UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Positive Psychology (Revised) **Course Code: APSY-481** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1. Describe similarities between the work of Seligman and Maslow in positive psychology.
2. Compare and contrast the hedonic and eudaimonic well-being.
3. Elaborate the Four-Branch Model of Emotional Intelligence.
4. Describe the empathy-altruism hypothesis.
5. What are the traits of a 'Positive Community'?
6. What is optimism? Differentiate between realistic and unrealistic optimism.
7. What is the importance of gratitude regarding the Islamic perspective?
8. What is the connection between spirituality and well-being?
9. Define self-efficacy. How it can be improved?
10. Define 'Flow'. What conditions can trigger flow experience?

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

1. Define attachment and different styles of attachment. How does parent-child attachment affect wellbeing and later adult relationships?
2. Explain the classification and measurement of human strengths in detail.
3. What are positive emotions? Explain the determinants and importance of positive emotions.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Peace Psychology (Revised) **Course Code: APSY-482** **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 are the major theories and models underlying peace psychology, and how do they inform our understanding of peace and conflict?
2. How does emotional intelligence (EI) impact an individual's ability to manage aggression and conflict, and what strategies can be employed to enhance EI?
3. What are the root causes of hate and prejudice, and how can these be addressed through education and socialization?
4. How does the cycle of violence perpetuate itself, and what strategies can be employed to break this cycle?
5. How can the concept of positive peace be operationalized and measured in different cultural and societal contexts, and what are the key indicators of positive peace that can be used to evaluate the effectiveness of peacebuilding interventions?
6. What role can regional organizations such as the Association of Southeast Asian Nations (ASEAN) play in promoting peacebuilding and conflict resolution in Asia

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

1. How can peace psychology be used to promote positive social change, and what are the potential applications of peace psychology in fields such as education, healthcare, and community development?
2. What role can empathy, active listening, and other interpersonal skills play in facilitating effective conflict resolution, and how can these skills be developed and utilized in conflict resolution training programs?
3. What are the key components of a comprehensive peacebuilding framework, and how can these components be integrated and sequenced to support sustainable peace and stability in post-conflict societies?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Clinical Psychology-II **Course Code: APSY-483** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1) What are forceful coping statements and how are they practiced in REBT?
2) Explain the role of proselytizing in strengthening rational beliefs?
3) Explain the role of Client Therapist collaboration in the success of CBT?
4) Explain how skill training is conducted in REBT to address difficulties in behavior?
5) Discuss the importance of relapse prevention in ensuring long term success in REBT?
6) Explain the importance of identifying and challenging core belief in CBT?
7) Describe the function of cognitive distortions in maintaining negative thought patterns and how CBT address them?
8) How does modeling help clients in learning rational behaviors?
9) What is cognitive restructuring in CBT, give example?
10) Discuss the importance of therapeutic alliance in REBT?

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

1) Discuss in detail the historical development of CBT and its Foundational Theories?
2) Difference between healthy and unhealthy negative feelings in REBT, providing relevant example?
3) Explore the contributions of Albert Ellis to the field of psychology and psychotherapy. What motivated him to create REBT and how does differ from the dominant therapeutic operations of his time, such as psychoanalysis?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Arabic-VIII **Course Code: ARB-402** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچے کو علیحدہ سے مہیا کی گئی جوابی کاپی پر حل کریں

السؤال الأول: أجب عن الأسئلة التالية بإيجاز. **(10x3=30)**

1. اذكر مثالًا للنهي.
2. اذكر مثالًا للنداء.
3. اذكر مثالًا للاستعارة الأصلية.
4. عرّف التشبيه المرسل.
5. عرّف التشبيه المؤكد.
6. اذكر مثالًا للاستعارة التبعية.
7. اذكر مثالًا للاستعارة التصريحية.
8. عرّف التشبيه المفصل.
9. عرّف التشبيه الضمني.
10. اذكر مثالًا للاستعارة المكنية.

السؤال الثاني: عرّف التشبيه واذكر أركانه. وضّح إجابتك بالأمثلة. **(15)**

السؤال الثالث: عرّف الإنشاء واذكر أهم أغراضه. وضّح إجابتك بالأمثلة. **(15)**

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Statistics (Advanced) **Course Code: BBA-410** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

i. Confidence Interval
ii. Bootstrapping
iii. Type-I Error
iv. Null and Alternative Hypothesis
v. P-Value
vi. Analysis of Variance
vii. Properties of Least Square Regression Line
viii. Properties of Correlation Coefficient
ix. Multicollinearity
x. Contingency Table

Answer the following Questions. (5x6=30)

Q2. Is your favorite TV program often interrupted by advertising? CNBC presented statistics on the average number of programming minutes in a half-hour sitcom (CNBC, February 23, 2006). The following data (in minutes) are representative of their findings.

21.06	21.66	23.82	21.52	20.02	22.37	23.36	22.24	21.23	20.30

Test the hypothesis that the mean number of programming minutes during a half-hour television Sitcom is 21.0 minutes using the 95% confidence interval.

Q3. According to Thomson Financial, through January 25, 2006, the majority of companies reporting profits had beaten estimates (*BusinessWeek*, February 6, 2006). A sample of 162 companies showed 104 beat estimates, 29 matched estimates, and 29 fell short. Test the hypothesis that the proportion for beaten estimates differ from 50% using a 95% confidence interval.

Q4. The data in the following table show the number of shares selling (millions) and the expected price (average of projected low price and projected high price) for 10 selected initial public stock offerings.

Shares Selling (millions)	5.0	9.0	6.7	8.75	3.0	13.6	4.6	6.7	3.0	7.7
Expected Price ($)	15	14	15	17	11	19	13	14	10	13

i. Develop a scatter diagram for these data with Shares Selling as the independent variable.
ii. Predict the Expected Price for the 10.0 million shares selling using the estimated least square regression equation.
iii. Find the Pearson's correlation coefficient between the Expected Price ($) and the shares selling.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. ……

Paper: E-Commerce **Course Code: BBA-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. What is B2C E-Commerce?

ii. What is SSL/TLS in E-Commerce?

iii. What are the E-Commerce Security Threats?

iv. What are the advantages of B2B E-Commerce?

v. How can E-Commerce business ensure system redundancy?

vi. What is a payment gateway, and how does it ensure secure transactions in E-Commerce?

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

i. What is the fundamental Concepts and components and underpin the foundation of E-Business, and how do they contribute to the overall success and growth of online ventures?

ii. Do a comparative analysis between traditional commerce and E-Commerce?

iii. What are the key components of an effective digital marketing strategy for a newly launched online business?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Financial Institutions & Services **Course Code: BBA-412** **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) Modaraba agreement
b) Lender of last resort
c) Initial public offering vs private placement
d) Underwriting
e) Mutual funds
f) Venture capital

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

Q.2 Discuss the role of Securities and Exchange Commission of Pakistan (SECP) for managing securities market.

Q.3 Discuss the evolution of Islamic banking in Pakistan. Differentiate between Islamic banking and conventional banking.

Q.4 What is the concept of General/non-life insurance? Explain in detail the types of general insurance are offered by insurance companies in Pakistan?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Financial Management (Advanced) **Course Code: BBA-413** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

a) Define Degree of Operating Leverage and its use
b) What are Stock Dividends
c) What is difference between Commercial Banking and Investment Banking
d) Why Preferred stocks are considered hybrid securities?
e) Differentiate between Gross and net working capital
f) Define Credit terms and credit length

Answer the following Questions. (3x10=30)

Question 2:

Play-More Toys produces inflatable beach balls, selling 400,000 balls per year. Each ball produced has a variable operating cost of $0.84 and sells for $1.00. Fixed operating costs are $28,000. The firm has annual interest charges of $6,000, preferred dividends of $2,000, and a 40% tax rate.

i. Calculate the operating breakeven point in units.
ii. Use the degree of operating leverage (DOL) formula to calculate DOL.
iii. Use the degree of financial leverage (DFL) formula to calculate DFL.
iv. Use the degree of total leverage (DTL) formula to calculate DTL. Compare this to the product of DOL and DFL calculated in parts b and c.

Question 3:

Aubey Appliance Corporation is considering a merger with the Velmore Vacuum Company. Velmore is a publicly traded company, and its current beta is 1.30. Velmore has been barely profitable, so it has paid an average of only 20% in taxes during the last several years. In addition, it uses little debt, having a debt ratio of just 25%. If the acquisition were made, Aubey would operate Velmore as a separate, wholly owned subsidiary. Aubey would pay taxes on a consolidated basis, and the tax rate would therefore increase to 35%. Aubey also would increase the debt capitalization in the Velmore subsidiary to 40% of assets, which would increase its beta to 1.47. Aubey's acquisition department estimates that Velmore, if acquired, would produce the following cash flows to Aubey's shareholders (in millions of dollars):

Year	Cash Flows
1	$1.25
2	1.45
3	1.65
4	1.85
5 and beyond	Constant growth at 6%

These cash flows include all acquisition effects. Aubey's cost of equity is 14%, its beta is 1.0, and its cost of debt is 10%. The risk-free rate is 9%.

i. What discount rate should be used to discount the estimated cash flows? (Hint: Use Aubey's rs to determine the market risk premium.)

ii. What is the dollar value of Velmore to Aubey?

iii. Velmore has 1.5 million common shares outstanding. What is the maximum price per share that Aubey should offer for Velmore? If the tender offer is accepted at this price, what will happen to Aubey's stock price?

Question 4:

A firm is contemplating shortening its credit period from 40 to 30 days and believes that, as a result of this change, its average collection period will decline from 45 to 36 days. Bad-debt expenses are expected to decrease from 1.5% to 1% of sales. The firm is currently selling 12,000 units but believes that as a result of the proposed change, sales will decline to 10,000 units. The sale price per unit is $56, and the variable cost per unit is $45. The firm has a required return on equal-risk investments of 25%. Evaluate this decision and make a recommendation to the firm. (Note: Assume a 365-day year.)

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Labour Laws in Pakistan **Course Code: BBA-417** **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 are duties of employers?

ii. Factories Act 1934

iii. Difference between conciliation and arbitration.

iv. Payment of Wages Act 1936

v. Industrial Relations Act 2012

vi. Briefly explain the functions of labor court

Answer the following questions. (3x10=30)

Q2: What is the process for resolving labor disputes in Pakistan?

Q3: How can conducting regular employee survey help identify dissatisfaction?

Q4: How does a union organizing campaign move from informal discussions to a formal petition for union recognition

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Human Resource Development **Course Code: BBA-418** **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 significance of cross-cultural training in global HRD?
II. What is the role of technology in HRD?
III. Define Apprenticeship training.
IV. What is Succession planning.
V. What is the primary role of HRD professionals in training administration?
VI. Explain On-the-job training.

Answer the following questions. (3x10=30)

Q.No.2: Discuss the Cognitive theory. Also Explain how learning from training can be applied in the workplace?

Q.No.3: How can HRD professionals ensure that traditional methods still provide value in today's digital and fast-paced work environment? Discussed.

Q.No.4: What are the key components of Human Resource Development functions, and how are they aligned with the organization's overall goals?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Microbes, Man and the Environment **Course Code: BOT-409** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1. What do you understand by the term MYCORRHIZAL ASSOCIATION?
2. Name some BACTERIAL diseases of plants. Mention the name of causal organism also.
3. Differentiate between Brown and White Rot.
4. Name the types of MICROBES involved in NITROGEN CYCLE.
5. What are RETROVIRUSES?
6. Name some FUNGAL diseases of man.
7. What do you mean by BINARY FISSION in bacteria?
8. Differentiate between YEAST and MOLD by giving examples.
9. Differentiate between the STATIONARY and DECLINE phase of bacterial growth curve.
10. Name four steps of waste water treatment.

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

i. What are the major human diseases and their symptoms caused by bacterial infection?

ii. Write about the importance of ENZYMES in food industry.

iii. Write in detail the mechanism of action involved in ANTIBIOTIC RESISTANCE.

iv. What do you understand by the term Biological control. Discuss

v. Explain the model of TOXIN action of microbes

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. ……

Paper: Challenges of a Changing Earth **Course Code: BOT-413** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

i. What is a climate smart crop?
ii. What is Air quality Index?
iii. What is a plankton bloom?
iv. The Amazon rainforest is sometimes called the 'lungs of the Earth'. Why?
v. Which country has the best seafood?
vi. Is a smog a global problem?
vii. What are the major greenhouse gases responsible for trapping heat around earth?
viii. What are biodiversity hotspots?
ix. What is Gaia hypothesis?

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

1. How does climate change affect food security?
2. What are the social and economic challenges affecting the health of terrestrial and aquatic ecosystem?
3. How does cryosphere contribute to global climate change, empirical evidence and impacts of climate change in the latitude?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Media Management and Marketing **Course Code: BSCS-413** **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 نمبر1: درج ذیل سوالات کے مختصر جواب تحریر کریں۔

i. Enlist the key financial challenges faced by Pakistan media outlet.

الف) پاکستانی میڈیا آؤٹ لیٹ کو درپیش اہم مالی چیلنجوں کی فہرست مرتب کیجئے۔

ii. Write down concise definition of media management. Enlist types of media management.

ب) میڈیا مینجمنٹ کی مختصر تعریف لکھیں۔ میڈیا مینجمنٹ کی اقسام کی فہرست بنائیں۔

iii. What is mass media organization? Enlist the main features of mass media organization in Pakistan.

ج) میڈیا آرگنائزیشن کیا ہے؟ پاکستان میں ذرائع ابلاغ کی تنظیم کی اہم خصوصیات کی فہرست بنائیں۔

iv. Private Ownership allows for a greater chance of serving the public interest. Describe shortly.

د) نجی ملکیت عوامی مفاد کی خدمت کے زیادہ مواقع فراہم کرتی ہے۔ مختصراً بیان کیجئے۔

v. Pen down four functions of mass communication as social institution.

ہ) بطور سماجی ادارہ ابلاغ عامہ کے چار کاموں کو قلمبند کیجئے۔

vi. Enlist three types of media in marketing along with examples.

و) مارکیٹنگ میں میڈیا کی تین اقسام مثالوں کے ساتھ لکھیں۔

Q.2. Answer the following questions. (2x15=30)

سوال نمبر2: درج ذیل سوالات کے تفصیلی جواب تحریر کریں۔

i. Define media conglomerates along with examples. Also discuss the characteristics of media conglomerates.

الف) مثالوں کے ساتھ میڈیا گروپس کی وضاحت کریں۔ میڈیا گروپس کی خصوصیات پر بھی بات کریں۔

ii. Circulation number for traditional print media has been affected due to shift to digital media. Debate on it.

ب) ڈیجیٹل میڈیا پر منتقل ہونے کی وجہ سے روایتی پرنٹ میڈیا کے سرکولیشن نمبر متاثر ہوئے ہیں۔ بحث کیجئے۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Specialized Journalism

Course Code: BSCS-414 (viii) Media in SAARC Countries

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 نمبر1: مختصر جوابات تحریر کریں۔

1- Discuss the Failures of SAARC.

1- سارک کی ناکامیاں بیان کریں۔

2- Write down the history of SAARC in your Words.

2- سارک کی ہسٹری اپنے الفاظ میں تحریر کریں ۔

3- Describe the Role of Media in Regional Conflicts.

3- خطے کے تنازعات میں میڈیا کے کردار پر روشنی ڈالیں۔

4- Discuss the effects of Modern Media on Traditional Media in SAARC Member Countries.

4- سارک ممالک میں جدید میڈیا کے روایتی میڈیا پر اثرات پر نوٹ لکھیں۔

5- How Freedom of Press can be ensure in the Region.

5- خطے میں پریس کی آزادی کو کس طرح سے یقینی بنایا جا سکتا ہے۔

6- What is the major issue of the SAARC Member Countries and How Media can play a Positive role the Solution.

6- سارک ممبر ممالک کا بڑا مسئلہ کیا ہے اور میڈیا کس طرح اس کے حل میں کتنا کردار ادا کر سکتا ہے۔

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

سوال نمبر2: مندرجہ ذیل سوالات کے جوابات تحریر کیجیے۔

1- Write a detail note on the role of Electronic Media in SAARC.

1- سارک ممالک میں الیکٹرانک میڈیا کے کردار پر تفصیلی نوٹ لکھیں۔

2- Media is a Powerful tool in reconciliation, Justify the statement.

2- میڈیا مفاہمت کے لیے ایک طاقتور آلہ ہے بیان کو ثابت کریں۔

3- Briefly discuss the Media Prospects in Afghanistan and role of SAARC in it.

3- افغانستان میں میڈیا کے امکانات اور اس میں سارک کے کردار پر روشنی ڈالیں۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Specialized Journalism **Course Code: BSCS-414-B (ii) Education** **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 نمبر1: درج ذیل سوالات کے مختصر جواب تحریر کریں۔

i. Briefly explain the structure of News.

الف) خبر کی ساخت بیان کریں۔

ii. Explain the purpose of Youth Internship Program.

ب) یوتھ انٹرن شپ پروگرام کے مقاصد پر مختصر نوٹ لکھیں۔

iii. Explain Article 25A of Constitution of Pakistan.

ج) پاکستانی آئین کے آرٹیکل 25A پر مختصر نوٹ لکھیں۔

iv. Briefly discuss the objectives of TEVTA.

د) TEVTA کے مقاصد کیا ہیں؟ مختصر بیان کریں۔

v. Write down the techniques of interview.

ہ) انٹرویو کے اسلوب بیان کریں۔

vi. Describe five characteristics of Education Reporter.

و) ایجوکیشن رپورٹر کی پانچ خصوصیات بیان کریں۔

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

سوال نمبر2: درج ذیل سوالات کے تفصیلی جواب تحریر کریں۔

i. Throw light on the Role & Responsibilities of the media in disseminating educational information in Pakistan.

الف) پاکستان میں تعلیمی معلومات کو پھیلانے میں میڈیا کے کردار اور ذمہ داریوں پر تفصیلی روشنی ڈالئے۔

ii. Discuss in detail the objectives & functions of Higher Education Department. Also mention its major wings.

ب) ہائر ایجوکیشن ڈیپارٹمنٹ کے مقاصد اور افعال کے بارے میں تفصیلاً گفتگو کریں۔

iii. Explain the importance of media education. Do you think that education reporter can be helpful to change the mindset of the people in Pakistan, which lead towards Socio-Economic growth? Discuss.

ج) میڈیا تعلیم کی اہمیت کی وضاحت کیجئے۔ نیز کیا آپکو لگتا ہے کہ ایجوکیشن رپورٹر لوگوں کی ذہنیت تبدیل کرنے میں مددگار ثابت ہو سکتا ہے جو پاکستان کو سماجی اور اقتصادی ترقی کی طرف لے جاسکتے ہیں؟ بحث کریں۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Advertising-II **Course Code: BSCS-419** **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 نمبر1: درج ذیل سوالات کے مختصر جواب تحریر کریں۔

i. Testimonial

الف) تعریفی بیان

ii. Product placement

ب) مصنوعات کی جگہ

iii. Guerrila Advertisement

ج) گوریلا اشتہار بازی

iv. Publicity

د) تشہیر

v. Personified Radio Ad

ہ) شخصیت پر مبنی ریڈیو اشتہار

vi. Direct mail advertising

و) ڈائریکٹ میل ایڈورٹائزنگ

Q.2. Answer the following questions. (2x15=30)

سوال نمبر2: درج ذیل سوالات کے تفصیلی جواب تحریر کریں۔

i. Explain how do creative elements impact the effectiveness of a TV advertisements? Provide examples and discuss how these creative aspects capture viewer attention and achieve the desired marketing goals.

الف) ٹیلی ویژن اشتہار پر تخلیقی عناصر کیسے اثر انداز ہوتے ہیں؟ یہ کیسے دیکھنے والوں کی توجہ حاصل کرنے اور مارکیٹنگ کے مقاصد حاصل کرنے میں اپنا کردار ادا کرتے ہیں؟

ii. What is secondary research? Briefly discuss how we use it in advertising research in effective decision-making.

ب) ثانوی تحقیق کیا ہے؟ ہم کیسے پر اثر فصلہ سازی میں اشتہار بازی کی تحقیق کو استعمال کرتے ہیں۔ بیان کریں۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Public Relations-II **Course Code: BSCS-421** **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: مختصر جوابات تحریر کریں۔

1. **Briefly describe any three types of audio visual media.**

الف) کسی بھی تین قسم کے آڈیو ویژول میڈیا کو مختصراً بیان کریں۔

2. **What is meant by earned media?**

ب) ارنڈ میڈیا سے کیا مراد ہے؟

3. **Define Publics in Public Relations.**

ج) تعلقات عامہ میں عوام کی تعریف کریں۔

4. **What is your understanding of speaker panels?**

د) اسپیکر پینلز کے بارے میں آپ کی کیا سمجھ ہے؟

5. **Describe any three types of special events in Public Relations.**

ہ) تعلقات عامہ میں کسی بھی تین قسم کے خصوصی واقعات کی وضاحت کریں۔

6. **Describe the significance of Public Relations.**

و) تعلقات عامہ کی اہمیت بیان کریں۔

Q.2. Answer the following questions. (2x15=30)

سوال نمبر 2: مندرجہ ذیل سوالات کے جوابات تحریر کیجیے۔

1) **Discuss the importance of maintaining good relations with media with reference to Pakistani society.**

الف) پاکستانی معاشرے کے حوالے سے میڈیا کے ساتھ اچھے تعلقات رکھنے کی اہمیت پر تبادلہ خیال کریں۔

2) **Comment on the role of Contingency Planning for effective Public Relations.**

ب) موثر تعلقات عامہ کے لیے ہنگامی منصوبہ بندی کے کردار پر تبصرہ کریں۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Environmental Chemistry **Course Code: CHEM-402** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1. What are essential components of a typical fertile soil?
2. How HUMUS is helpful in the soil fertility?
3. Suggest a suitable analytical technique for analysis of heavy metals in the environment?
4. What is soil erosion?
5. What are AFLATOXINS?
6. Enlist micronutrients of plants.
7. What are primary pollutants?
8. What is soil pollution.
9. What is CEC of the soil?
10. Enlist any two pollutants included in the dirty dozen?

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

1. What are Heavy Metals? How these are affecting the environment?
2. Elaborate any three principles of GREEN CHEMISTRY.
3. Describe the principle and application of AAS for environmental monitoring.
4. Elaborate the SOLID components of soil.
5. How MINING is contributing in soil pollution?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Inorganic Chemistry (Sp. Theory-I) **Course Code: CHEM-425** **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. Discuss the significance of lattice energy?
ii. Write any two applications of Born - Haber cycle.
iii. What is Born Mayer equation.
iv. Write any two properties of tetraboranes.
v. What is the role of Tesla coil in ICP?
vi. Why is photodetector used in flame photometer?
vii. What are metasilicates?
viii. Write any four applications of zeolites?
ix. Compare properties of benzene and borazine.
x. Write uses of talc.
xi. Give various types of fuels used to produce different ranges of flame temperatures in spectroscopy.
xii. Give two clinical applications of Flame Emission Spectroscopy.
xiii. What are three dimensional silicates?
xiv. What are S-N rings?
xv. How does lattice energy affect solubility?

Q.2. Give adequate answer to the following questions. (6x5=30)

i. Derive Born-Lande equation for the calculation of lattice energy.
ii. What are the main ionization and excitation mechanisms that occur in ICP?
iii. Explain the working of laminar flow burner.
iv. Discuss chemistry of homocyclic system of selenium.
v. Write a note on borazine.
vi. Discuss applications and uses of silicates.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Organic Chemistry (Sp. Theory-I) **Course Code: CHEM-428** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions.

(a) **(2.5 x 2 = 5)**

I. Why only a small quantity of the sample (in the vapour state) is used for analysis in the mass spectrometer?

II. Explain why the deuterium-coupled 1H-spectrum of cyclohexane-d11 contains only a sharp singlet at room temperature but two singlet at 170 K.

(b). **(2.5 x 2 = 5)**

I. How will you distinguish between CH_3Cl, CH_3Br, and CH_3I by mass spectrometry?

II. What are natural products?

(c). **(2.5 x 2 = 5)**

I. In benzaldehyde, two of the ring protons have resonance at 7.87 ppm, and the other three have resonance in the range from 7.5 to 7.6 ppm. Explain.

II. Arrange the following protons in the decreasing order of their δ values in 1H-NMR and account for your order: Methyl, ethylenic, acetylenic, aryl and aldehydic.

(d). How would you distinguish between primary, secondary and tertiary butyl alcohols by mass spectrometry? **(5).**

(e). How can you distinguish among the seven isomers of $C_4H_{10}O$ by the number of distinct signals and areas under them in their PMR spectra? **(5)**

(f) What fragments are expected as a result of McLafferty rearrangement in the following compounds? **(1x5 = 5)**

i) 5-Methyl hexanal, ii) 4-Methyl-2-pentanone, iii) 2-Butylcyclohexanone,

iv) Butyl 2,2-dimethylpropanoate v) 2-Ethylhexanoic acid.

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

a) Deduce the structure of each of the following compounds on basis of their PMR spectral data and molecular formula.

A. C_7H_8: δ 2.3 (3H, s) and 7.1 (5H, s)

B. $C_8H_8O_2$: δ 3.9 (3H, s) 7.5 (3H, m) and 8.0 (2H, m)

C. $C_5H_{10}O_2$: δ 1.2 (6H, d) 2.0 (3H, s) and 5.0 (1H, m)

D. C_6H_{12}: δ 1.4 (12H, s)

E. $C_2H_6O_2$: δ 3.7 (4H, s) and 4.7 (2H, s)

b) What fragments are expected from the McLafferty rearrangement in the following compounds.

(i) 5-Methyl hexanal

(ii) 4-Methyl-2-pentanone

(iii) 2-Butyl cyclohexanone

(iv) Butyl-2,2-dimethyl propanoate

(v) 2-Ethylhexanoic acid

c) Write a note on terpenoids. Also explain the general methods of structure determination of terpenoids.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Organic Chemistry (Sp. Theory-II) **Course Code: CHEM-429** **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 can you explain the fact that Aryl silanes undergo ipso substitution with electrophiles?

II. Write two methods for the protection and deprotection of carboxylic acids in chemical reaction.

III. What is phase transfer catalysis? Describe how crown ethers can be used for phase transfer catalysis?

IV. How can you synthesize propan-1-ol from propene? Write complete reaction.

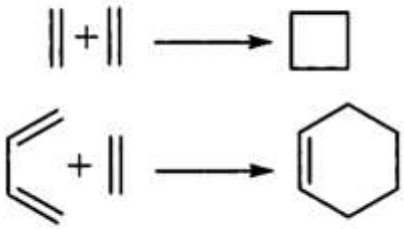
V. What are synthon and synthetic equivalent in disconnection approach? Give example.

VI. How would you differentiate between singlet carbene and triplet carbene? Explain their structures.

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

A) By using energy level correlation diagram how can you explain that thermal electrocyclic reactions involving 4n electrons proceed in a conrotatory fashion while photochemical electrocyclic reactions involving 4n electrons proceed in a disrotatory fashion?

B) Which of the following reactions will proceed thermally and which will undergo photochemically? Explain your answer by using frontier molecular orbital (FMO) approach.



C) Explain Merrifield Solid-Phase Peptide Synthesis. Describe all steps involved.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Analytical Chemistry (Sp. Theory-I) **Course Code: CHEM-431** **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)- Give the types of conductometric titrations?

ii)- What is stripping voltammetry

iii)- What are the advantages of electroanalytical techniques over other analytical methods?

iv)- What change in conductance is observed when HCl in added to NH_4OH?

v)- How voltammetric techniques are classified?

vi)- Give differences between equivalent conductance and molar conductance.

vii)- What is difference between cathodic current and anodic current?

viii)- Why a supporting electrolyte is used in voltammetry?

ix)- What is electric arc? Give its uses?

x)- How does electric spark occur?

xi)- Differentiate between automated and automatic instruments.

xii)- What is cell constant? How is it measured?

xiii)- Draw a schematic diagram of a DC arc.

xiv)- What is *Ilkovic* equation?

xv)- What are the advantages of polarography?

Q.2. Answer the following questions. (6x5=30)

a. Discuss cyclic voltammetry.

b. Discuss different kinds of currents contributing to polarographic waves.

c. Give advantages and limitations of using DME.

d. Give applications of amperometric titrations

e. Write down the advantages of automation process.

f. Discuss applications of polarography in inorganic analysis

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Applied Chemistry (Sp. Theory-I) **Course Code: CHEM-434** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following questions. (15x2=30)

(i) Give reactions for the conversion of methane to acetylene.

(ii) What are the major uses of carbon black?

(iii) Write down the chemical reactions involved in manufacturing of viscose rayon.

(iv) Describe neutralizing and dyeing in leather industry.

(v) Write down the major and minor components of fats and oil.

(vi) Define mercerization and briefly describe its importance in textile finishing

(vii) What is meant by emulsion and gives its types?

(viii) Chromium salts are undesirable in leather industry, comment

(ix) What are important petrochemicals obtained from propene and acetylene.

(x) Enlist the raw materials for Dacron, also give the reaction of its formation.

(xi) Distinguish between primary petrochemical and intermediate petrochemicals. Give examples.

(xii) Write the chemical equations of the production of nylon 66 and nylon 6.

(xii) Name different processes used for the conversion of polymers to fibres.

(xiv) Describe the reasons of fat spoilage.

(xv) Differentiate between simple and mixed triglycerides with one example of each.

Answer the following questions.

Q No. 02 (a) Give brief description of 'steps involved in converting animal skin to leather. (7)

(b) Define fibre and comment that all fibres are not textile fibres. (3)

Q No. 03 (a) Describe different steps involved in the extraction of 'COTTON SEED OIL'. (5)

(b) Give the importance of acetylene and benzene as petrochemicals (5)

Q No. 04 (a) Describe the production of 'nylon 66' with the help of flow sheet diagram. (6)

(b) Write a concise note on the 'HYDROGENATION' of vegetable oils. (4)

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Investment Analysis & Management (Finance Specialization)
Course Code: COMM-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)

a) Efficient market hypothesis (EMH)
b) Technical analysis vs fundamental analysis
c) Differentiate between systematic and nonsystematic risk.
d) Differentiate between stock dividend and stock split.
e) Initial public offering vs private placement
f) Types of option contract

Answer the following questions. (3x10=30)

Q.2 Define risk? Explain various sources of risk in detail.

Q.3 Differentiate between future contract and forward contract. Explain marked to market principle in future contract.

Q.4 Calculate the expected return and expected risk (standard deviation) of Goods Ltd. for 2025, given the following information:

Possible returns	Probabilities
- 0.05	0.08
0.09	0.16
0.12	0.50
0.16	0.22
0.22	0.06

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Comparative Economic System **Course Code: ECON-312** **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 a note on ownership in Islam

ii. Discuss the major features of Pakistan economy.

iii. Discuss the modern trends in Socialism.

iv. What are the negative impacts of market economy?

v. Explain the concept of equity in Islam.

vi. Discuss the environmental problems in Capitalism.

Answer the following questions. (3x10=30)

Q. 2 Discuss the fundamental characteristics of Islamic economic system. In what respect this economic system is superior to capitalism?

Q. 3 Discuss the achievements and failures of Communism in USSR.

Q. 4 Explain the classification of economic systems. Which economic system do you think is more suitable for Pakistan?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Development Policy **Course Code: ECON-313** **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. Poverty of Opportunities Index.
2. Debt cycle.
3. Growth and income inequality in the world.
4. Roll of GATT in international trade.
5. Product Cycle.
6. Absolute poverty vs. Relative poverty.

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

1. Compare and Contrast Harrod Domar Model with Kaldor's model.

2. Explain Foreign Direct investment (FDI) and its determinant. What is the contribution of FDI in the development of a developing country like Pakistan?

3. Transfer of Technology is an important Source of development. Discuss the technology centered development and the issue facing in this regard.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Growth Theories and Models **Course Code: ECON-402 A** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following questions. (6x5=30)

1. Malthusian Model
2. Human Capital and education
3. Role of technology in growth
4. Relation between openness and productivity
5. Kuznet's hypothesis about income inequality
6. Cultural change in growth

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

1. Derive the Solow Growth model. Discuss the role of capital in Economic growth in the model.
2. Discuss the role of human capital. How can investments in human capital spur economic growth?
3. Critically analyze how an increase in the government spending may increase or decrease economic growth.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Applied Economics **Course Code: ECON-403 A** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following questions. (6x5=30)

1. Differentiate between VAR and ARIMA models.
2. How one can improve model estimates?
3. Discuss any three applied areas of your interest. Also provide statement of problem pertaining to each chosen area.
4. What is literature review? What benefits literature review gives us in applied research?
5. Differentiate between single equation model and simultaneous equation model.
6. What do you mean by regression function? Why we need this?

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

1. Why we need confidence interval and hypothesis testing in empirical research? Discuss the procedure to estimate demand, supply and their equilibrium in E-views?
2. Discuss estimation of demand and supply with the help of SPSS.
3. Explain all the steps of building a good econometric model in detail.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: International Trade **Course Code: ECON-404 A** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Give short answers to the following concepts. (5x6=30)

i. Import quota

ii. Comparative advantage

iii. Terms of trade

iv. Factor abundance

v. Marginal rate of transformation

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

i. How voluntary export restraints restrict trade?

ii. **How trade-diverting custom unions operate in real world?**

iii. Explain Partial Equilibrium effects of import quota for a nation with the help of graph.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Environmental and Natural Resource Economics
Course Code: ECON-410

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 pecuniary externality?

II. What is sustainability in the context of environment?

III. What are factors mitigating resource scarcity?

IV. What are renewable and non-renewable resources?

V. What are environmental policy instruments?

VI. What is the economic significance of biodiversity?

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

1. What is trans-boundary environmental issue in relation to global pollution?

2. Draw and discuss the environmental Kuznet's curve in the context of fossil fuels.

3. What is the difference between marginal abatement costs and marginal damage cost. How can we achieve the socially efficient level of emission. Explain this with help of a diagram?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Islamic Banking and Finance **Course Code: ECON-418** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1. Islamic banking and finance on a global basis.
2. Economic significance of Islamic banking.
3. Differentiate among Murabah, Mu'ajjal and Salam.
4. Islamic banking and finance explaining series of key alternative principles.
5. Islamic business ethics.
6. Discovering the financial instruments offered by Islamic banks.

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

1. Highlight the key differences between Islamic banking and conventional banking.
2. Analyze the Islamic business ethics incorporating essential teachings on gentleness, honesty, legitimate earnings and justice.
3. Explain the key elements of Islamic contracts, the various types of contracts relevant to Islamic banking and their frame work.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: World Economic History **Course Code: ECON-420** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

i. Why we study Economic History.
ii. Motivations behind colonial expansion in Asia
iii. The Latin American revolutions
iv. Nationalist thought and indigenous response.
v. First industrial revolution

Answer the following questions. (3x10=30)

Q.2. Elucidate the Golden Age of Islam and the reasons of downfall.

Q.3. Explain and critically review the current global economy and lessons from economic history.

Q.4. Explain and critically review the Russian political and economic development

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: General Equilibrium and Welfare Economics

Course Code: ECON-421

Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

i. What do economists mean when they say markets are mutually interdependent? Give an example to support your explanation.

ii. What is general equilibrium analysis?

iii. Is there a trade-off between efficiency and equity?

iv. What is wrong with partial equilibrium analysis?

v. Differentiate between Marginal Rate of Technical Substitution (MRTS) and Marginal Rate of Transformation (MRT).

Write detailed answers to the following questions.

Q2. a) Market economies are inherently inequitable, and there is little a government can do to change this. True or False? Explain

b) "Because all points on a contract curve are efficient, they are all equally desirable from a social point of view." Do you agree with this statement? Explain. (5+5)

Q3. a) Explain the Theory of the Second Best.

b) Explain why goods will not be distributed efficiently among consumers if the Marginal Rate of Transformation (MRT) is not equal to the consumers' Marginal Rate of Substitution (MRS). (5+5)

Q4. a) What factors determine whether a particular economic issue can be adequately analyzed by using a partial rather than a general equilibrium approach?

b) Suppose the only two meat dishes consumed in the United States are fish and beef. What are the likely effects in these markets of a rumor of a major water pollution problem discovered in the commercial fishing waters? Assume that production resources cannot be shifted between sectors. (5+5)

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Comparative Education **Course Code: ED-324** **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 pecuniary externality?

II. What is sustainability in the context of environment?

III. What are factors mitigating resource scarcity?

IV. What are renewable and non-renewable resources?

V. What are environmental policy instruments?

VI. What is the economic significance of biodiversity?

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

1. What is trans-boundary environmental issue in relation to global pollution?

2. Draw and discuss the environmental Kuznet's curve in the context of fossil fuels.

3. What is the difference between marginal abatement costs and marginal damage cost. How can we achieve the socially efficient level of emission. Explain this with help of a diagram?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Pakistani Literature **Course Code: ENG-407** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Answer the following short questions. (3x5=15)

1) What is the significance of the spatial metaphor of Chandani Chowk in the novel *Twilight in Delhi* by Ahmad Ali?
2) Who is the narrator of *Meatless Days* by Sara Suleri?
3) What does Hawk symbolize in Iqbal's poetic world?

Q.2. Answer the following questions. (3x15=45)

1) How is the story *Attar of Roses* by Tahira Naqvi about temptations and seductiveness?

2) Write critical appreciations of the poems 'Ark' by Adrian Hussein and 'Reproductions' by Daud Kamal.

3) Discuss the intertwined themes of marriage and sex in *Twilight in Delhi* by Ahmad Ali.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Teaching of Literature **Course Code: ENG-408** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions. (3x5=15)

a) How can peer observation improve standards of education?
b) **How can group work improve the students spoken skills?**
c) **What is the teaching methodology adopted for higher education?**

Q.2. Answer the following questions. (3x15=45)

I. What is microteaching? Give instructions for students of Grade 8 to study a poem using the technique of peer teaching. You may select any poem of your choice as an example.

II. How can a teacher effectively teach at school level? Keep in mind any short story and design a lesson plan.

III. Make a lesson plan for Grammar and Vocabulary. You may select any topic of your choice.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: TESOL 11-Syllabus and Material Evaluation and Design

Course Code: ENG-417 **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. Briefly describe *syllabus designing*?
ii. What is the difference between *Curriculum* and *Syllabus?*
iii. What do you understand by *low-cost materials*.

Q.2. Answer the following questions. (3x15=45)

i. How can feedback from teachers and students be incorporated into the syllabus design process?
ii. How can digital tools and web-based materials complement traditional textbooks in Pakistani education system?
iii. What methods can be used to ensure that self-study materials promote learner autonomy and self-regulation in language learning?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Fiqh-III **Course Code: ISE-406** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

اس پرچے کو علیحدہ سے مہیا کی گئی جوابی کاپی پر حل کریں

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

سوال نمبر1: درج ذیل سوالات کے مختصر جوابات تحریر کیجئے۔

1. Write down the types of Shirakah with examples.

1. شرکت کی اقسام مع امثلہ تحریر کریں۔؟

2. In which items or transactions is Mudarabah prohibited?

2. مضاربت کن اشیاء اور معاملات میں جائز نہیں ہے۔؟

3. What is the ruling if the capital in Mudarabah is lost?

3. اگر مضاربت کا مال ضائع ہو جائے تو اس کا حکم کیا ہو گا؟

4. What is meant by Shirakat Wujuh? Give examples.

4. شرکت وجوہ سے کیا مراد ہے مثال دیں۔؟

5. What are the essential conditions for the validity of a sale (Bai')?

5. بیع کے صحیح ہونے کی بنیادی شرائط کیا ہیں؟

6. Write a Quranic verse related to the permissibility of sales with translation.

6. بیع کے جواز پر قرآنی آیت مع ترجمہ لکھیں۔؟

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

سوال نمبر2: درج ذیل سوالات کے تفصیلی جوابات تحریر کیجئے۔

1. Explain in detail the types of permissible Shirakah with examples.

1. شرکت کے جواز کی اقسام مع امثلہ تفصیلا بیان کریں۔؟

2. Discuss the conditions of Mudarabah in detail, including juristic opinions.

2. مضاربت کی شرائط بیان کرتے ہوئے فقہاء کی آراء کا تفصیلی جائزہ پیش کریں۔؟

3. Add diacritical marks (I'rab) to the following text and translate it:

3. مندرجہ ذیل عبارت پر اعراب لگا کر ترجمہ لکھیں:

والكلام في الإقالة في مواضع، في بيان ركن الإقالة، وفي بيان ماهية الإقالة، وفي بيان شرائط صحة الإقالة، وفي بيان حكم الإقالة (أما) ركنها فهو الإيجاب من أحد العاقدين والقبول من الآخر، فإذا وجد الإيجاب من أحدهما والقبول من الآخر بلفظ يدل عليه فقد تم الركن، لكن الكلام في صيغة اللفظ الذي ينعقد به الركن فنقول: لا خلاف أنه ينعقد بلفظين يعبر بهما عن الماضي بأن يقول أحدهما: أقلت، والآخر: قبلت أو رضيت أو هويت ونحو ذلك، وهل ينعقد بلفظين يعبر بأحدهما عن الماضي وبالآخر عن المستقبل ؟ بأن قال أحدهما لصاحبه: أقلني، فيقول: أقلتك، أو قال له: جئتك لتقيلني، فقال: أقلت فقال أبو حنيفة وأبو يوسف رحمهما الله: ينعقد كما في النكاح، وقال محمد: لا ينعقد إلا بلفظين يعبر بهما عن الماضي كما في البيع.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Network Security **Course Code: IT-406** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

I. How does a stateful firewall differ from a stateless firewall?
II. How does multi-factor authentication (MFA) improve network security?
III. How would you detect and respond to a brute-force attack on a login system?
IV. EHow can data encryption prevent unauthorized access to sensitive information.
V. Explain the term Man-in-the-Middle attack (MITM).

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

I. How do distributed denial-of-service (DDoS) attacks disrupt network security, and what basic steps can network administrators take to prevent or mitigate the impact of such attacks?

II. How does using secure communication protocols like HTTPS, SSL/TLS, and SSH help prevent data interception during transmission? Discuss the importance of encryption in maintaining confidentiality and integrity.

III. How do antivirus and antimalware software prevent the spread of malicious software? Describe the role of real-time scanning and automated updates in maintaining network security.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Software Quality Assurance **Course Code: IT-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 "quality assurance" with example?
2. Differentiate 'quality' and 'grade' with examples?
3. Differentiate 'exhaustive testing' and 'selective' with examples?
4. Define and explain "product quality"?
5. Explain "boundary value analysis" in short?
6. Differentiate "walk through" and "inspection" with examples?

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

1. Define and explain "test case"? Write down its essential heads?
2. Explain "unit testing" in details?
3. Explain "top down integration testing" and "bottom up integration testing" in details?

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Introduction to Economics **Course Code: IT-408** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1) **Discuss the role of increased wages on the supply of a product with the help of a graph.**
2) **Calculate the Percentage Change in Quantity Supplied, if the percentage change in Price is 10% and the Price Elasticity of supply is equal to 0.75.**
3) **Discuss the role of Bank Rate in controlling inflation.**
4) **If the crops that Pakistan exports to other countries are badly affected by Flood events. What would the effect of this event of Gross Domestic Product?**
5) **Discuss the concept of opportunity cost with the help of an example.**

Q.2. Answer the following questions. (2x15=30)

i.

Discuss **the Law of Marginal Rate of Substitution** with the help of an example. Write down its assumptions.

ii.

Explain the effects of **decreased Bank Rate** and **decreased Open Market Operations** on inflation and Unemployment in a country.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Measure Theory and Lebesgue Integration **Course Code: MATH-416** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(5x6=30)**

(i) If $m^*(E) = 0$, then E is a measurable set.

(ii) Show that the interval (a, b) is measurable for any $a, b \in \mathbb{R}$.

(iii) Let $\{f_n\}$ be a sequence of extended real valued measurable functions with the same domain D. show that $\underset{1 \le i \le n}{\text{Min}} f_i$ is measurable for each n.

(iv) Show that any singleton set is a Borel set with Borel measure zero.

(v) Show that Lebesgue outer measure of a countable set is zero.

Solve the following. **(3x10=30)**

Q2: State and prove Bounded Convergence Theorem.

Q3: Let f be an extended real-valued function defined on a Borel set D. Show that the function f is Borel measurable if and only if $\{x: f(x) < \alpha\}$ is a Borel set for all $\alpha \in \mathbb{R}$.

Q4: Show that Lebesgue outer measure of an interval is its length.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Methods of Mathematical Physics **Course Code: MATH-417** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(6x5=30)**

(i) Find solution of following algebraic expression by using perturbation technique.

$$(x-1)(x-\tau) = -\varepsilon x$$

(ii) Construct Green's function associated with B.V.P

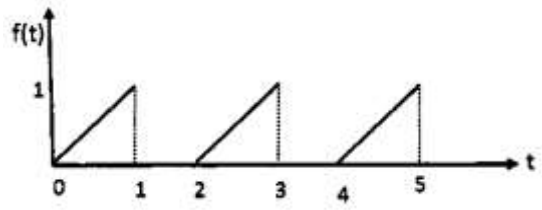
$$y'' + \lambda y = 0, y(0) + y'(1) = 0,\ y(1) + 2y'(0) = 0$$

(iii) Find Laplace transform of $f(t) = |t-1| + |t+1|$

(iv) Discuss boundedness and continuity of, Fourier Transform function.

(v) Find extremal for the integral $I = \int_0^1 (y'^2 + 4y^2)dx, y(0) = e^2$

(vi) Find Laplace transform of the following function.



Solve the following. **(3x10=30)**

Q. 02 Determine $F_c\{x^{\alpha-1}\}$ and $F_S\{x^{\alpha-1}\}$.

Q. 03 Find the curve of shortest length on the surface of a sphere.

Q. 04 Use the heaviside expansion formula to evaluate the inverse Laplace transformation of

$$\frac{s+2}{(s-1)^2\, s^3}$$

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Numerical Analysis-II **Course Code: MATH-418** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(6x5=30)**

i. Deduce formula for computing first and second derivatives of a function $f(x)$ using Newton's forward interpolating formula.

ii. Evaluate $\int_0^{10} \frac{dx}{\sqrt{1-x^2}}$ using Weddle's Rule.

iii. In a machine a slider moves along a fixed straight rod. Its distance of x units along a rod is given below in time t seconds.

t	0	0.1	0.2	0.3	0.4	0.5	0.6
x	30.13	31.62	32.87	33.64	33.95	33.81	33.24

Find the velocity and acceleration when t =0.3 seconds.

iv. Derive the Modified Euler's method for the solution of first order ordinary differential equations.

v. Form the difference equation given that $y_n = A4^n + B5^n$ where A, B are arbitrary constants.

vi. Find the values $f'(3.8)$and $f''(3.8)$ using the following data.

x	0	2	3	4	7	9
$f(x)$	4	26	58	112	466	22

Solve the following. **(5x6=30)**

i. Derive the composite form (general form) of Simpson's one-third rule for numerical integration.

ii. Given $\frac{dy}{dx} = x^2(1+y), y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979$ *evaluate* $y(1.4)$ by Milne's Predictor Corrector method.

iii. Evaluate $\int_0^{\pi/4} tanx$ by the Trapezoidal rule from values provided in the table

x	0	$\frac{\pi}{8}$	$\frac{\pi}{4}$
tan$x$	0	0.4141	1

iv. Using Adams-Bashforth method, find y (0.4) if y satisfies $\frac{dy}{dx} = x^2 - y$, y (0) = 1, h=0.1. Find the values of y(0.1), y(0.2) and y(0.3) using Modified Euler's method.

v. Derive Newton-Cote's quadrature formula and use it to derive Simpson's 3/8 rule for numerical integration.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Mathematical Statistics-II **Course Code: MATH-419** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following.

(i)	If $T \sim t_v$, then show that $T^2 \sim F(1, v)$. Where t_v and F denotes t-distribution and F-distribution respectively.	(5)
(ii)	If ρ is the coefficient of correlation, then prove that $-1 \leq \rho \leq 1$.	(5)
(iii)	Write the partitioning and additive properties of a Chi-square distribution.	(3+2)
(iv)	If $f(x_1, x_2) = \begin{cases} 6e^{-3x_1-2x_2}, & x_1 > 0, x_2 > 0 \\ 0, & otherwise \end{cases}$. Find the probability density of $Y = X_1 + X_2$.	(5)
(v)	If X_r and X_s are the rth and sth random variables of a random sample of size n drawn from the finite population $\{C_1, C_2, C_3 \ldots, C_N\}$, then $\text{Cov}(X_r, X_s) = -\frac{\sigma^2}{N-1}$.	(5)
(vi)	If X and Y are uncorrelated variables and $U = X+Y$, $V = X-Y$, Then find the correlation between U and V in terms of σ_x, σ_y, where both of these are standard deviations of x and y respectively.	(5)

Solve the following. **(3x10=30)**

Q.2	Given the joint density $f(x,y) = \begin{cases} \frac{2}{5}(2x+3y) & for \quad 0<x<1 \text{ and } 0<y<1 \\ 0 & elsewhere \end{cases}$. Find $\mu_{Y/x}$ and $\mu_{X/x}$.
Q.3	If F follows $F(\upsilon_1, \upsilon_2)$ then $y = (1 + \frac{\upsilon_1}{\upsilon_2} F)^{-1}$ follows $\beta(\frac{\upsilon_1}{2}, \frac{\upsilon_2}{2})$ Where υ_1, υ_2 are the degrees of freedom for F-distribution.
Q.4	Prove that $R^2_{a.bc} = 2\left(1 - \frac{r_{bc}\Delta_{bc}}{\Delta_{aa}}\right) - \left(\frac{\Delta_{bb}+\Delta_{cc}}{\Delta_{aa}}\right)$, where R denotes coefficient of multiple correlation.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Computer Applications **Course Code: MATH-421** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(5x6=30)**

i. Write a command in Mathematica to find the real and imaginary parts of complex number -6+8i.

ii. Write a command in Mathematica to find the root of the equation $3x^3 - 4x+7=0$.

iii. Write a command in Mathematica to evaluate $\frac{d^2}{dydx} Cos(x-2y)$.

iv. Write a command in Mathematica to draw the graph of $\sqrt{x^2+2x+5,}\ -4 \le x \le 4$.

v. Write a command in Mathematica to find the sum of series $\sum_{i=1}^{\infty} \frac{1}{3^i}$.

Solve the following. **(3x10=30)**

a. Write a program to implement Runge-Kutta method of order two for the solution of IVP $\frac{dy}{dt} = \frac{1}{y+t}$ at t=0.6 with y(0)=1 taking h=0.1.

b. Write a program to integrate $\int_0^1 \frac{1}{1+x^2}$ dx using Simpson's 3/8 rule by taking n=18.

c. Write a program to find a real root of $x - cosx = 0$ correct to two decimal places by Bisection method.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Group Theory-III **Course Code: MATH-422** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(6x5=30)**

i) Define lower and upper central series and construct these for D_4.
ii) Prove that the direct product of two solvable groups is solvable.
iii) Define free groups and free product of groups with example.
iv) Determine whether or not S_n is nilpotent. Also justify your answer.
v) Define Fratini subgroup and partial complement with examples.
vi) Prove that special linear group is normal subgroup of general linear group.

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

i) Prove that a finite group is solvable if and only if the factor groups of its composition series are cyclic of prime order.
ii) Prove that a finite group is nilpotent if and only if $G' \subseteq \Phi(G)$
iii) Let G be a nilpotent group and H be a proper subgroup of G. Then prove that $H \subset N_G(H)$.
iv) Let $G = G_0 \supset G_1 \supset \ldots \supset G_k = E$ be a normal series for G. Then prove that $G_i \subseteq \zeta_i(G)$, where $\zeta_i(G)$ is ith term of upper central series.
v) Prove that the Frattini subgroup of a group G consists of precisely those elements of G which can be omitted from every generating system of generators of G in which they occur.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Theory of Modules **Course Code: MATH-423** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. (6x5=30)

1. Let A, B and C be R –submodules of an R –module M such that $C \subseteq A$. Then $A \cap (B + C) = (A \cap B) + C$.
2. Exhibit all $\mathbb{Z}$ – module homomorphisms from $\mathbb{Z}/30\mathbb{Z}$ to $\mathbb{Z}/21\mathbb{Z}$.
3. Let $\mathbb{Z}_6$ be a left $\mathbb{Z}$ –module. Find all direct summands of $\mathbb{Z}_6$.
4. Let M be an R- module and $I = \{r \in R: rm = 0\}$ be an ideal of R. Then show that M is an R/I - module
5. An R-module is simple if and only if M is generated by every non-zero element $a \in M$.
6. Prove that the empty set is a set of generators for the zero module.

Q.2. Solve the following. (3x10=30)

1. Prove or disprove that an R-module which is finitely generated has a submodule which is not finitely generated.
2. Let A, B be submodules of a module M. Then there exist natural isomorphism $\frac{A+B}{A} \approx \frac{B}{A \cap B}$.
3. Suppose A and B are two simple R- modules. Then any R-linear map $f: B \to A$ is either 0 or an isomorphism. In particular, $D = End_R(B)$ is a division ring.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Number Theory-II **Course Code: MATH-424** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following: (6x5=30)

(I)	Find all the unit elements of the ring $\mathbb{Z}_5[i]$.
(II)	Show that if θ is algebraic over F then it has a unique minimal polynomial.
(III)	Find the solution of quadratic congruence $x^2 + 7x + 10 \equiv 0 (\text{mod } 11)$.
(IV)	Let p be a prime number. Show that the congruence $x^2 + y^2 + 1 \equiv 0 (\text{mod } p)$ is solvable.
(V)	Show that if P is a maximal ideal then $PP^{-1} = (1)$.
(VI)	Evaluate the following Legendre symbols: (a) $\left(\frac{7}{11}\right)$, (b) $\left(\frac{23}{19}\right)$.

Solve the following. (3x10=30)

Q2	Find all $n \in \mathbb{N}$ for which $3x^2 + 2nx + 12$ is irreducible over $\mathbb{R}$.
Q3	If $p \neq 3$ is an odd prime then show that $\left(\frac{3}{p}\right) = \begin{cases} 1, & if\ p \equiv \mp 1\ (mod\ 12); \\ -1, & if\ p \equiv \mp 5\ (mod\ 12). \end{cases}$
Q4	Let p be an odd prime and $\gcd(a, p) = 1$. Then show that a is a quadratic residue of p if and only if $a^{\frac{p-1}{2}} \equiv 1 (\text{mod } p)$.
Q5	If ζ is a primitive p^{th} root of unity, p an odd prime, then show that $D(\zeta) = (-1)^{\frac{p-1}{2}} p^{p-2}$.
Q6	Prove that all integral basis of a field $K = R(\theta)$ have the same discriminant.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Operations Research-II **Course Code: MATH-428** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. (6x5=30)

1 Which of the the following two algorithms is more generalized? Justify your answer.
   1. Dijkstra's algorithm 2. Floyd's algorithm

2 What is meant by integer linear programming problems?

3 Write the steps of Floyd's algorithm.

4 Describe the main idea of the cutting plane algorithm.

5 Write a note on parametric linear programming.

6 Use dynamic programming to solve the problem.
Maximize $z = u_1 u_2 u_3$
subject to

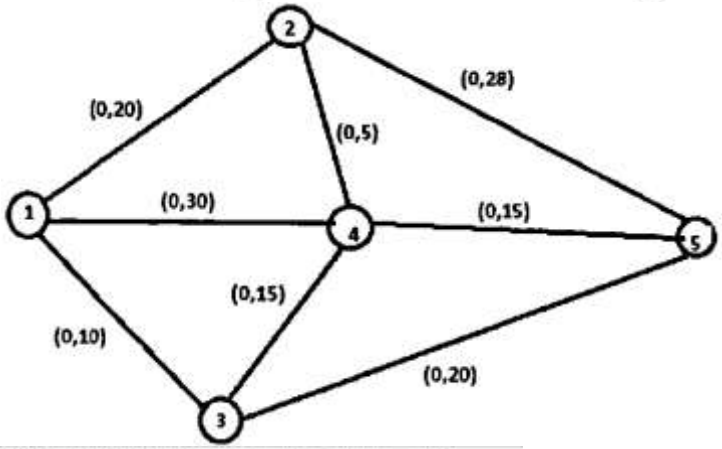
$$u_1 + u_2 + u_3 = 10$$
$$u_1, u_2, u_3 \geq 0$$

Q.2. Solve the following. (3x10=30)

1. Use revised simplex method to solve the problem.
Minimize $z = x_1 + 2x_2$
subject to

$$2x_1 + 5x_2 \geq 6$$
$$x_1 + x_2 \geq 2$$
$$x_1, x_2 \geq 0$$

2. Find the maximal flow from node 1 to node 5 in the following network. The maximum and minimum possible flow along each arc is shown in the figure.



3. Solve the following problem using branch and bound method.
Maximize $z = x_1 + x_2$
subject to

$$2x_1 + 5x_2 \leq 16$$
$$6x_1 + 5x_2 \leq 30$$

x_1, x_2 are nonnegative integers.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Theory of Approximation and Splines-II **Course Code: MATH-429** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(5x6=30)**

1. Define Bernstein Bézier form.
2. State and Prove de Casteljau Algorithm for Bernstein Bezier curve of degree n.
3. Prove that Bernstein Bezier rational cubic form preserves the convex hull property.
4. Define the Degree Raising Algorithm.
5. State and prove the Affine Invariance property for Bernstein Bezier curve.

Q.2. Solve the following. **(3x10=30)**

1. Find the natural cubic spline $S(x)$ that passes through (0,0.0), (1,0.5), (2,2.0) and (3,1.5) with the boundary conditions $S''(0) = 0$, $S''(3) = 0$.
2. Determine $N_{-2}^{(4)}(t)$ using basic definition. Also Plot it and show that $N_{-2}^{(4)}(t)$ are continuous at konts.
3. Consider the cubic Hermite interpolatory function, derive a matrix form for Not a Knot end Conditions.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Fluid Mechanics-II **Course Code: MATH-431** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following. **(6x5=30)**

(i) Explain the image system of a source outside a circular cylinder.

(ii) What is superposition of vortex, doublet and uniform stream? Discuss it briefly.

(iii) Derive Helmholtz vorticity equation under conservative forces.

(iv) Discuss the plane Poiseuille flow of a viscous incompressible fluid between two parallel plates?

(v) What is Stokes' first problem? Find its solution by any appropriate method.

(vi) Under which configuration of vortices the time required to move a distance a is $\frac{a}{u}$? Prove it.

Solve the following. **(3x10=30)**

Q. 2 State and prove Blasius theorem.

Q. 3 How exact solution of boundary layer equations is formed? Explain with an example.

Q. 4 Use the method of images to prove that if there be a source of strength m at the point z_0 in a fluid bounded by the lines: $\theta = 0$ *and* $\theta = \frac{\pi}{3}$, the solution is

$$\varphi + i\Psi = -\frac{m}{2\pi}\ln(z^3 - z_0^3)(z^3 - z_0'^3) \text{ where } z_0 = x_0 + iy_0 \text{ and } z_0' = x_0 - iy_0.$$

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Nuclear Physics-II **Course Code: PHY-424** **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) Why compound nucleus processes are slower than direct processes?

(ii) Explain the differences between a cyclotron and a synchrotron.

(iii) How can we use a neutron capture reaction to determine the energy and spin-parity of the capturing state?

(iv) Which part of the nuclear binding energy favors the distortion of its shape?

(v) Why do fission fragments have unequal masses? Explain.

(vi) Why do fission isomers have relatively small activation energy for fission?

Q.2. Answer the following questions.

(i) (a) Explain the physical meaning of the cross-section of a nuclear reaction? Does it depend on the physical dimensions of the involved nuclei? Derive an expression for the cross-section of resonance reactions (the so-called Breit-Wigner formula) and use it to explain the width of the resonance.

(b) What is the Q value of the nuclear reaction

$$n + {}^{A}_{Z}X_N \rightarrow {}^{A}_{Z-1}X_{N+1} + p.$$

The same product nucleus could be formed through the following reaction

$${}^{A}_{Z}X_N \rightarrow {}^{A}_{Z-1}X_{N+1} + e^+ + \nu.$$

If we assume that ν is mass less what would be the maximum energy of e^+. Relate this maximum kinetic energy with the Q value of the last reaction.

(ii) (a) What is the Q value of a nuclear reaction:

$$a + X \rightarrow Y + b,$$

where a is the incident particle, X is the target nucleus, Y (Heavy) and b (lighter) are the product nuclei. What are the conditions for particle b to have two values of the kinetic energy?

(b) The (d,p) reaction on ^{52}Cr leads to the $\frac{3}{2}^-$ ground state of ^{53}Cr.How would the analysis of the angular momentum transfer in this reaction differ between an analysis in terms of direct reactions and one in terms of compound-nucleus reactions?

(iii) (a) Why do nuclei undergo fission? What prevents ^{238}U from undergoing sponatneous fission despite its positive Q-value?

(b) Estimate the neutron energy needed to produce fission of ^{208}Pb. Is it likely that such a neutrons would be released in the fission, making possible a self-sustaining reaction? [m(^{208}Pb)=207.976627 u, m(^{209}Pb)=208.981065 u]

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Advanced Electronics-III (Theory) **Course Code: PHY-431** **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 the basic working principle of photo detector?

b. Draw the symbol of n-channel JFET and characteristics curve.

c. Draw the wave forms of FM and AM modulation.

d. What is telemetry system in communication. Draw its main applications.

e. Draw the block diagram of communication heterodyne receiver.

f. How visible light generates.?

Answer the following questions. (3x10=30)

Q 2. Write down a complete note on klystron tube. 10

Q 3. Differentiate between AM, FM and PM communication systems in detail. 10

Q 4. Write note any two of the followings.

a. Phase locked loop circuit.

b. Microwave spectrum.

c. LED

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Relativity and Cosmology **Course Code: PHYS-4102** **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 are the fundamental postulates of special relativity?
II. Define time dilation and length contraction.
III. Show that proper time is a scalar quantity.
IV. Distinguish between time-like, light-like and space-like intervals.
V. Describe the equivalence principle in general relativity.
VI. Explain the terms (a) Light Cone (b) Atlas
VII. Define cosmological principle.
VIII. What is Cosmic Microwave Background (CMB) in cosmology?
IX. Describe the difference between dark matter and dark energy.
X. Define Friedmann equation.
XI. Describe the concept of spacetime curvature.
XII. What is gravitational lensing?
XIII. Show that Newton's Laws remain invariant under Galilean transformation.
XIV. Prove that the partial differentiation of tensors in not tensorial.
XV. Deduce the Minkowski line element $ds^2 = dt^2 - dx^2 - dy^2 - dz^2$ for infinitesimal separated events.

Answer the following questions. (3x10=30)

Q2. Discuss Doppler's effect for light in special relativity and derive its equation.

Q3. Show that $\nabla_{[c}\nabla_{d]}X^a = \frac{1}{2}R^a_{bcd}X^b$, where R^a_{bcd} is the Riemann Tensor.

Q4. Explain the concept of cosmological redshift and how it provides evidence for the expansion of the universe. Derive the relationship between redshift, distance, and recession velocity.

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Roll No. ……

Paper: Astrophysics **Course Code: PHYS-4103** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

1. Give relationship between Luminosity and mass of main sequence star.
2. Give physical significance of Cepheid variable stars? How they can be used as a standard candles?
3. Explain electron degeneracy pressure?
4. What is Chandrasekhar Limit?
5. How a black hole can be detected, even if it can't be seen?
6. How far away is a galaxy from us if it is moving with 1% of speed of light?
7. How Hubble constant can be used to find age of Universe?
8. Give method to determine average temperature of universe.
9. Explain S-Process and R-Process in Nucleosynthesis?
10. Use Hubble's Law to determine age of universe.

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

1. Explain galaxy clusters and rotation curve in detail.\

2. (a) Describe different phases of formation of a star in detail.
   (b) Start A has a surface temperature half that of star B. Star A has twelve times larger than Star B. Calculate ration of their Luminosities.

3. (a) Describe the phenomenon of Nucleosynthesis in detail.
   (b) Traces of Uranium are found on many places of earth. Explain where they came from.

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Roll No. .....

Paper: Classical Electrodynamics-II **Course Code: PHYS-4202** **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)- Derive an expression for magnetic current density $\vec{J}_M$ in form,

$$\vec{J}_M = curl\vec{M}$$

(ii)- Explain the drawbacks in Ampere's circuital law and how was it rectified by Maxwell, what is displacement current?

(iii)- Calculate the frequency at which the skin depth in sea water is one meter. For sea water, $\mu = \mu_0$ and $g \approx 4.3$ mho/m. Explain importance of result.

(iv)- How Maxwell equations lead to the wave equations for electromagnetic fields. Derive these equations for $\vec{B}$ and $\vec{H}$.

(v)- Prove that power transferred into electromagnetic field through the motion of free charge in volume V is equal to rate of change of electromagnetic energy stored in V and a surface integral.

(vi)- Discuss Debye shielding and derive the formula for Debye shielding distance.

Q.2. Answer the following questions.

(a)-Show that magnetic induction due to a magnetized distribution of matter may be expressed as,

$$\vec{B} = \mu_0\vec{M}(\vec{r}) - \mu_0\nabla\varphi^*(\vec{r})$$

$\varphi^*(\vec{r})$ is called magnetic scalar potential and $\vec{M}(\vec{r})$ is the magnetization. (08)

(b)-The equations for scalar and vector potentials are given by,

$$\nabla^2\varphi - \in\mu\frac{\partial^2\varphi}{\partial t^2} = -\frac{\rho}{\in} \quad \& \quad \nabla^2\vec{A} - \in\mu\frac{\partial^2\vec{A}}{\partial t^2} = -\mu\vec{J}$$

where symbols have usual meanings. Find solutions of these equations for magnetic scalar and vector potentials in form of Green functions. (10)

(c)-Set up the equation governing the propagation of Alfven waves propagating parallel to y-axis with velocity v in a uniform magnetic field along z-axis. Prove that its solution is a damped plane wave propagating in $\pm z$-direction. (12)

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Roll No. .....

Paper: Nuclear Physics-II **Course Code: PHYS-4304** **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 threshold energy for a nuclear reaction, and why is it important?

(ii) What is Coulomb scattering, and how does it differ from nuclear scattering?

(iii) What is the significance of the cross-section in nuclear reactions?

(iv) How do direct reactions differ from compound nucleus reactions?

(v) What is the chain reaction in nuclear fission, and how is it controlled?

(vi) What is the difference between a linear accelerator and a colliding-beam accelerator?

(vii) What is the average number of neutrons released in a fission reaction, and why?

(viii) Calculate the Q-value for a reaction where a proton is absorbed by a nucleus, releasing 2.5 MeV of energy.

(ix) What is the difference between nuclear fission and nuclear fusion in terms of energy release?

(x) Why does a neutron, despite of being neutral, has any spin magnetic dipole moment?

Answer the following questions.

Question 2: **(3x10=30)**

What are the fundamental assumptions of compound nucleus model? Explain how does a nuclear reaction proceed according to this model? Give an example which shows that a compound nucleus forgets its mean of formation. What are limitations of this model?

Question 3:

In neutron slow down process, the scattering of fast neutrons from the atoms of moderator is observed in Laboratory frame (L-frame) and Center of mass frame (C-frame). Let θ and ϕ are scattering angles of neutron after collision to the original direction of neutron in L-fram and C-fram respectively. Show that the ratio of neutron energy E after collision to initial energy E_0 measured in C-fram can be expressed in terms of ϕ as

$$\frac{E}{E_0} = \frac{1+r}{2} + \frac{1-r}{2} cos\phi$$

with $r = (\frac{A-1}{A+1})^2$ and $A = \frac{M}{m}$ where M and m are the masses of moderator atoms and neutron respectively. Also show that which material can be used as best moderator made of light element or heavy element at $\phi = 180$.

Question 4:

(a): In a fission process a compound nucleus splits into intermediate nuclei with release of energy, discuss in detail mass and energy distribution of the fission products when fission is induced by thermal and fast neutrons.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. ……

Paper: Introductory Particle Physics **Course Code: PHYS-4305** **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. Why free quarks could not be observed?
ii. Write down the properties of hadrons and explain how do they interact?
iii. All resonance particles have very short life times. Why does this suggest they must hadrons?
iv. What are the exchange particles? Write exchange quant in case of fundamental interactions. Identify the unknown particles in the reaction given below:

$$\mu^- + P \rightarrow n + \cdots$$

v. Discuss conservations of angular momentum under rotation in space?
vi. Why do we use Feynman diagrams in Particles Physics? Differentiate between internal lines and external lines and their roles in a Feynman diagram. Draw the Feynman diagrams for moun and pion decays.
vii. What are the strangeness changing weak interactions? Give their examples. Explain how the theory of weak interaction was modified to take into account such type of interactions?
viii. By considering the radioactive decay of Cobalt nuclei, discuss in detail how it was experimentally tested that the parity is violated in weak interactions?
ix. What is equation of continuity? Derive the equation of continuity for Maxwell equations and write it in covariant form.
x. Describe the vacuum polarization in QED and QCD.

Answer the following questions. (3x10=30)

i. Show that translation in space leads to the conservation of momentum.
ii. a) Considering the capture of negative points into deuterium explain in detail how its intrinsic parity was measured?
    b) What is Eightfold way? Use this theory to arrange eight lightest mesons.
iii. a) The propagation of electromagnetic waves in free space modify the field equation as:

$$\Box^2 A^\mu = 0.$$

    Use this equation to discuss polarization states of photon.
    b) Discuss about the transformation properties of the polarization states of photon obtained in part (a) of this question.

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Roll No. .....

Paper: Nanomaterial and Nanodevices **Course Code: PHYS-4311** **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 nanotechnology?
ii. Give at least two examples of 0D, 1D, and 2D nanomaterials.
iii. Why do nanomaterials have higher surface reactivity than bulk materials?
iv. What are nanocomposites?
v. What is electron beam lithography?
vi. Why is a scanning electron microscope (SEM) preferred over an optical microscope for visualizing nanomaterials?
vii. Define photocatalysis.
viii. Differentiate between top-down and bottom-up synthesis methods.
ix. Describe hydrothermal technique.
x. Differentiate between physical vapor deposition (PVD) and chemical vapor deposition (CVD) techniques.
xi. Provide examples of solution-based synthesis methods.
xii. How do we determine the crystallite size of nanomaterials?
xiii. What is photodetector?
xiv. Describe the application of supercapactors.
xv. Why do we use FTIR spectroscopy?

Q.2. Answer the following questions.

i. (a) Explain some potential risks associated with nanomaterials. **(4)**

(b) Provide a detailed description of the applications of nanomaterials in the biomedical field and energy storage technologies. **(6)**

ii. (a) Outline the basic working principle of the following synthesis techniques: **(6)**

- Sputtering
- Thermal Evaporation
- Atomic Layer Deposition (ALD)

(b) Explain the essential steps in the co-precipitation method and discuss the factors that affect the synthesis of nanomaterials. **(4)**

iii. (a) What is X-ray diffraction (XRD), and how is it used 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:

- UV-Vis Spectroscopy
- Atomic Force Microscopy (AFM)
- X-ray Photoelectron Spectroscopy (XPS) **(6)**

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Roll No. .....

Paper: Solid State Physics-III **Course Code: PHYS-4404** **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. Explain direct and indirect gap semiconductors and rules of corresponding optical transitions.
2. Show that the conductivity, from frequency dependent dielectric constant, is given as

$$\sigma = \frac{Ne^2 f_0}{m(\gamma_0 - i\omega)}$$

3. Explain briefly three sources of polarization in solids, known as dipolar, ionic and electronic polarization.
4. If we have Boltzmann transport equation given as

$$\frac{\partial f_k}{\partial t}|_{field} = \frac{e}{\hbar}(E + V \times B).\nabla_k f_k$$

Then reduce the above equation to the following form.

$$\frac{\partial f_k}{\partial t}|_{field} = e(E.V)\frac{\partial f_k^o}{\partial \varepsilon} + (VxB).\nabla_k g_k$$

5. Draw schematic diagrams representing Frenkel and Wannier Mott excitons and give binding energies and one line description of each.
6. What is a polaron? How does it propagate in the medium?

Q.2. Answer the following questions.

1. a. Give classical description of Raman Effect and find out the necessary condition in terms of polarizability for a molecule to be Raman active. 6

   b. Give a comprehensive understanding of Stokes and Anti Stokes Raman scattering with the help of diagrams. 4
2. The Hamiltonian for free electron in the presence of magnetic field B along z direction is given by

$$\hat{H} = \frac{-\hbar^2}{2m}\left[\frac{\partial^2}{\partial x^2} + \left(\frac{\partial}{\partial y} - i\frac{eBx}{\hbar c}\right)^2 + \frac{\partial^2}{\partial z^2}\right]$$

   a. What will be A (vector potential) for B chosen along z direction? Choose a wave function for electron moving in yz plane. Perform all mathematical steps to derive energy Eigen values of electrons, called Landua levels. 7

   b. Compare this energy with the free electron energies obtained in the absence of B. 3

3. a. Find out the energy dispersion relation of Frenkel excitons. 6

   b. Give a comprehensive understanding of Exciton condensation into electron hole drop. 4

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Roll No. .....

Paper: Medical Physics **Course Code: PHYS-4607** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

i. Discuss the comparative analysis of different energy loss.

ii. What is the specific ionization resulting from the passage of a 0.1-MeV beta particle through standard air?

iii. A very small source (physically) of 3.7 × 1010Bq (1 Ci) of 32P is inside a lead shield just thick enough to prevent any beta particles from emerging. What is the bremsstrahlung energy flux at a distance of 10 cm from the source (neglect attenuation of the bremsstrahlung by the beta shield)?

iv. Explain about photoelectric effect, in which the photon disappears, is an interaction between a photon and a tightly bound electron.

v. Sate about the any possible risks involve in Magnetic Resonance Imaging (MRI).

vi. Explain about bioeffects mechanism and acoustics output metrics of Ultrasound medical imaging technique.

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

I. How would you classify neutrons into different types on the basis of energy distribution support your answer by energy equation at any given temperature?

II. How would you differentiate between ionization and excitation? Also, explain specific ionization to support your answer?

III. What is the importance of dosimetry in radiation physics discuss the functions of photographic and scintillation dosimeters.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Local Government in Pakistan **Course Code: POL-407** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following questions. (6x5=30)

سوال نمبر1: مندرجہ ذیل سوالات کے مختصر جوابات تحریر کریں۔

i. Write a note on Tehsil Nazim.

الف) تحصیل ناظم پر ایک نوٹ لکھیں۔

ii. What do you mean by good governance?

ب) گڈ گورننس سے آپ کی کیا مراد ہے؟

iii. Explain the word panchayat.

ج) لفظ پنچایت کی وضاحت کریں۔

iv. How is the district Ombudsman appointed?

د) ضلعی محتسب کا تقرر کیسے کیا جاتا ہے؟

v. Explain the community board.

ہ) کمیونٹی بورڈ کی وضاحت کریں۔

vi. Discuss element of local government.

و) مقامی حکومت کے عناصر (ایلیمنٹس) پر بحث کریں۔

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

سوال نمبر2: مندرجہ ذیل سوالات کے مفصل جوابات تحریر کریں۔

i. Critically examine the different approaches to the study of local government.

الف) مقامی حکومت کے مطالعہ کے مختلف طریقوں کا تنقیدی جائزہ لیں۔

ii. Highlight various issues of local government in developing countries.

ب) ترقی پذیر ممالک میں مقامی حکومت کے مختلف مسائل اجاگر کرتا ہے۔

iii. Describe the kind of transfer of power at local level.

ج) مقامی سطح پر اقتدار کی منتقلی کی مختلف اقسام کی وضاحت کریں۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. ……

Paper: Public International Law-II **Course Code: POL-408** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following questions. (6x5=30)

i. Define Nationality

ii. What is International Humanitarian Law?

iii. Define Extra-Territorial Asylum.

iv. What is difference between combatants and non-combatants?

v. Define Neutrality.

vi. Define Laws of War.

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

i. Write a detail note on Extradition.

ii. Write down the Rights and Privileges of Diplomatic Envoys.

iii. What are the peaceful means of settlement of International disputes?

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: International Organizations **Course Code: POL-409** **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. What were objectives of the League of Nations?

i- انجمن اقوام کے مقاصد کیا تھے؟

ii. Write a brief note on the "Council" of the League of Nations.

ii- انجمن اقوام کی "کونسل" پر مختصر نوٹ تحریر کریں۔

iii. Write a short note on International Labour Organization (ILO).

iii- بین الاقوامی ادارہ محنت پر مختصر نوٹ تحریر کریں۔

iv. What was the basic purpose of San Francisco Conference?

iv- سان فرانسسکو کانفرنس کا بنیادی مقصد کیا تھا؟

v. Write some major achievements of the United Nations.

v- اقوام متحدہ کی کچھ اہم کامیابیاں تحریر کریں۔

vi. Write a short note on the Trusteeship Council of United Nations?

vi- اقوام متحدہ کی تولیتی کونسل پر مختصر نوٹ تحریر کریں۔

Answer the following questions. (3x10=30)

درج ذیل سوالات کے جوابات تحریر کریں۔

Q.2. Define international organization and discuss characteristics of an international organization in detail.

سوال نمبر ۲: بین الاقوامی تنظیم کی تعریف کریں اور بین الاقوامی تنظیم کی خصوصیات تفصیل سے بیان کریں۔

Q.3. Explain the functions and powers of United Nations Secretariat.

سوال نمبر ۳: اقوام متحدہ کے سیکریٹریٹ کے فرائض و اختیارات کی وضاحت کریں۔

Q.4. Critically evaluate the role of United Nations regarding Kashmir issue.

سوال نمبر ۴: مسئلہ کشمیر کے حوالے سے اقوام متحدہ کے کردار کا تنقیدی جائزہ پیش کریں۔

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Statistical Inference-II (Theory) **Course Code: STAT-407** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write short answers to the following questions. (6x5=30)

I. What is Minimum Chi Square Estimation (MCSE), under what situation MCSE is preferred over Maximum Likelihood Estimator.

II. Write Down Merits and Demerits of Moment Estimators.

III. How do we Construction Posterior Distribution.

IV. Let $X_1, X_2 \ldots\ldots\ldots X_n$ denote the random sample from Poisson distribution with parameter λ . Find MLE of λ.

V. Give Practical Example of Type-I and Type-II Errors, which error is more serious.

VI. Compare Best Linear Unbiased Estimator (BLUE) and Minimum Variance Quadratic Unbiased Estimator (MVQUE).

Answer the following questions. (3x10=30)

Question 2: The probability density function of r.v is given as

$$f(x) = \frac{1}{2} e^{-|x-\theta|} \; ; -\infty < x < \infty$$

Whether. MLE of θ can be obtained through Maximum likelihood principal. If no suggest some alternative MLE, do you think the MLE you suggest is unique.

Question3 : The random variable "X" follows the exponential distribution with parameter λ . we assume the prior density for unknown λ as

$$f(\lambda) = \frac{1}{m!}\left(\frac{m+1}{\lambda_0}\right)^{m+1} \lambda^m e^{-\frac{(m+1)\lambda}{\lambda_0}}$$

Given the random sample of size "n". Estimate the **Bayes estimator**.

Question4: Based upon the random sample of size n from

$$f(x;\theta) = \theta^x (1-\theta)^{1-x} \quad , x = 0, 1$$

Obtain the MCSE for θ

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Applied Econometrics (Theory) **Course Code: STAT-409** **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 do you mean by non-spherical disturbances?

(ii) Explain the steps of the Goldfeld-Quandt test for heteroscedasticity.

(iii) What is a lagged variable? Give a brief explanation.

(iv) What are the limitations of the Durbin-Watson test for detecting autocorrelation?

(v) What are the causes of multicollinearity?

(vi) Explain the simultaneous equation system.

Answer the following questions. (3x10=30)

Q.2. What happens when OLS estimators are used while the error terms have first-order autocorrelation?

Q.3. What steps can be taken to address the issue of multicollinearity?

Q.4. Given the following structural model:

$Y_1 = \alpha_1 + \alpha_2 Y_2 + \alpha_3 X_1 + u_1$ and $Y_2 = \beta_1 + \beta_2 Y_1 + \beta_3 X_2 + u_2$

Which results in the reduced form equations:

$Y_1 = 4 + 3X_1 + 8X_2$ and $Y_1 = 2 + 6X_1 + 10X_2$.

Find the structural parameters using the estimated coefficients of the reduced form equations.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Total Quality Management **Course Code: STAT-415** **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Write a short note on the following. **(6x5=30)**

(i) Acceptance Sampling Plan
(ii) International Standard Organization
(iii) Process Capability
(iv) Eras of Quality Management
(v) Attribute control charts
(vi) Natural tolerance limits

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

Q. No.2: State the various obstacles for the implementation of TQM.

Q. No. 3: Sample of $n = 8$ items each are taken from a manufacturing process at regular intervals. A certain quality characteristic is measured and $\bar{x}$ and R values are computed for each subgroup. After 50 subgroups have been analyzed, we have

$$\sum_{i=1}^{50} \bar{x}_i = 2000, \sum_{i=1}^{50} R_i = 250$$

Assume that the quality characteristic is normally distributed.

(a) Compute the control limit for $\bar{x}$ and R control charts.

(b) Assume that all points on both charts plot within the control limits computed in part (a), what are the natural tolerance limits of the process?

(c) If specification limits are 41 ± 5.0, what are your conclusions regarding the ability of the process to produce items within these specifications.

(d) Assuming that if an item exceeds the upper specification limit it can be reworked and if it is below the lower specification limit it must be scrapped, what percent scrap and rework is the process now producing?

Q. No. 4: Describe Six-sigma Methodology and compare it with traditional approach.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Naayay Tanqidi Mubahas **Course Code: URDU-406** **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۔

سوال نمبر 1: مندرجہ ذیل سوالات کے مختصر جوابات لکھیں۔ **(6x5=30)**

ا۔ ساختیات کی تعریف کریں اور مثال سے واضح کریں۔

ب۔ سوسیئر کے لسانی ماڈل کی روشنی میں یک زمانی اور تاریخی لسانی مطالعے میں فرق واضح کریں۔

ج۔ ساختیاتی تنقید کے بنیادی طریقہ ہائے کار کی وضاحت کیجیے۔

د۔ پسِ ساختیات کے بنیاد گزار ماہرینِ علوم میں سے دو کا مختصر تعارف پیش کریں۔

ہ۔ نئے تنقیدی مباحث کے بین العلومی پس منظر کی مختصر وضاحت کیجیے۔

و۔ ساختیات اور پس ساختیات میں فرق واضح کیجیے۔

سوال نمبر 2: مندرجہ ذیل سوالات کے تفصیلی جوابات تحریر لکھیں۔ **(3x10=30)**

ا۔ ساختیاتی تنقید کے مطالعاتی طریقِ کار کی وضاحت مثالوں کی مدد سے کیجیے۔

ب۔ ردِ تشکیل کیا ہے؟ کسی متن کی ردِ تشکیل کے اہم نکات کی وضاحت کیجیے۔

ج۔ مشیل فوکو کے علمی طریقہ کار اور بنیادی تصورات کی وضاحت کریں۔۔

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Iqbal ka Khasoosi Mutalia (fiqri o funny mutalia aur tashery maton)
Course Code: URDU-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۔

سوال نمبر1: مندرجہ ذیل سوالات کے مختصر جوابات لکھیں۔ **(6x5=30)**

۱: شعر کا مفہوم بیان کیجیے اور متن کا حوالہ بھی دیجیے۔

عشق کی اک جست نے طے کر دیا قصہ تمام
اس زمین و آسماں کو بے کراں سمجھا تھا میں

۲: شعر کا ترجمہ کیجیے اور متن کا حوالہ بھی دیجیے۔

اے پسر ذوقِ نگہ از من بگیر
سوختن در لاالٰہ از من بگیر

۳: اقبال کے تصورِ انسان کامل کے ضمن میں مردِ مومن کی کوئی سی دو خصوصیات مع اشعار تحریر کیجیے۔

۴: علامہ اقبال کے پانچ شعری مجموعوں کے اسما مع سنہِ اشاعت تحریر کیجیے۔

۵: اقبال اور عشقِ رسول صلی اللہ علیہ والہٖ وسلم کے حوالے سے دو اشعار مع مفہوم تحریر کیجیے۔

۶: تربیتِ خودی کے تین مراحل کے نام لکھیے اور تصورِ خودی کی ذیل میں اقبال کے دو اشعار تحریر کیجیے۔

سوال نمبر2: مندرجہ ذیل سوالات کے تفصیلی جوابات تحریر لکھیں۔ **(3x10=30)**

۱: اقبال کے تصورِ فن کے بنیادی نکات کی وضاحت کیجیے۔

۲: اقبال کے تصورِ عشق و خرد کا تقابلی انداز میں جائزہ لیجیے۔

۳: ذیل کے اشعار کی تشریح بحوالۂ متن کیجیے، نیز فنی محاسن کی نشان دہی کیجیے۔

ہے مگر اُس نقش میں رنگِ ثباتِ دوام
جس کو کیا ہو کسی مردِ خدا نے تمام
نقش ہیں سب ناتمام خونِ جگر کے بغیر
نغمہ ہے سودائے خام خونِ جگر کے بغیر

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Biological Techniques **Course Code: ZOOL-407** **Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

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

i. Fixation and Embedding

ii. Thin layer chromatography

iii. Ultra centrifuge

iv. Data Collection

v. Cell fractionation

vi. Preservation of animals

Answer the following questions. (3x10=30)

Q. 2 Write a detailed note HPLC.

Q.3 Discuss use of stage micrometer and ocular micrometer. Support your answer with suitable sketches

Q.4 What is meant by electrophoresis? Explain gel electrophoresis in detail.

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Zoogeography **Course Code: ZOOL-409** **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. Applied Zoogeography

II. Endemic Distribution

III. Physical Barriers

IV. Micro Islands

V. Divergent Boundaries

VI. Mediterranean Subregion

Answer the following Questions. (3x10=30)

Q.2. Explain Land Bridges

Q.3. Write a note on Oriental Region

Q.4. Explain occurrence and significance of Discontinuous Distribution

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Bacteriology **Course Code: ZOOL-429** **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 describe microbial pure-culturing techniques.
II. Differentiate pasteurization from sterilization. Briefly describe chemical sterilization.
III. Describe the procedure of viable counting of bacteria.
IV. Describe various culture preservation techniques.
V. Draw and illustrate a standard bacterial growth curve.
VI. How do bacteria harvest energy for their cellular functioning?

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

I. Describe various methods used to estimate microbial growth.
II. Describe about various physical agents to control microbes.
III. Sequentially describe various steps involved in laboratory cultivation of microbes.

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B.S. 4 Years Program / Eighth Semester – Fall 2024

Roll No. .....

Paper: Environmental Microbiology **Course Code: ZOOL-431** **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. Biochemical types of bacteria in Milk

ii. Physical characteristics of soil

iii. Purification of water

iv. Fundamentals of microbial ecology

v. Effect of pH of environment on microorganism

vi. Study of microbial status of water

Answer the following Questions. (3x10=30)

Q. 2 Write about role of microbes in nitrogen cycle.

Q. 3 Describe preservation of food in detail.

Q. 4 Write a comprehensive note on nature of microbial communities.