levels? Support your explanation with an energy equation for a given temperature.
- II. What is the difference between *ionization* and *excitation*? Provide an explanation of *specific ionization* to support your answer.
- III. Why is *dosimetry* important in radiation physics? Discuss the functions of *photographic dosimeters* and *scintillation dosimeters*.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Public International Law-I

Course Code: POL-403

Time: 3 Hrs.

Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- i. Write down the nature of International Law.
- ii. Relationship between International Law and Municipal Law.
- iii. Write two sources of International Law.
- iv. Define state as, actor of International Law.
- v. Define Defacto Recognition.
- vi. What is meant by Territorial Jurisdiction?

Q.2. Answer the following questions.

(3x10=30)

- i. Write down the scope of International Law.
- ii. Define State Succession in detail.
- iii. Write down different methods for Acquisition of Territorial Sovereignty.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Foreign Policy of Pakistan

Course Code: POL-404

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

1. What is the meaning of Regionalism.
2. What are essential factors of strong foreign policy.
3. What is Kashmir Issue.
4. SAARC and ECO are stand for?
5. When and why did Pakistan join Non- Alignment Movement.
6. What is Cold War Era.

Q.2. Answer the following questions.

(3x10=30)

1. Write the principles of Pakistan foreign policy.
2. How did terrorism affect the foreign policy of Pakistan.
3. Pakistan relation with Iran and Afghanistan. Discuss



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Diplomacy

Course Code: POL-405

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions:

(6x5=30)

سوال نمبر 1: درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

- i. Discuss the difference between old and new Diplomacy?
i. نئی اور پرانی سفارت کاری میں فرق بیان کریں۔
- ii. Name any four diplomatic institutions?
ii. چار سفارتی اداروں کے نام لکھیں۔
- iii. Explain briefly the organization of diplomatic Mission?
iii. سفارتی مشن کی تنظیم مختصر اوضح کریں۔
- iv. What is Public Diplomacy?
iv. پبلک سفارت کاری کیا ہوتی ہے؟
- v. Who is an attache?
v. اتاشی کون ہوتا ہے؟
- vi. What is environmental diplomacy?
vi. ماحولیاتی سفارت کاری سے کیا مراد ہے؟

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر 2: درج ذیل سوالات کے تفصیلی جوابات دیجئے۔

- i. Write diplomatic immunities in detail?
i. سفارتی سہولیات / حقوق کی وضاحت کریں۔
- ii. Write a note on Economic Diplomacy?
ii. معاشی سفارت کاری پر نوٹ لکھیں۔
- iii. Write major features of Islamic Diplomacy?
iii. اسلامی سفارت کاری کی اہم خصوصیات تحریر کریں۔



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

- 1) What is Data reader?
- 2) What is entity data model?
- 3) What is a delegate in enterprise systems?
- 4) Write difference between WSDL and SOAP.
- 5) What is the syntax of XML?
- 6) What is web API?

Q.2. Answer the following questions.

(2x15=30)

1. What is MVC? Write its uses and advantages.
2. How we define variables in JavaScript? Write a program in JavaScript to calculate the factorial of a number.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

- 1: Define SOCIAL RESEARCH, please
- 2: Please define QUANTITATIVE and QUALITATIVE research.
- 3: Please name any five research APPROACHES.
- 4: What is the difference between RESEARCH METHOD and RESEARCH METHODOLOGY?
- 5: Please write KEY CHARACTERISTICS of social research.
- 6: Please describe ACTION RESEARCH APPROACH.

Q.2. Answer the following questions.

(3x10=30)

- 1: What are the different STEPS in social research? Please discuss any two of them.
- 2: Please discuss why we do LITERATURE REVIEW in social research.
- 3: Please define and discuss research SYNOPSIS.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short Questions.

(6x5=30)

1-Define Social action

2 Discuss the need and importance of social action.

3-Discuss methodology of social action

4-What is the history of social action?

5-How social action leads to social policy?

6-Define Human rights.

Q.2. Answer the following Questions.

(3x10=30)

1-Discuss in detail the methodology of social action.

2-What do you mean by mobilization? How mobilization is for successful social action?

3-Discuss the role of social worker in the process of social action.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: Statistical Inference-I (Theory)

Course Code: STAT-401

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- I. Differentiate between risk and loss functions
- II. Describe the type of Consistency
- III. Differentiate between location invariant and scale invariant
- IV. Write the procedure for finding whether any estimator is sufficient or not, what are (if any) the objections on them
- V. Differentiate between efficiency and mean-square consistency
- VI. Explain the Fisher-Neyman factorization criterion for sufficiency

Q.2. Answer the following questions. (3x10=30)

- I. Show and prove Neyman Factorization Theorem
- II. Let X is a random sample of size n distributed uniformly $\mu (0, \alpha)$. Show that $\hat{M} = \text{Max of } (Y_1, Y_2, \dots, Y_n)$ is a consistent estimator of M
- III. Show that if minimum variance estimator exist, it would essentially be unique irrespective of whether any bound is attained.



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (6x5=30)

- a) What is the difference between the OLS and Maximum Likelihood estimation methods?
- b) Properties of residual in GLR (Generalized Linear Regression).
- c) Explain the sampling distribution of the regression sum of squares in General Linear Regression.
- d) Find mean and the variance of the slope estimator in SLR model.
- e) What are the key steps involved in Stepwise Regression?
- f) Describe the main objectives of the regression analysis.

Answer the following questions. (3x10=30)

Q.2. For the GLR model, derive the least squares unbiased estimate of variance of disturbance term

Q.3. Consider the following regression output

$$\hat{Y} = 0.2033 + 0.6560X_i$$

$$se(\hat{\beta}_0) = 0.0796, se(\hat{\beta}_1) = 0.1961, \text{Regression SS} = 0.0358, \text{Residuals SS} = 0.0544.$$

Where, Y = labor force participation rate (LFPR) of women in 1972 and X= LFPR of women in 1968. The regression results were obtained from a sample of 19 cities in the United States.

- (a) How would you interpret these regression results?
- (b) Test the hypothesis $H_0: \beta_1 = 1$ against $H_1: \beta_1 > 1$. Which test do you use? And why?
What are the underlying assumptions of the test(s) you use?

Q.4. Under SLRM $Y_i = \beta_0 + \beta_1 X_i + \epsilon_i$, obtain the ML estimators of β_0 and β_1 .



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(6x5=30)

- (i) Describe the purpose and aims of exploratory research. Support your explanation with relevant examples.
- (ii) Define coverage error and identify its primary sources. Discuss the methods used to control coverage error.
- (iii) Explain the concept of close-ended questions and discuss their pros and cons.
- (iv) Describe briefly the distinction between simple random sampling and systematic sampling.
- (v) Explain the difference between census and sample survey?
- (vi) Define sample design and explain the main steps involved in developing an effective sample design for research studies.

Answer the following questions.

(3x10=30)

- Q.2** Define measurement and its role in research methodology. Outline the different levels of measurement, including nominal, ordinal, interval, and ratio scales, and provide examples to clarify each.
- Q.3** Describe the process of pretesting a questionnaire and its underlying aims. Enlist the advantages and disadvantages of pretesting.
- Q.4** Provide a brief overview of the typical structure of a research report. Describe the precautions that researcher should take while writing his research report.

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED**

Q.1. Answer the following short questions: (5x6=30)

- How to stabilize the mean in case of non-stationary time series.
- Write a short note on seasonal ARIMA models.
- Differentiate between discrete and continuous time series.
- Define seasonal variations in time series. Briefly discuss the methods used for analyzing the seasonal variations.
- What are the main objectives of analyzing a time series?

Answer the following questions. (3x10=30)

Q.2. The following are the weekly profits in thousands of rupees in a certain small business:

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
Profit	3	6	2	10	7	9	14	12	18

Determine the trend line by the least squares method. Plot the actual values and linear trend on the same graph and interpret the results.

Q.3. Find the conditions for λ_1 and λ_2 , such that the 2nd degree AR Process defined by

$$X_t = \lambda_1 X_{t-1} + \lambda_2 X_{t-2} + Z_t$$

is stationary. If $\lambda_1 = \frac{1}{3}$ and $\lambda_2 = \frac{2}{9}$, Show that the ACF (X_t) is given by

$$\rho_k = \frac{16}{21} \left(\frac{2}{3}\right)^{|k|} + \frac{5}{21} \left(\frac{-1}{3}\right)^{|k|}$$

Q.4. Find the ψ weights and π weights for the ARMA (1,1) process given by

$$X_t = 0.5 X_{t-1} + Z_t - 0.3 Z_{t-1}$$



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions:

(5x6=30)

- i. Artificial variable and Decision variable.
- ii. Pivot element.
- iii. Corner point and constraints
- iv. Step of simplex method
- v. Degeneracy

Answer the following questions.

Q2. A lake contains two types of Fish-I, and Fish II. The owner provides two types of food A and B for fish. The Fish-I requires 2 units of food A and 4 units of food B while Fish-II requires 5 units of food A and 2 units of food B. If the owner has 800 units of each food, find the maximum number of fish that the lake can support. (10)

Q3. Solve the following problems using the graphical method.

(2x5=10)

- (i) Maximize $Z=20x+15y$
Subject to
$$\begin{aligned}x+y &\leq 100 \\3x+2y &\leq 240 \\x, y &\geq 0\end{aligned}$$
- (ii) Minimize $Z=3X_1+8X_2$
Subject to
$$\begin{aligned}X_1+2X_2 &\geq 6 \\3X_1+2X_2 &\leq 20 \\X_2 &\geq 8 \\X_1, X_2 &\geq 0\end{aligned}$$

Q4. Use Simplex method to solve the following problem. Provide the tables for all iteration. (2x5=10)

- (i) Maximize $Z = 2x + 3y$
Subject to
$$\begin{aligned}3x + 4y &\leq 12 \\2x + y &\leq 4 \\2x - y &\leq 4 \\x, y &\geq 0\end{aligned}$$
- (ii) Minimize $Z = 2x_1 + 3x_2$
Subject to
$$\begin{aligned}0.5x_1 + 0.25x_2 &\leq 4 \\x_1 + 3x_2 &\geq 20 \\x_1 + x_2 &= 10 \\x_1, x_2 &\geq 0\end{aligned}$$

**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED**

Q.1. Answer the following short questions: (5x6=30)

- Differentiate between cohort study and case study by giving suitable examples.
- Which sampling distributions are commonly used to analyze categorical data, and in which context are they applied?
- State the assumptions required for the application of the chi-square distribution and explain its limitations.
- Explain odds ratio and relative risk.
- A survey was conducted to compare the proportion of people who prefer online shopping versus in-store shopping in two cities. In city *A*, 120 out of 200 people preferred online shopping. In city *B*, 150 out of 250 people preferred online shopping. Construct a 95% confidence interval for the difference in proportions of people who prefer online shopping between the two cities. Interpret the results.

Answer the following questions. (3x10=30)

- Q.2** Records maintained for the number of male and female births in 800 families having 4 children are shown below. Fit binomial distribution to the given data and test the hypothesis of goodness-of-fit.

No. of male births	0	1	2	3	4
Families	32	178	290	236	64

Test whether the data is consistent with the hypothesis that binomial law holds and that the chance of female births is equal to the male births.

- Q.3** The table below shows the cross classification of belief in afterlife by gender.

	No	Yes
Male	509	116
Female	398	104

- Calculate odds for belief in afterlife for male.
- Calculate odds for belief in afterlife for female.
- Calculate the odd ratios and interpret.
- Calculate 95% confidence interval for odds ratio and interpret.

- Q.4** The following data are intended to show the dependence of brittleness in polyethylene bars on the duration of heat treatment at a particular phase of the manufacturing process. Use Fisher's exact test to the claim that the brittleness of polyethylene bars do not vary with the two heat treatments.

	Brittle	Tough
Treatment 1	2	8
Treatment 2	6	3



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Paper: Lasaniyaat

Course Code: URDU-401

Roll No.

Time: 3 Hrs.

Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

Q.1. Answer the following short questions.

(6x5=30)

سوال نمبر ۱: درج ذیل سوالات کے مختصر جوابات دیجئے۔

- Differentiate between Socio linguistics and Historical linguistics.
.i سماجی لسانیات اور تاریخی لسانیات میں فرق بیان کیجئے۔
- Describe phonetic briefly.
.ii صوتیات کا مختصر تعارف پیش کیجئے۔
- Briefly write the thoughts of Naseer Uddin Hashmi about the beginning of Urdu.
.iii اردو کی ابتدا کے بارے میں نصیر الدین ہاشمی کے خیالات مختصر بیان کیجئے۔
- Write the names of five prominent Urdu linguistics.
.iv اردو کے پانچ نمایاں ماہرین لسانیات کے نام لکھیے۔
- Write the names of branches of descriptive linguistics.
.v توضیحی / تشریحی لسانیات کی شاخوں کے نام لکھیے۔
- What is difference between Morphology and Syntax.
.vi صورتیات اور نحویات میں فرق بیان کیجئے۔

Q.2. Answer the following questions.

(3x10=30)

سوال نمبر ۲: درج ذیل سوالات کے جامع جواب دیجئے۔

- Write the need and importance of linguistics.
.i لسانیات کی ضرورت اور اہمیت بیان کیجئے۔
- Write note on descriptive linguistics.
.ii توضیحی لسانیات پر نوٹ لکھیے۔
- Write Hafiz Mehmood Sheerani's point of view in "Punjab Main Urdu" about Urdu.
.iii "پنجاب میں اردو" میں اردو کی بابت حافظ محمود شیرانی کے خیالات بیان کیجئے۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Usool e Tehqiq o Tadveen

Course Code: Urdu-402

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6x5=30)

سوال نمبر: 1۔ درج ذیل سوالات کے مختصر جوابات لکھیں۔

۱. ادبی تحقیق کی کیا اہمیت ہے۔ مختصر لکھیں؟
۲. بنیادی مآخذ سے کیا مراد ہے؟
۳. قیاسی تصحیح کے کہتے ہیں؟
۴. تسوید مقالہ کیسے کرتے ہیں؟
۵. تدوین کی اہمیت پر اختصار سے نوٹ لکھیں؟
۶. تعلقات کے متعلق آپ کیا جانتے ہیں؟

(3x10=30)

سوال نمبر: 2۔ درج ذیل سوالات کے تفصیلی جوابات لکھیں۔

۱. امتیاز علی عرشی نے اردو تحقیق کی روایت میں کیا کردار ادا کیا؟
۲. کتابیات کے اصول بتائیں؟
۳. مشفق خواجہ کی تدوین کے حوالے سے خدمات پر نوٹ لکھیں۔



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Urdu Adab Kay Muntakhib Komi-o-Byno-ul-Aqwami Marakaz

Course Code: Urdu-410

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچہ کو مہیا کی گئی جوابی کاپی پر حل کریں۔

(6x5=30)

سوال نمبر 1۔ درج ذیل سوالات کے مختصر جوابات تحریر کریں۔

- ا۔ انجمن پنجاب کی ادبی خدمات کیا ہیں؟
- ب۔ حلقہ ارباب ذوق کا مختصر تعارف بیان کریں۔
- ج۔ جامعہ کراچی میں شعبہ تصنیف و تالیف کی ادبی خدمات کا مختصر جائزہ لیں۔
- د۔ ترکی کا اردو ادب کے فروغ میں کیا کردار ہے؟
- ه۔ اردو سائنس بورڈ کے قیام کے مقاصد تحریر کریں۔
- و۔ امریکہ میں بابائے اردو کا تعارف اور خدمات کیا ہیں؟

(3x10=30)

مندرجہ ذیل سوالات کے جوابات تحریر کریں۔

- سوال نمبر 2۔ اردو ادب کے فروغ میں چین کا کیا کردار رہا مفصل بیان کریں۔
- سوال نمبر 3۔ اردو ادب کی تدریس و ترویج کے حوالے سے لاہور اور جاپان کے دو اہم مراکز پر نوٹ لکھیں۔
- سوال نمبر 4۔ ایران نے اردو کے فروغ کے لیے بھرپور کردار ادا کیا بحث کریں۔



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(6x5=30)

- i. Error of measurement and its sources
- ii. Criteria of Problem identification for research
- iii. ANOVA
- iv. References
- v. Motivations for research
- vi. Purpose of literature review

Answer the following questions.

(3x10=30)

Q.2 Write a detailed note on plagiarism.

Q.3 Explain the general steps involved in research.

Q.4 Give a comprehensive note on different parts of thesis.



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Bio Statistics/Univ. Option

Course Code: ZOOL-401A

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answers the following short questions:

(6x5=30)

i. An urn contains 3 red balls, 2 blue balls, and 5 white balls. A ball is selected and its color noted. Then it is replaced. A second ball is selected and its color noted. Find the probability of each of these.

- Selecting 2 blue ball
- Selecting 1 blue ball and then 1 white ball
- Selecting 1 red ball and then 1 blue ball

ii. Using the z table (Table E), find the critical value (or values) for each.

- $\alpha = 0.05$, two-tailed test
- $\alpha = 0.01$, left-tailed test

iii. Write down the formula of Z-test, t-Test and Chi-square test.

iv. What test is used to compare three or more means?

- State three reasons why multiple t tests cannot be used to compare three or more means.
- What are the assumptions for ANOVA?
- Define between-group variance and within-group variance.
- What is the F test formula for comparing three or more means?
- State the hypotheses used in the ANOVA test.

v. Explain the followings:-

- Explain right skewed distribution of data, how does it affect the mean.
- Differentiate between type I and Type II error in statistics.

vi. The average quantitative GRE scores for the top 30 graduate schools of engineering are listed. Construct a grouped frequency distribution and a cumulative frequency distribution with 5 classes.

767 770 761 760 771 768 776 771 756 770
763 760 747 766 754 771 771 778 766 762
780 750 746 764 769 759 757 753 758 746

Answer the following questions.

(3x10=30)

Q No.2: A survey found that the average hotel room rate in New Orleans is \$88.42 and the average room rate in Phoenix is \$80.61. Assume that the data were obtained from two samples of 50 hotels each and that the standard deviations of the populations are \$5.62 and \$4.83, respectively. At $\alpha = 0.05$, can it be concluded that there is a significant difference in the rates?

Q No.3: The owner of an ice cream shop claims that 40% of his customers prefer chocolate, 35 % vanilla, 15% strawberry and 10% mint ice cream. An employee selects 100 customers and ask their preference which is as under:-

Chocolate	vanilla	strawberry	mint
34	31	25	10

Test if owners claim is true?

Q No. 4: Is there any correlation between no of hours studied and percentage marks obtained in exams

X= hours	08	02	0	04	02	-----	-----
s							
Y=% mark	98	74	87	82	72	-----	-----



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2025

Roll No.

Paper: Molecular Biology

Course Code: ZOOL-403 A

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Define the following Terms:

(6x5=30)

- i. Supercoiling
- ii. Leading and Lagging Strand
- iii. Nucleotide and Nucleoside
- iv. Excision repair of thymine dimers
- v. Chromatin and Nucleosome
- vi. DNA Replication enzymes and proteins in Prokaryotes.

Answer the following questions:

(3x10=30)

- Q.2** What is polycistronic mRNA. Explain the process of Lac operon Regulation.
- Q.3** Write the comprehensive note on process of rRNA transcription
- Q.4.** What are post transcriptional modification. How mRNA in Eukaryotes is modified with reference to addition of 5' Cap, poly A tail and removal of introns.