[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 1755 **GC-3** **Your Roll No.....**
प्रश्न–पत्र का क्रमांक **आपका अनुक्रमांक.....**

Unique Paper Code : 12321101

Name of the Paper : Understanding Political Theory

Name of the Course : **B.A. (Hons.) Pol. Science Choice Based Credit System Part – I**

Semester : Ist Semester
प्रथम सेमेस्टर

Duration : 3 Hours
समय : 3 घण्टे

Maximum Marks : 75
पूर्णांक : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions.
3. **All** questions carry equal marks.
4. Answers may be written either in English or Hindi; but the same medium should be used throughout the paper.

छात्रों के लिए निर्देश

1. इस प्रश्न–पत्र के मिलते ही ऊपर दिए गए निर्धारित स्थान पर अपना अनुक्रमांक लिखिए।
2. किन्हीं चार प्रश्नों के उत्तर दीजिए।
3. सभी प्रश्नों के अंक समान हैं।
4. इस प्रश्न–पत्र का उत्तर अंग्रेजी या हिंदी किसी एक भाषा में दीजिए, लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

1. What is political theory? Differentiate between empirical and normative approaches to political theory.

राजनीति सिद्धांत क्या है ? राजनीति सिद्धांत के अनुभवसिद्ध और मानकीय दृष्टिकोण के बीच अंतर कीजिए।

2. Examine the relationship between power and politics. Do you think, approaches to studying power help us in understanding politics ? Give reasons.

राजनीति और शक्ति के बीच संबंधों का परीक्षण कीजिए। क्या आप यह मानते हैं कि शक्ति का अध्ययन करने के दृष्टिकोण हमें राजनीति को समझने में मदद करते है ? कारण बताइए।

3. Examine some of the core principles of liberalism.

उदारवाद के कुछ मुख्य सिद्धांतों का परीक्षण कीजिए।

4. Evaluate foundational principles of Marxism.

मार्क्सवाद के बुनियादी सिद्धांतों का मूल्यांकन कीजिए।

5. Examine various streams of feminism. Do you think they sufficiently address the question of women's equality ?

नारीवाद की विविध धाराओं का परीक्षण कीजिए। क्या आप यह मानते हैं कि वे महिला समानता के प्रश्न को पर्याप्त रूप से संबोधित करते हैं ?

6. Write a brief essay on the history of democracy.

लोकतंत्र के इतिहास पर एक संक्षिप्त निबंध लिखिए।

7. What is deliberative democracy ? Do you think, it enriches procedural democracy ? Give arguments.

विमर्शी लोकतंत्र क्या है ? क्या आप यह मानते हैं कि यह प्रक्रियात्मक लोकतंत्र को समृद्ध बनाता है ? तर्क दीजिए।

8. Write short notes on **any two** of the following :

निम्नलिखित में से किन्हीं दो पर संक्षिप्त टिप्पणी लिखिए :

(a) Postmodernism
उत्तर - आधुनिकतावाद

(b) Conservative tradition of political theory
राजनीति सिद्धांत की अनुदारवादी परंपरा

(c) Anarchism
अराजकतावाद

(d) Idea of the political
राजनीतिक (पॉलिटिकल) का विचार

[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 1756 **GC-3** **Your Roll No.....**
प्रश्न-पत्र का क्रमांक **आपका अनुक्रमांक.....**

Unique Paper Code : 12321102

Name of the Paper : Constitutionalism Government and Democracy in India

Name of the Course : **B.A. (Hons.) Pol. Science Choice Based Credit System Part – I**

Semester : Ist Semester
सेमेस्टर प्रथम सेमेस्टर

Duration : 3 Hours Maximum Marks : 75
समय : 3 घण्टे पूर्णांक : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions.
3. **All** questions carry equal marks.
4. Answers may be written either in English or Hindi; but the same medium should be used throughout the paper.

छात्रों के लिए निर्देश

1. इस प्रश्न-पत्र के मिलते ही ऊपर दिए गए निर्धारित स्थान पर अपना अनुक्रमांक लिखिए।
2. किन्हीं चार प्रश्नों के उत्तर दीजिए।
3. सभी प्रश्नों के अंक समान हैं।
4. इस प्रश्न-पत्र का उत्तर अंग्रेजी या हिंदी किसी एक भाषा में दीजिए, लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

1. Elucidate and discuss the features of the Indian Constitution. To what extent does the Preamble reflect these features ?

   भारतीय संविधान की विशेषताओं पर प्रकाश डालिए और उनकी विवेचना कीजिए। प्रस्तावना किस सीमा तक इन विशेषताओं को प्रतिबिंबित करती है ?

2. Do you agree that the Directive Principles of State Policy complements the Fundamental Rights ? Give reasons for your answer.

P.T.O.

क्या आप सहमत हैं कि राज्य के नीति निर्देशक तत्व मौलिक अधिकारों के पूरक हैं ? अपने उत्तर के समर्थन में कारण दीजिए।

3. Examine how has the changing nature of representation affected the functioning of the Indian Parliament.

   प्रतिनिधित्व की बदलती प्रकृति ने किस प्रकार भारतीय संसद की कार्यप्रणाली को प्रभावित किया है ? परीक्षण कीजिए।

4. The Indian Prime Minister was never 'first among equals'. Do you agree ? Give reasons for your answer.

   भारतीय प्रधानमंत्री 'समानों में प्रथम' कभी नहीं था। क्या आप सहमत हैं ? अपने उत्तर के समर्थन में कारण दीजिए।

5. How is the Supreme Court of India constituted ? Critically examine its role in protecting the basic structure of the Indian Constitution.

   भारतीय सर्वोच्च न्यायालय का गठन किस प्रकार होता है ? भारतीय संविधान की बुनियादी संरचना के संरक्षण में इसकी भूमिका का आलोचनात्मक परीक्षण कीजिए।

6. Critically examine the basic features of strong-Centre federalism in India.

   भारत में प्रबल-केंद्र संघवाद के बुनियादी विशेषताओं का आलोचनात्मक परीक्षण कीजिए।

7. Discuss the growth and development of Panchayati Raj Institutions in India.

   भारत में पंचायती राज संस्थाओं के उदय एवं विकास की विवेचना कीजिए।

8. Write short notes on any **two** of the following :
   निम्नलिखित में से **किन्हीं दो** पर संक्षिप्त टिप्पणी लिखिए :
   (a) Emergency Provisions
   आपात्तकालीन प्रावधान
   (b) Judicial Review
   न्यायिक समीक्षा
   (c) Fifth and Sixth Schedule
   पांचवी एवं छठी अनुसूची
   (d) Women's representation in local government
   स्थानीय प्रशासन में महिला प्रतिनिधित्व

is question paper contains **16+8+3** printed pages]

Roll No. | | | | | | | | | | | |

No. of Question Paper : **1861**

nique Paper Code : **22411101** **GC-3**

ame of the Paper : **Financial Accounting**

ame of the Course : **B.Com. (Hons.), CBCS**

emester : **I**

Duration : **3 Hours** Maximum Marks : **55**

(Write your Roll No. on the top immediately on receipt of this question paper.)

(इस प्रश्न-पत्र के मिलते ही ऊपर दिए गए निर्धारित स्थान पर अपना अनुक्रमांक लिखिए।)

Note : — Answers may be written *either* in English *or* in Hindi; but the same medium should be used throughout the paper.

टिप्पणी :— इस प्रश्न-पत्र का उत्तर अंग्रेजी **या** हिंदी किसी एक भाषा में दीजिए; परन्तु सभी उत्तरों का माध्यम एक ही होना चाहिए।

Attempt *All* questions.

Show your working notes clearly.

सभी प्रश्न हल कीजिए।

अपनी गणनाएँ स्पष्ट दिखाइए।

1. State with reasons whether the following statements are True *or* False :

(*a*) Legal fees paid to acquire a property is capital expenditure.

(*b*) Advance received from a supplier is not taken as income or sales.

P.T.O.

(*c*) Calibre or quality of management team is not directly disclosed in the balanc sheet.

(*d*) Deferred revenue expenditure is current year's revenue expenditure to be paid in late years.

(*e*) Depreciation is decrease in the market value of a fixed assets.

कारण सहित बताइये कि निम्न कथन सही हैं अथवा गलत :

(*a*) किसी सम्पत्ति को क्रय करने के लिए दी गई कानूनी फीस एक पूँजीगत व्यय होत है।

(*b*) माल की आपूर्तिकर्ता से प्राप्त अग्रिम राशि को आय अथवा बिक्री नहीं माना जाता।

(*c*) तुलन-पत्र में, प्रबन्धक टीम की योग्यता तथा गुणवत्ता को सीधे-सीधे नहीं दर्शाया जाता।

(*d*) आस्थगित राजस्व व्यय वर्तमान वर्ष का ऐसा राजस्व व्यय होता है जिसका भुगतान बाद के वर्षों में किया जाता है।

(*e*) स्थाई सम्पत्ति के बाजार मूल्य में गिरावट को ह्रास कहते हैं।

2. From the following particulars, prepare the Trading and Profit & Loss Account for the year ended 31st December, 2014 and the Balance Sheet as on that date :

Particulars	₹	**Particulars**	₹
Building	5,00,000	Loans (1-1-2014)	3,00,000
Machinery	2,20,000	Capital	5,20,000

Furniture	1,00,000	Creditors	4,00,000
Bank	90,000	Purchase Returns	1,00,000
Cash	10,000	Sales	32,20,000
Debtors	5,00,000	Provident Fund Deducted	
Opening Stock	1,20,000	from Salaries	10,000
Purchases	25,00,000		
Sales Return	1,20,000		
Rent	60,000		
Establishment	1,60,000		
Interest (10%)	20,000		
Electricity	10,000		
Phone	10,000		
Commission	60,000		
Insurance Premium	10,000		
Bad debts	20,000		
Bills Receivable	40,000		
	45,50,000		45,50,000

P.T.O.

Adjustments :

Provide depreciation on Building @ 5%, Machinery @ 15% and Furniture @ 10%. Stock was not taken on 31st December, 2014 but only on 7/1/2015. The transactions from 1/1/2015 to 7/1/2015 are : Sales ₹ 2,50,000, Purchase ₹ 1,50,000. Stock on 7/1/2015 ₹ 1,80,000 and rate of Gross Profit being 20%. During the year machinery of the value of ₹ 1,00,000 was destroyed by the fire and the insurance claim was settled at ₹ 80,000 and credited to Machinery A/C. Also provide Employer's share of P.F. ₹ 10,000, Provision for Bad debts 5%, Commission of the Manager @ 10% on net profit after providing such commission. 10

अधोलिखित ब्यौरे से 31 दिसम्बर, 2014 को समाप्य वर्ष के लिए व्यापार तथा लाभ-हानि खाता तैयार कीजिए तथा उसी तिथि को तुलन-पत्र भी बनाइए :

विवरण	**₹**	**विवरण**	**₹**
भवन	5,00,000	ऋण (1-1-2014)	3,00,000
मशीनें	2,20,000	पूँजी	5,20,000
फर्नीचर	1,00,000	लेनदार	4,00,000
बैंक	90,000	क्रय वापसी	1,00,000
नगद	10,000	विक्रय	32,20,000
देनदार	5,00,000	वेतन से काटी गई भविष्य निधि	10,000

आरम्भिक स्टॉक	1,20,000		
क्रय	25,00,000		
विक्रय वापसी	1,20,000		
किराया	60,000		
स्थापना व्यय	1,60,000		
ब्याज (10%)	20,000		
बिजली	10,000		
फोन	10,000		
कमीशन	60,000		
बीमा प्रीमियम	10,000		
बट्टे खाते	20,000		
प्राप्य बिल	40,000		
	45,50,000		45,50,000

समायोजन :

भवन पर 5%, मशीनों पर 15% तथा फर्नीचर पर 10% की दर से मूल्यह्रास लगाएँ। स्टॉक का आकलन 31 दिसम्बर, 2014 को नहीं किया जा सका अपितु 7/1/2015 को किया गया। 1/1/2015 से 7/1/2015 के बीच के लेन-देन हैं : बिक्री ₹ 2,50,000, क्रय ₹ 1,50,000, 7/1/2015 को स्टॉक ₹ 1,80,000 तथा सकल लाभ की दर 20%। वर्ष के दौरान ₹ 1,00,000 मूल्य की मशीनें आग लगने

P.T.O.

से क्षतिग्रस्त हो गईं तथा बीमा दावे का निबटारा ₹ 80,000 में हुआ जिसे मशीन खाते में जमा कर दिया गया। P.F. में नियोक्ता के हिस्से का ₹ 10,000 का प्रावधान कीजिए, बट्टे खातों के लिए 5% प्रावधान करें। प्रबन्धक को, उसकी कमीशन के बाद के शुद्ध लाभ का 10% कमीशन के तौर पर दिया जाना है।

Or

(अथवा)

From the following Receipts and Payments Account of a Cricket Club and additional information, prepare Income and Expenditure Account for the year ended 31st March, 2015 and a Balance Sheet as on that date :

Receipts	₹	**Payments**	₹
To Balance b/d :		By Purchase of Balls	65,000
Cash	10,200	By Tournament Fees	10,000
Bank	30,000	By Affiliation Fee for five years	2,000
To Subscriptions	2,45,000	By Rent of Playground	6,000
To Interest on Investment	1,800	By Travelling Expenses	20,000
To Sale of ticket for Variety		By Expenses of Variety	
Programme	20,000	Programme	15,000
To Sale of furniture		By Refreshment Expenses	4,000
(30-09-2014)	9,000	By Furniture bought on	
To Donation for Building	50,000	(1-10-2014)	5,000

To Legacy	11,000	By Advance to Building Contractor	50,000
		By Repairs	5,000
		By Salary	15,000
		By Telephone bill	1,500
		By Miscellaneous Exps	8,000
		By 12% Investments	
		(F.V. ₹ 1,70,000) 1-1-2015	1,50,000
		By Balance :	
		Cash	8,500
		Bank	12,000
	3,77,000		3,77,000

Additional Information :

(*a*) Miscellaneous expenses include ₹ 3,000 for the honorarium.

(*b*) Subscriptions received include ₹ 9,000 outstanding subscription for the year 2013-14. Subscription for the year 2014-15 amounting to ₹ 16,000 is still outstanding. Some members have paid subscription for the 2015-16 amounting to ₹ 8,000 which is included in the subscription received.

(*c*) Face value of 12% investment on 31st March 2014 was ₹ 15,000 (Cost price ₹ 12,000).

(*d*) Book value of the furniture sold on 1-4-2014 was ₹ 12,000 depreciation being 20% p.a. Provide depreciation on new furniture at the same rate.

(*e*) Telephone bill for one quarter is outstanding, the amount outstanding being ₹ 300. The charge for each quarter is same both for 2013-14 and 2014-15.

(*f*) Unpresented cheques for repairs to building being ₹ 4,000 for 2013-14 and ₹ 12,000 for 2014-15.

(*g*) Bank balance represents 'Balance as per Bank Pass Book'.

(*h*) Stock of balls with the club on 31st March, 2015 amounted to ₹ 6,000. 10

एक क्रिकेट क्लब के निम्न प्राप्ति तथा भुगतान खाते व अन्य अतिरिक्त जानकारियों के आधार पर, 31 मार्च, 2015 को समाप्य वर्ष के लिए आय तथा व्यय खाता तैयार कीजिए तथा उस दिवस को उसका तुलन-पत्र भी बनाइये :

प्राप्तियाँ	₹	भुगतान	₹
शेष आगे लाया गया :		गेंदों का क्रय	65,000
नगद	10,200	टूर्नामेन्ट की फीस	10,000
बैंक	30,000	पाँच वर्ष के लिए सम्बद्धता शुल्क	2,000
सदस्यों का अंशदान	2,45,000	खेल मैदान का किराया	6,000

निवेश पर ब्याज	1,800	यात्रा व्यय	20,000
विविध कार्यक्रम की टिकट बिक्री	20,000	विविध कार्यक्रम पर व्यय	15,000
फर्नीचर की बिक्री		जलपान के लिए व्यय	4,000
(30-09-2014)	9,000	फर्नीचर क्रय (1-10-2014)	5,000
भवन के लिए दान	50,000	भवन के लिए अग्रिम भुगतान	
विरासत से प्राप्तियाँ	11,000	ठेकेदार को दिया	50,000
		मरम्मत व्यय	5,000
		वेतन	15,000
		टेलीफोन बिल	1,500
		विविध व्यय	8,000
		12% निवेश (भविष्य मूल्य	
		₹ 1,70,000) 1-1-2015	1,50,000
		शेष आगे ले जाया गया :	
		नगद	8,500
		बैंक	12,000
	3,77,000		3,77,000

P.T.O.

अतिरिक्त जानकारी :

(*a*) विविध व्यय में ₹ 3,000 मानदेय राशि सम्मिलित है।

(*b*) प्राप्त अंशदान में, 2013-14 वर्ष की ₹ 9,000 बकाया राशि सम्मिलित है। वर्ष 2014-15 के लिए ₹ 16,000 अंशदान अभी भी बकाया है। कुछ सदस्यों ने वर्ष 2015-16 के लिए ₹ 8,000 अग्रिम अंशदान दे दिया है जो प्राप्त अंशदान में सम्मिलित है।

(*c*) 31 मार्च, 2014 को, 12% निवेश का अंकित मूल्य ₹ 15,000 था (जिसका लागत मूल्य ₹ 12,000 था)।

(*d*) 1-4-2014 को बेचे गए फर्नीचर का पुस्तक मूल्य ₹ 12,000 था। ह्रास मूल्य की दर 20% वार्षिक थी। नए फर्नीचर पर भी इसी दर से ह्रास लागू होगा।

(*e*) एक तिमाही का टेलीफोन बिल बकाया है जिसकी राशि ₹ 300 है। 2013-14 तथा 2014-15 दोनों वर्षों में प्रत्येक तिमाही का यही खर्चा है।

(*f*) भवन की मरम्मत के लिए जारी, वर्ष 2013-14 में ₹ 4,000 तथा 2014-15 में ₹ 12,000 के चेक भुगतान के लिए प्रस्तुत नहीं किए गए।

(*g*) बैंक बैलेन्स 'बैंक पास बुक के अनुसार शेष' को प्रदर्शित करता है।

(*h*) 31 मार्च, 2015 को क्लब के पास उपलब्ध गेंदों का स्टॉक मूल्य ₹ 6,000 था।

3. (*a*) Distinguish between Periodic Inventory System and Perpetual Inventory System. 3

(*b*) The following are the details of a spare part of Golden Mills :

1-1-2015	Opening Stock	Nil
1-1-2015	Purchases	200 units @ ₹ 30 per unit

15-1-2015	Issued for consumptions	100 units
1-2-2015	Purchases	400 units @ ₹ 40 per unit
15-2-2015	Issued for consumptions	200 units
20-2-2015	Issued for consumptions	200 units
1-3-2015	Purchases	300 units @ ₹ 50 per unit
15-3-2015	Issued for consumptions	100 units

Find out value of stock as on 31-3-2015 if the company follows :

(*i*) FIFO

(*ii*) Weighted Average Method

under Perpetual Inventory System. 7

(*a*) सामयिक इन्वेन्टरी पद्धति तथा सतत् इन्वेन्टरी पद्धति में अन्तर्भेद कीजिए।

(*b*) गोल्डन मिल के एक स्पेयर पार्ट का विवरण नीचे दिया गया है :

1-1-2015	आरम्भिक स्टॉक	शून्य
1-1-2015	क्रय की गईं	200 इकाई @ ₹ 30 प्रति इकाई
15-1-2015	खपत के लिए जारी किए	100 इकाई
1-2-2015	क्रय की गईं	400 इकाई @ ₹ 40 प्रति इकाई

P.T.O.

15-2-2015	खपत के लिए जारी	200 इकाई
20-2-2015	खपत के लिए जारी	200 इकाई
1-3-2015	क्रय की गईं	300 इकाई @ ₹ 50 प्रति इका
15-3-2015	खपत के लिए जारी	100 इकाई

सतत् इन्वेन्टरी पद्धति द्वारा, 31-3-2015 को स्टॉक का मूल्य ज्ञात कीजिए यदि कम्पनी :

(*i*) प्रथम आवक प्रथम जावक (FIFO) तरीका अपनाती है तथा

(*ii*) भारित औसत (Weighted Average) का तरीका अपनाती है।

Or

(अथवा)

(*a*) On 1st January 2010, Riddhi purchased machine 'A' for ₹ 30,000 and machine 'B' for ₹ 20,000. On 1st January 2011, she purchased a machine 'C' for ₹ 50,000. On 1st January 2012, machine 'A' got out of order and a new machine was purchased costing ₹ 60,000 after surrendering the old one and paying cash ₹ 45,000. On 1st January 2013, machine 'C' purchased on 1st January 2011, was destroyed by fire and insurance company paid ₹ 30,000 only. Show the Machine account for 2010, 2011, 2012 and 2013. Charge depreciation @ 10% p.a. on the W.D.V. method. 7

(*b*) What do you understand by convergence of IFRS ? Is there any need for such convergence ? 3

(*a*) 1 जनवरी, 2010 को रिद्धि ने ₹ 30,000 में मशीन 'ए' तथा ₹ 20,000 में मशीन 'बी' खरीदी। 1 जनवरी, 2011 को उसने ₹ 50,000 में मशीन 'सी' खरीदी। 1 जनवरी, 2012 को मशीन 'ए' खराब हो गई तथा ₹ 60,000 मूल्य की नई मशीन खरीदी गई जिसके लिए पुरानी मशीन के साथ ₹ 45,000 नगद भुगतान किया गया। 1 जनवरी, 2013 को, 1 जनवरी, 2011 को खरीदी गई मशीन 'सी' आग लगने से क्षतिग्रस्त हो गई जिसके लिए इन्श्योरेन्स कम्पनी ने मात्र ₹ 30,000 दिए। 2010, 2011, 2012 तथा 2013 के लिए मशीन खाता बनाइये। क्रमशः घटते मूल्य पर 10% वार्षिक दर से मूल्यह्रास लगाइए।

(*b*) अन्तर्राष्ट्रीय वित्तीय रिपोर्टिंग मानकों (IFRS) के अभिसरण से आपका क्या अभिप्राय है ? क्या इस प्रकार के अभिसरण की कोई आवश्यकता है ?

Aaryan Motor Ltd. purchased three trucks costing ₹ 2,00,000 each from Dev Auto Ltd. on 1st January, 2012 on hire-purchase system. The terms were : payment on delivery ₹ 50,000 for each truck and balance of the principal amount by 3 equal instalments plus interest at 15% p.a. to be paid at the end of each year. Aaryan Motor Ltd. writes off 25% depreciation yearly on the diminishing balance method. Aaryan Motor Ltd. paid the instalment due on 31st December, 2012 and 31st December 2013 but could not pay the final instalment.

Dev Auto Ltd. repossessed two trucks adjusting their values against the amount due. The repossession was done on 1st January 2015 on the basis of 40% p.a. depreciation on the diminishing balance method. Dev Auto Ltd. spent ₹ 13,600 on the repair of two trucks and sold of them for ₹ 65,000.

Write up the ledger accounts in the books of Aaryan Motor Ltd. and also prepare Goods repossessed A/c in Dev Auto Ltd. showing the above transactions upto 1-1-2015: 10

01 जनवरी, 2012 को आर्यन मोटर लि. ने ₹ 2,00,000 प्रति ट्रक के हिसाब से, देव ऑटो लि. से तीन ट्रक किराया-क्रय पद्धति से क्रय किए। शर्तें इस प्रकार थीं—डिलीवरी पर ₹ 50,000 प्रति ट्रक भुगतान तथा शेष मूल राशि का भुगतान तीन समान किश्तों में, 15% वार्षिक ब्याज सहित, प्रत्येक वर्ष के अन्त में किया जाएगा। आर्यन मोटर लि. 25% वार्षिक की दर से, घटते शेष तरीके के आधार पर मूल्यह्रास लगाते हैं। आर्यन मोटर लि. ने 31 दिसम्बर, 2012 तथा 31 दिसम्बर, 2013 को देय किश्तों का भुगतान कर दिया किन्तु वे अन्तिम किश्त का भुगतान नहीं कर पाए।

देव ऑटो लि. ने देय राशि के विरुद्ध दो ट्रकों का मूल्य समायोजित करते हुए उन्हें वापस ले लिया। वापस लिए गए ट्रकों का मूल्य, घटते शेष पर 40% वार्षिक दर से मूल्यह्रास लगाकर 1 जनवरी, 2015 को देव ऑटो लि. ने ट्रकों को वापस ले लिया। देव ऑटो लि. ने दोनों ट्रकों की मरम्मत पर ₹ 13,600 खर्च किए तथा ₹ 65,000 में उन्हें बेच दिया।

आर्यन मोटर लि. की पुस्तकों में लैजर खाते बनाइये तथा देव ऑटो लि. की पुस्तकों में माल वापसी खाता दर्शाइये। उपर्युक्त सभी लेन-देन 1-1-2015 तक दर्शाइये।

Or

(अथवा)

Mohan sells goods on hire-purchase basis also. He fixes hire-purchase price by adding 50% to the cost of the goods to him. The following are the figures relating to his hire-purchase business for the year 2014 :

	₹
Balance on Hire-Purchase Stock Account on 1-1-2014	24,000
Balance on Hire-Purchase Debtors Account on 1-1-2014	600
Selling price of the goods sold on hire-purchase basis during the year	1,81,200
Cash received from hire-purchase customers during the year	1,84,800
Total amount of instalments that fell due during 2014	1,85,400

One customer to whom goods had been sold for ₹ 2,400 paid only three instalments of ₹ 200 each. On his failure to pay the monthly instalment of ₹ 200 due on 4th December, 2014 the goods were repossessed on 27-12-2014 after legal notice.

Prepare ledger accounts as per Stock and Debtors system. 10

मोहन, किराया-क्रय आधार पर भी माल बेचता है। वह किराया-क्रय का मूल्य अपनी लागत में 50% जोड़कर तय करता है। निम्नलिखित आंकड़े वर्ष 2014 के लिए उसके किराया-क्रय व्यापार से सम्बद्ध हैं :

	₹
1-1-2014 को किराया-क्रय स्टॉक खाते का शेष	24,000
1-1-2014 को किराया-क्रय लेनदार खाते का शेष	600
वर्ष के दौरान किराया-क्रय के आधार पर बेचे गए माल का विक्रय मूल्य	1,81,200
वर्ष के दौरान किराया-क्रय ग्राहकों से नगद प्राप्तियाँ	1,84,800
वर्ष 2014 के दौरान देय किश्तों की कुल धनराशि	1,85,400

एक ग्राहक ने जिसे ₹ 2,400 का माल बेचा गया था, ₹ 200 प्रति के हिसाब से केवल तीन किश्तों का भुगतान किया। 4 दिसम्बर, 2014 को देय ₹ 200 की किश्त का भुगतान न कर पाने की स्थिति में, कानूनी नोटिस देने के बाद 27-12-2014 को उस ग्राहक से सामान वापस ले लिया गया।

किराया-क्रय लेन-देनों से होने वाले लाभ अथवा हानि को ज्ञात करने के लिए, 'स्टॉक एवं डेटर्स' पद्धति से लैजर खाते तैयार कीजिए।

Delhi head office supplies goods to its branch at Kanpur at invoice price which is cost plus 50%. All cash received by the branch is remitted to Delhi and all Branch expenses are paid by the head office. The following are the particulars related to Kanpur Branch for the year 2014 :

	₹
Stock at Branch on 1-1-2014 at Invoice price	60,000
Branch Debtors on 1-1-2014	12,000
Petty cash on 1-1-2014	100

1861

Goods received from Head Office at Invoice price		1,86,000
Goods returned to Head Office		3,000
Credit sales less returns		84,000
Allowances to customers off selling price already adjusted while Invoicing		2,000
Cash received from Debtors		90,000
Discount allowed to Debtors		2,400
Expenses paid by Head Office :		
Rent	2,400	
Salaries	24,000	
Petty cash	1,000	27,400
Cash sales		1,04,000
Stock at Branch on 31-12-2014		54,000
Petty cash balance on 31-12-2014		100

Prepare :

(1) Branch stock account

(2) Branch debtors account

(3) Branch adjustment account

(4) Branch profit & loss account

in the books of Head Office. 10

P.T.O.

1861

दिल्ली प्रधान कार्यालय, कानपुर स्थित अपनी शाखा को बीजक मूल्य, जोकि लागत जमा 50% है, पर माल भेजता है। शाखा द्वारा प्राप्त समस्त नगद राशि दिल्ली भेज दी जाती है तथा शाखा के सभी खर्चों का भुगतान प्रधान कार्यालय द्वारा किया जाता है। निम्न विवरण, वर्ष 2014 के लिए, कानपुर शाखा से सम्बद्ध हैं :

		₹
1-1-2014 को शाखा में बीजक मूल्य पर स्टॉक		60,000
1-1-2014 को शाखा के देनदार		12,000
1-1-2014 को फुटकर रोकड़ राशि		100
बीजक मूल्य पर प्रधान कार्यालय से प्राप्त माल		1,86,000
प्रधान कार्यालय को माल वापसी		3,000
वापसियाँ घटाकर उधार विक्रय		84,000
विक्रय मूल्य पर ग्राहकों को छूट जिसे बीजक बनाते समय पहले ही समायोजित किया जा चुका है		2,000
देनदारों से नगद प्राप्ति		90,000
देनदारों को प्रदत्त छूट		2,400
प्रधान कार्यालय द्वारा भुगतान किए गए व्यय :		
किराया	2,400	
वेतन	24,000	
फुटकर रोकड़	1,000	27,400

	1861
नगद विक्रय	1,04,000
31-12-2014 को शाखा में स्टॉक	54,000
31-12-2014 को फुटकर रोकड़ का शेष	100

प्रधान कार्यालय की पुस्तकों में निम्न खाते तैयार कीजिए :

(1) शाखा स्टॉक खाता

(2) शाखा देनदार खाता

(3) शाखा समायोजन खाता तथा

(4) शाखा लाभ-हानि खाता।

Or

(अथवा)

The following is the Trial Balance of Mumbai Branch as at 31st March, 2015 :

Particulars	₹	Particulars	₹
Delhi Head Office	32,400	Sales	3,80,000
Stock (1-4-2014)	60,000	Goods supplied to H.O.	60,000
Purchases	1,78,000	Creditors	18,500
Goods received from H.O.	90,000		

Salaries	15,000		
Debtors	37,000		
Rent	9,600		
Office Expenses	4,700		
Cash in hand & Bank	17,800		
Furniture	14,000		
	4,58,500		4,58,500

Additional information :

Closing stock was valued at ₹ 27,000. The Branch Account in the books of Head Office stood at ₹ 4,600 (Debit Balance) on 31st March, 2015. On 28th March, 2015 the Head Office forwarded goods to the value of ₹ 25,000 to the branch where these were received on 3rd April, 2015.

Prepare :

(*i*) Branch Trading and Profit & Loss Account,

(*ii*) Mumbai Branch Account in the books of Head Office. 10

नीचे 31 मार्च, 2015 को मुम्बई शाखा का कच्चा चिट्ठा दिया गया है :

विवरण	₹	विवरण	₹
दिल्ली प्रधान कार्यालय	32,400	विक्रय	3,80,000
स्टॉक (1-4-2014)	60,000	प्रधान कार्यालय को माल भेजा	60,000
क्रय	1,78,000	लेनदार	18,500
प्रधान कार्यालय से माल आया	90,000		
वेतन	15,000		
देनदार	37,000		
किराया	9,600		
कार्यालयी व्यय	4,700		
नगद तथा बैंक बैलेन्स	17,800		
फर्नीचर	14,000		
	4,58,500		4,58,500

अतिरिक्त जानकारी :

अन्तिम स्टॉक का मूल्यांकन ₹ 27,000 किया गया। 31 मार्च, 2015 को प्रधान कार्यालय की पुस्तकों में शाखा खाते में नामे शेष ₹ 4,600 (Debit Balance) था। 28 मार्च, 2015 को प्रधान कार्यालय ने ₹ 25,000 मूल्य का माल शाखा को प्रेषित किया किन्तु शाखा में यह माल 3 अप्रैल, 2015 को प्राप्त हुआ।

P.T.O.

प्रधान कार्यालय की पुस्तकों में निम्नलिखित खाते तैयार कीजिए :

(*i*) शाखा व्यापार तथा लाभ एवं हानि खाता, तथा

(*ii*) मुम्बई शाखा खाता।

A, B and C were partners sharing profits and losses in the ratio of 2 : 2 : 1 respectively. The balance sheet of the firm as on 31st March, 2015 was as follows :

Liabilities	₹	Assets		₹
Capital :		Fixed Assets		4,00,000
A	2,92,000	Current Assets :		
B	1,08,000	Stock	2,50,000	
C	1,00,000	Debtors	2,50,000	
C's Loan Account	50,000	Cash	10,000	5,10,000
Mrs. A's Loan	1,00,000	Advance to B		40,000
Sundry Creditors	2,50,000			
Provision for Bad debts	50,000			
	9,50,000			9,50,000

The firm was dissolved on the date of Balance Sheet due to continued losses. After preparing the Balance Sheet as on 31st March 2015, it was discovered the purchases amounting to ₹ 40,000 in March, 2015 were not recorded in the books though the goods were received during March, 2015.

Fixed assets realised ₹ 2,00,000; stock ₹ 2,10,000 and debtors ₹ 2,05,000. Creditors were paid after deduction of discount @ 2%. The realisation expenses amounted to ₹ 10,800. A agreed to take over the loan of Mrs. A. B is insolvent and his estate is unable to contribute anything. Prepare Realisation A/C, Partners Capital A/Cs and Cash A/C to close the books of the firm applying the decision in Garner *Vs.* Murray. 10

A, B तथा C क्रमशः 2 : 2 : 1 के अनुपात में लाभ तथा हानि बाँटने वाले साझेदार हैं। 31 मार्च, 2015 को उनकी फर्म का तुलन-पत्र इस प्रकार था :

देयताएँ	₹	परिसम्पत्तियाँ		₹
पूँजी :		स्थाई सम्पत्तियाँ		4,00,000
A	2,92,000	चालू सम्पत्तियाँ :		
B	1,08,000	स्टॉक	2,50,000	
C	1,00,000	देनदार	2,50,000	
C का ऋण खाता	50,000	नगद	10,000	5,10,000
श्रीमती A का ऋण	1,00,000	B को अग्रिम भुगतान		40,000
विभिन्न लेनदार	2,50,000			
बट्टे खाते का प्रावधान	50,000			
	9,50,000			9,50,000

P.T.O.

लगातार होती हानि के कारण तुलन-पत्र की तिथि को साझेदारी फर्म को भंग कर दिया गया। 31 मार्च, 2015 को तुलन-पत्र तैयार करने के बाद पता चला कि मार्च, 2015 में ₹ 40,000 की खरीद को फर्म की पुस्तकों में रिकॉर्ड नहीं किया गया हालांकि माल मार्च, 2015 में प्राप्त कर लिया गया था।

स्थाई परिसम्पत्तियों से प्राप्त हुए ₹ 2,00,000; स्टॉक से ₹ 2,10,000 तथा देनदारों से ₹ 2,05,000, लेनदारों को 2% छूट काटकर भुगतान किया गया। वसूली का व्यय ₹ 10,800 हुआ। A ने श्रीमती A के ऋण को अपनाना स्वीकार किया। B दीवालिया है तथा उसकी सम्पत्तियों से कुछ भी योगदान प्राप्त नहीं हो सकता। गार्नर **बनाम** मरे के निर्णय को लागू करते हुए फर्म की पुस्तकें बन्द करने के लिए—वसूली खाता, साझेदारों के पूँजी खाते तथा रोकड़ खाता तैयार कीजिए।

Or

(अथवा)

A, B, C and D were partners in a firm. The capital of the firm consisted of ₹ 80,000 contributed originally in the proportion of 4 : 3 : 2 : 1. The profits and losses were shared in the same proportion. The firm was dissolved on 31st March, 2015. The Balance Sheet as on that date was as under :

Liabilities	₹	Assets	₹
Capital :		Stock	38,000
A	40,000	Debtors	1,00,000
B	28,000	Cash	12,000

C	21,000	
D	5,000	
Loan :		
A	10,000	
C	16,000	
Creditors	30,000	
	1,50,000	1,50,000

It was decided on 15th April, 2015 that the net realisation should be distributed on the first of each month in the appropriate order. The realisation and expenses at the end of each month were as under :

	Debtors	Stock	Expenses
	₹	₹	₹
April	30,000	14,000	1,000
May	17,000	10,000	2,000
June	22,000	—	500
July	11,000	8,000	300
August	14,000	5,000	200

P.T.O.

The stock was completely disposed off. It was further agreed that B should take over the remaining debts of ₹ 5,000. Show the distribution of cash through maximum possible loss method. 10

A, B, C और D एक फर्म में साझेदार थे। फर्म की पूँजी ₹ 80,000 थी जिसे साझेदारों ने मूल रूप से 4 : 3 : 2 : 1 के अनुपात में लगाया था। लाभ-हानि का विभाजन भी इसी अनुपात में होता था। 31 मार्च, 2015 को फर्म को भंग कर दिया गया। उस तिथि को फर्म का तुलन-पत्र इस प्रकार था :

देयताएँ	₹	सम्पत्तियाँ	₹
पूँजी :		स्टॉक	38,000
A	40,000	देनदार	1,00,000
B	28,000	नगद	12,000
C	21,000		
D	5,000		
ऋण :			
A	10,000		
C	16,000		
लेनदार	30,000		
	1,50,000		1,50,000

15 अप्रैल, 2015 को निर्णय किया गया कि निबल वसूली की राशि को प्रत्येक माह की पहली तिथि को उचित क्रम में बाँट लिया जाय। हर माह के अन्त में वसूली तथा खर्चों का ब्यौरा नीचे दिया गया है :

माह	देनदार	स्टॉक	खर्चे
	₹	₹	₹
अप्रैल	30,000	14,000	1,000
मई	17,000	10,000	2,000
जून	22,000	—	500
जुलाई	11,000	8,000	300
अगस्त	14,000	5,000	200

स्टॉक को समुचित रूप से बेच दिया गया। बाद में यह भी तय हुआ कि ₹ 5,000 की बची हुई देनदारियों का भुगतान B करेगा। अधिकतम संभाव्य-हानि विधि द्वारा रोकड़ का भुगतान दर्शाइए।

(25)

This question paper contains 6 printed pages. *Your Roll No.* .....

Sl. No. of Ques. Paper	: **1862** **GC-3**
Unique Paper Code	: **22411102**
Name of Paper	: **Business Law**
Name of Course	: **B.Com. (Hons.) CBCS**
Semester	: **I**
Duration	: **3 hours**
Maximum Marks	: **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

(इस प्रश्न-पत्र के मिलते ही ऊपर दिये गये निर्धारित स्थान पर अपना अनुक्रमांक लिखिये।)

NOTE:— *Answers may be written either in English or in Hindi; but the same medium should used throughout the paper.*

टिप्पणी:—*इस प्रश्नपत्र का उत्तर अंग्रेज़ी या हिन्दी किसी एक भाषा में दीजिए; लेकिन सभी उत्तरों का म एक ही होना चाहिए।*

*Attempt **all** questions. All questions carry equal marks.*

***सभी** प्रश्नों के उत्तर दीजिए। सभी प्रश्नों के अंक समान हैं।*

1. (a) State, with reasons in brief, whether the following statements are true or false:

(i) Collateral transactions to an illegal agreement are valid.

(ii) Mere silence as to facts is not fraud.

(iii) Quasi contracts are not contracts in the real sense of the term.

संक्षेप में कारण देकर बताइए कि निम्नलिखित कथन सत्य हैं या असत्य:

(i) अवैध करार के तहत संपार्श्विक लेन-देन वैध होते हैं।

(ii) तथ्यों के प्रति मात्र चुप्पी कोई कपट नहीं है।

(iii) अर्ध संविदाएँ, शब्द के वास्तविक आशय में, संविदाएँ नहीं होतीं।

(b) 'The law of contracts is not the whole law of agreements, nor is it the whole la obligations." Explain.

"संविदाओं का कानून, करारों का पूरा कानून नहीं होता और न ही यह बाध्यताओं का पूरा होता है।" व्याख्या कीजिए।

Or (अथवा)

(a) State, with reasons in brief, whether the following statements are true or false:

(i) A voidable contract may remain valid.

(ii) Insurance is an example of wagering agreements.

(iii) Special damages can be claimed as a right by the aggrieved party.

संक्षेप में कारण देकर उल्लेख कीजिए कि निम्नलिखित कथन सत्य हैं या असत्य:

(i) शून्यकरणीय करार वैध बना रह सकता है।

(ii) बीमा, बाजी करारों का एक नमूना है।

(iii) विशेष हानियों के लिए दावा, व्यथित पार्टी अधिकार के रूप में, कर सकती है। 9

(b) A, a minor, borrowed some money from B and executed a promissory note in favour of B. The promissory note was renewed by A when he attained majority. B brings a suit against A on the basis of second promissory note. Will he succeed in recovering money from A? Give reasons.

A, जो कि अल्पवयस्क है, B से कुछ पैसा उधार ले लेता है और B के पक्ष में वचन पत्र निष्पादित कर देता है। यह वचन पत्र फिर से नवीकृत किया गया था जब A वयस्क हो गया था। B इस वचन पत्र के आधार पर A के खिलाफ वाद डाल देता है। क्या वह A से पैसा वसूलने में सफल होगा? कारण दीजिए। 3

(c) Ram's son absconded from home. He sent his manager in search of the boy. After the manager had left, he announced a reward of Rs. 10,000 for anybody giving information about his son. The manager came to know of this offer only when he had already traced the missing boy. Explain his rights giving reasons.

राम का बेटा घर से फरार हो गया था। उसने लड़के को ढूँढने के लिए, अपने प्रबंधक को भेजा। प्रबंधक के जाने के बाद उसने उस व्यक्ति को 10000 रु० का उपहार देने की घोषणा की, जो भी व्यक्ति उसके बेटे के बारे में सूचना देगा। प्रबंधक को इस प्रस्ताव का पता तब चला जब उसने बेटे का पता लगा लिया था। उसके अधिकार की व्याख्या कीजिए और कारण दीजिए। 3

2. (a) (i) "Custody of goods implies property in goods." Comment.

(ii) X agreed to sell to Y the entire quantity of oil lying in a tanker in X's godown. The oil was to be filled into drums and then the drums were to be delivered to Y. Some drums were filled in the presence of Y; but before the remaining drums could be filled, a fire broke out and the entire quantity of oil was destroyed. Who will bear the loss? Discuss.

(iii) A delivers some jewellery to B on sale or return basis. B pledges the jewellery with C. A sues B for recovery of price. Will he succeed?

(i) "माल की अभिरक्षा का निहितार्थ है माल में संपत्ति।" टिप्पणी कीजिए।

(ii) X तेल की संपूर्ण मात्रा को Y को बेचने के लिए सहमत हो जाता है जो तेल X के भंडार में टैंकर में पड़ा था। तेल को ड्रमों में भरा जाना था और फिर ड्रमों को Y के पास भिजवाना था। कुछ ड्रमों को Y की उपस्थिति में भर दिया गया था। परंतु शेष ड्रमों के भरने से पहले

आग फैल गई और तेल की संपूर्ण मात्रा नष्ट हो गई। इस हानि को कौन वहन करेग विवेचन कीजिए।

(iii) A कुछ आभूषण बिक्री या वापसी आधार पर B को दे देता है। B इन आभूषणों को C नाम रेहन रख देता है। A इसकी कीमत वसूलने के लिए B पर दावा डाल देता है। व वह सफल होगा?

(b) "The Doctrine of *Caveat Emptor* does not apply in all contracts of sale of good Explain the Doctrine and give the situations where this Doctrine is not applicable.

"क्रेता सावधान रहे", यह सिद्धांत माल-बिक्री की सभी संविदाओं पर लागू नहीं होता।" इस सिद्ध की व्याख्या कीजिए और उन स्थितियों को बताइए जिनमें यह सिद्धांत लागू नहीं होता।"

Or (अथवा)

(a) (i) "A seller becomes an unpaid seller only when the buyer has not paid the pric Comment.

(ii) A lady, who knew that her skin was abnormally sensitive, bought a coat a developed skin trouble by using it. She did not disclose to the seller that h skin was abnormally sensitive. Can the seller be held liable?

(iii) Distinguish between right of lien and right of stoppage of goods in transit.

(i) "विक्रेता एक अदत्त विक्रेता केवल तब बन जाता है जब क्रेता ने कीमत न चुकाई हो टिप्पणी कीजिए।

(ii) एक महिला, जो यह जानती थी कि उसकी त्वचा असाधारण रूप से संवेदनशील है, एक व खरीदती है और उसके प्रयोग से उसे त्वचा रोग हो जाता है। उसने विक्रेता को यह बताया था कि उसकी त्वचा असाधारणत: संवेदनशील है। क्या विक्रेता से ज़िम्मेदार ठहर जा सकता है?

(iii) धारणाधिकार और मार्ग में रोकने के अधिकार में अंतर बताइए।

(b) "A seller cannot convey a better title to the buyer than what he himself has." Expl the statement, giving exceptions to this rule, if any.

"विक्रेता, क्रेता को उससे ज्यादा हक नहीं दे सकता जितना उसके स्वयं के पास है।" इस कथन व्याख्या कीजिए और इस नियम के अपवादों को बताइए, यदि कोई हों।

3. (a) State the process of formation of LLP.

LLP के निर्माण की प्रक्रिया का उल्लेख कीजिए।

(b) State the circumstances under which a Limited Liability Partnership (LLP) can wound up by the court.

उन परिस्थितियों का उल्लेख कीजिए जिनमें सीमित दायित्व भागीदारी (LLP) को न्यायालय सम कर सकता है।

Or (अथवा)

(a) Explain the following statements:

(i) An LLP has a legal entity separate from its partners.

(ii) The responsibility for carrying out the legal obligations as laid down by the LLP Act shall be solely of the designated partners.

(iii) Every partner of an LLP is an agent of the LLP only and not of other partners.

निम्नलिखित कथनों की व्याख्या कीजिए:

(i) LLP की उसके भागीदारों से पृथक विधिक सत्ता होती है।

(ii) LLP अधिनियम द्वारा बताए गए रूप में विधिक बाध्यताओं को निभाने की ज़िम्मेदारी केवल निर्दिष्ट भागीदारों की होगी।

(iii) LLP का प्रत्येक भागीदार केवल LLP का एजेन्ट होता है और अन्य भागीदारों का नहीं। 9

(b) State the provisions of LLP Act, 2008 relating to change in registered office of an LLP.

LLP अधिनियम, 2008 की व्यवस्थाओं का उल्लेख कीजिए जिनका संबंध LLP के पंजीकृत कार्यालय में परिवर्तन से है। 6

4. (a) Comment on the following statements:

(i) Electronic records are not as authentic as hard copies.

(ii) Cyber Terrorism has been regarded as a cyber crime under IT (Amendment) Act, 2008.

(iii) One of the main objects of IT Act is to facilitate e-governance.

निम्नलिखित कथनों पर टिप्पणी कीजिए:

(i) इलैक्ट्रॉनिक रिकार्ड उतने प्रामाणिक नहीं होते जितने हार्ड डिस्क के होते हैं।

(ii) साइबर आतंकवाद को IT अधिनियम (संशोधित), 2008 के अनुसार साइबर अपराध माना जाता है।

(iii) IT अधिनियम के मुख्य उद्देश्यों में से एक ई-शासन को सुविधाजनक बनाना है। 9

(b) Define Certifying Authority. What are the duties of certifying authorities?

प्रमाणक अधिकारी की परिभाषा दीजिए। प्रमाणक अधिकारियों की ड्यूटियाँ क्या हैं। 6

Or (अथवा)

(a) Define the following terms:

(i) Hash function

(ii) Key pair

(iii) Computer network and computer virus.

निम्नलिखित पदों की परिभाषा दीजिए:

(i) हैश फंक्शन

(ii) की-पेपर

(iii) कम्प्यूटर नेटवर्क और कम्प्यूटर वाइरस।

(b) "Any person may make an application to a certifying authority for issue of I Signature Certificate." Explain the provisions of IT Act for grant and revocat Digital Signature Certificate.

"कोई भी व्यक्ति प्रमाणक अधिकारी को डिजिटल हस्ताक्षर प्रमाण पत्र जारी करने के लिए कर सकता है।" IT अधिनियम की उन व्यवस्थाओं की व्याख्या कीजिए जो डिजिटल हस्ता स्वीकृति देने और रद्द करने से संबंधित हैं।

5. (a) Write short notes on the following:

(i) Agency by ratification

(ii) Surety as a favored debtor

(iii) Doctrine of supervening impossibility.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए:

(i) अनुमोदन द्वारा एजेन्सी

(ii) अनुकूल देनदार के रूप में जमानतीं

(iii) अनुवर्ती संभाव्यता का सिद्धांत।

(b) Who can become partner in an LLP? What are the disqualifications for becom partner? How can a person become a partner of an LLP?

LLP में भागीदार कौन हो सकता है? भागीदार बनने के लिए अयोग्यताएँ क्या हैं? व्यक्ति प्रकार LLP का भागीदार बन सकता है?

Or (अथवा)

(a) "A stranger to consideration can sue, but a stranger to contract cannot sue." Ex the statement, giving exceptions, if any.

"प्रतिफल के लिए अनजान व्यक्ति दावा कर सकता है परन्तु संविदा से अपरिचित दावा नहीं कर सकता है।" इस कथन की व्याख्या कीजिए और अपवादों को बताइए, यदि हों। 9

(b) Describe the procedure of conversion of a private company into LLP.

निजी कंपनी को LLP में बदलने की प्रक्रिया का वर्णन कीजिए। 6

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1788 **GC-3** **Your Roll No.....**

Unique Paper Code : 32351101

Name of the Paper : C 1 – Calculus

Name of the Course : **B.Sc. (Hons.) / Maths – I (CBCS)**

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **All** the sections are compulsory.
3. **All** questions carry equal marks.
4. Use of non-programmable scientific calculator is allowed.

SECTION – I

Attempt any **four** *questions from Section I.*

1. If $\cos^{-1}\frac{y}{b}=\log\left(\frac{x}{n}\right)^n$ then show that

$$x^2y_{n+2}+(2n+1)xy_{n+1}+2n^2y_n=0$$

2. Sketch the graph of

$f(x)=\frac{1}{3}x^3-9x+2$ by finding intervals of increase and decrease, critical points, relative extrema and concavity for the given function.

3. Find the horizontal asymptote to the graph of the function

$$f(x) = x^5\left[\sin\frac{1}{x} - \frac{1}{x} + \frac{1}{6x^3}\right]$$

4. It is projected that t years from now, the population of a certain country will be

$$P(t) = 50e^{0.02t} \text{ million}$$

(a) At what rate will the population be changing with respect to time 10 years from now.

(b) At what percentage rate will the population be changing with respect to time t years from now.

5. Sketch the graph of the curve in polar coordinates

$r^2 = 9\cos 2\theta$.

SECTION – II

Attempt any **four** *questions from Section – II.*

6. Find the reduction formula for $\int \sin^n x\,dx$ where n being positive integer and hence evaluate $\int_0^{\frac{\pi}{2}} \sin^n x\,dx$.

Further show that $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \int_0^{\frac{\pi}{2}} \cos^n x\,dx$.

7. Find the volume of the solid generated when the region enclosed by the curve $y = \sqrt{x}$, $y = 6 - x$ and $y = 0$ is revolved about x-axis.

8. Find the volume of the solid generated when the region enclosed by the curve $x = 2y - 2y^2$ and $x = 0$ is revolved about x-axis.

9. Find the arc length of the parametric curve $x = e^t \sin t$, $y = e^t \cos t$ for $0 \le t \le \frac{\pi}{2}$.

10. Find the area of the surface generated by revolving the curve $x = \sqrt{9 - y^2}$, $-2 \le y \le 2$, about y-axis.

SECTION – III

Attempt any **three** *questions from Section – III.*

11. Find the equation for a hyperbola passing through the origin with asymptotes $y = 2x + 1$ and $y = -2x + 3$.

12. Find the equation of the ellipse whose foci are (1, 2) and (1, 4) and whose minor axis is of length 2.

13. Describe the graph of the equation $x^2 - 4y^2 + 2x + 8y - 7 = 0$.

14. Trace the conic $x^2 + 2\sqrt{3}xy + 3y^2 + 2\sqrt{3x} - 2y = 0$ by rotating the coordinate axes to remove the xy term.

SECTION – IV

Attempt any **four** *questions from Section – IV.*

15. Find tangent vector and parametric equation of tangent line to the graph of the vector function

$$\vec{F}(t) = t^2\hat{i} + (\cos t)\hat{j} + (t^2\cos t)\hat{k} \quad \text{at} \quad t = \frac{\pi}{2}.$$

16. A shell is fired with muzzle speed 150 m/s and angle of elevation 45° from a position 10 m above ground level. Where does the projectile hit the ground and with what speed ?

17. Find the tangential and normal components of acceleration of an object that moves along the parabolic path $y = 4x^2$ at the instant the speed is $\frac{ds}{dt} = 20$.

18. An object moves along the curve

$$r = \frac{1}{1-\cos\theta} \text{ and } \theta = t$$

Find its velocity and acceleration in terms of unit polar vectors u_r and u_θ.

19. Find the curvature and radius of curvature for a curve

$x = 3\cos t,\ y = 4\sin t,\ z = t$ at $t = \frac{\pi}{2}$.

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1789 **FC-3** **Your Roll No.....**

Unique Paper Code : 32351102

Name of the Paper : C2 – Algebra

Name of the Course : **B.Sc. (H) Mathematics – I (CBCS)**

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All **six** questions are compulsory.
3. Do any **two** parts from each question.

1. (a) Find the polar representation of the complex number (6)

$z = 1 + \cos\alpha + \sin\alpha,\ \alpha \in (0, 2\pi)$

(b) Compute (6)

$$z = \frac{\left((1-i)^{10}\left(\sqrt{3}+i\right)^5\right)}{\left(-1-i\sqrt{3}\right)^{10}}$$

(c) Find the three roots of unity of the complex number $z = 1 + i$ and represent them in the complex plane. (6)

2. (a) For $a, b \in Z/\{0\}$ define $a \sim b$ if and only if $ab > 0$. (6)

(i) Prove that $\sim$ defines an equivalence relation on Z.

(ii) What is the equivalence class of 5 ? What is the equivalence class of −5 ?

(b) Find the gcd (1800, 756). (6)

(c) Define S : IR ---→ IR by $S(x) = x - \lfloor x \rfloor$. Is S is one to one ? Is it onto ? Explain. (6)

3. (a) Given natural numbers a and b, show that there are unique non – negative integers q and r with $0 \le r < b$ such that $a = bq + r$. (6)

(b) Show that the open intervals (1,3) and $(0,\infty)$ have the same cardinality. (6)

(c) If $ac \equiv bc \pmod m$ and $(c, m) = 1$ then $a \equiv b \pmod m$. (6)

4. (a) Determine the values of h and k such that the system

$$x_1 + hx_2 = 2$$

$$4x_1 + 8x_2 = k$$

has (i) no solution (ii) a unique solution (iii) many solutions (6½)

(b) Let $v_1 = \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix}$, $v_2 = \begin{bmatrix} -3 \\ 1 \\ 8 \end{bmatrix}$ and $y = \begin{bmatrix} h \\ -5 \\ -3 \end{bmatrix}$.

For what values(s) of h is y in the plane generated by v_1 and v_2. (6½)

(c) Balance the given chemical equation where Boron Sulphide reacts violently with water to form boric acid and hydrogen sulphide gas. The unbalanced equation

$$B_2S_3 + H_2O \rightarrow H_3BO_3 + H_2S$$

Here, for each compound, construct a vector that lists the number of atoms of boron sulphur, hydrogen and oxygen. (6½)

5. (a) Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^4$ be defined as

$$T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2).$$

(i) Prove that T is a linear transformation.

(ii) Find the standard matrix of T. (6½)

(b) Let $T : \mathbb{R}^n \rightarrow \mathbb{R}^m$ be a linear transformation and let A be the standard matrix for T. Then prove that

(i) T maps $\mathbb{R}^n$ onto $\mathbb{R}^m$ if and only if columns of A spans $\mathbb{R}^m$.

(ii) T is one to one if and only if columns of A are linearly independent. (6½)

(c) Find the basis for the column space and null space of the matrix

$$A = \begin{bmatrix} 4 & 5 & 9 & -2 \\ 6 & 5 & 1 & 12 \\ 3 & 4 & 8 & -3 \end{bmatrix}$$ (6½)

6. (a) (i) Define a subspace H of $\mathbb{R}^n$ and its dimension too.

Is $H = \{(a, b, c, d) \mid c = a + 2b + 3d\}$ a subspace of $\mathbb{R}^4$. Justify your answer. (6½)

(b) Determine the dimension of the subspace H of $\mathbb{R}^3$ spanned by the vectors

$$v_1 = \begin{bmatrix} 2 \\ -8 \\ 6 \end{bmatrix}, \quad v_2 = \begin{bmatrix} 3 \\ -7 \\ -1 \end{bmatrix} \text{ and } v_3 = \begin{bmatrix} -1 \\ 6 \\ -7 \end{bmatrix} \qquad (6\frac{1}{2})$$

(c) Is $\lambda = 3$ an eigen value of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ 3 & -2 & 1 \\ 0 & 1 & 1 \end{bmatrix}$? If so, find one corresponding eigen vector. (6½)

[This question paper contains 6 printed pages.]

Sr. No. of Question Paper : 1796 **GC-3** **Your Roll No.....**

Unique Paper Code : 32371101

Name of the Paper : Descriptive Statistics

Name of the Course : **B.Sc. (Hons.) Statistics under CBCS**

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **6** questions in all.
3. Question No. **1** is compulsory.
4. Attempt 5 more questions selecting **three** questions from **Section A** and **two** from **Section B.**
5. Use of simple calculator is allowed.

1. Fill in the blanks :

   (i) $|x+6| + |x-4| + |x| + |x+10| + |x+3|$ is least for x = _____ .

   (ii) For a platykurtic distribution γ_2 is _____ .

   (iii) For a discrete distribution standard deviation is _____ than mean deviation about mean.

   (iv) If Corr(X, Y) = 0.8, $\sigma_x = 2.5$ and $\sigma_y = 3.5$, then Var(3X-2Y) is _____ .

   (v) If X_1, X_2, and X_3 are three variables, then partial correlation coefficient $r_{23.1}$ = _____ .

(vi) Correlation coefficient is the _____ of regression coefficients.

(vii) The acute angle between two lines of regression is given by _____ .

(viii) In case of n attributes, the total number of ultimate class frequencies is _____ and number of positive class frequencies is _____ .

(ix) If $P(A) = \frac{3}{4}$ and $P(B) = \frac{5}{8}$, then lower limit of $P(A \cap B)$ is _____ .

(x) Milk is sold at the rates of 8, 10 and 12 rupees per litre in three different months. Assuming that equal amounts were spent on milk by a family in the three months, the average price of milk is _____ .

(xi) Arithmetic mean of 100 observations is 50 and standard deviation is 10. If 5 is subtracted from each of the observations and then it is divided by 4 then new arithmetic mean is _____ and standard deviation is _____ .

(xii) A, B and C are three mutually exclusive and exhaustive events associated with a random experiment. If P(B) = (3/2), P(A) and P(C) = (½) P(B) then P(A) is _____ and $P(\bar{A} \cap \bar{B})$ is _____ . (1,1,1,1,1,1,1,1,1,2,2,2)

SECTION A

2. (a) (i) Prove that the sum of the squares of the deviations of a set of observations is minimum when taken about mean.

(ii) Let r be the range and s be the standard deviation of a set of observations $x_1, x_2, \ldots, x_n$. Prove that $s \leq r$.

(b) In a frequency table, the upper boundary of each class interval has a constant ratio to the lower boundary. Show that the geometric mean G may be expressed by the following formula :

$$\log G = x_0 + \frac{c}{N}\sum_i f_i (i-1),$$

where, x_0 is the logarithm of the mid value of the first interval and c is the logarithm of the ratio between upper and lower boundaries. (6,6)

3. (a) Show that in a discrete series if deviations $x_i = X_i - M$, are small compared with the value of the mean M so that $(x/M)^3$ and higher powers of (x/M) are neglected,

(i) $H = M\left(1 - \frac{\sigma^2}{M^2}\right)$

(ii) Mean $\left(\frac{1}{\sqrt{x}}\right) = \frac{1}{M}\left(1 + \frac{3\sigma^2}{8M^2}\right)$ approx.

where, H is the harmonic mean of the values $x_1, x_2, \ldots, x_n$ and σ^2 is the variance.

(b) Two variables X and Y are known to be related to each other by the relation $Y = \frac{X}{aX+b}$. Derive the normal equations for fitting the given curve and estimate the constants 'a' and 'b' for a given set of n points $\{(x_i, y_i), i = 1,2 \ldots\ldots n\}$. (7,5)

4. (a) Define Spearman's rank correlation coefficient. Let $x_1, x_2, \ldots, x_n$ be the ranks of n individuals according to a character A and $y_1, y_2, \ldots, y_n$ be the corresponding ranks of the individuals according to another character B. Obtain the rank correlation coefficient between them if $x_i + y_i = n + 1 \ \forall \ i = 1, 2, \ldots n$.

(b) X and Y are two random variables with variances σ_x^2 and σ_y^2 respectively and r is the coefficient of correlation between them. If $U = X + kY$ and $V = X + \frac{\sigma_x}{\sigma_y} Y$, find the value of k so that U and V are uncorrelated.

(6,6)

5. (a) Show that $1 - R_{1.23}^2 = (1 - r_{12}^2)(1 - r_{13.2}^2)$

Deduce that (ii) $R_{1.23} \geq r_{12}$

(iii) $R_{1.23}^2 = r_{12}^2 + r_{13}^2$, if $r_{23} = 0$

(iv) $1 - R_{1.23}^2 = \frac{(1-\rho)(1+2\rho)}{(1+\rho)}$, provided all coefficients of zero order are equal to ρ.

(b) Given that $Y = kX + 4$ and $X = 4Y + 5$ are the lines of regression of Y on X and X on Y respectively, show that $0 \leq k \leq 1/4$. If $k = \frac{1}{16}$, find mean of two variables and the coefficient of correlation between them.

(7,5)

SECTION B

6. (a) Four tickets marked 00, 01, 10 and 11 respectively are placed in a bag. A ticket is drawn at random five times, being replaced each time. Find the probability that the sum of the numbers on the tickets thus drawn is 23.

(b) If $A_1, A_2, \ldots, A_n$ are n independent events with $P(A_i) = 1 - \frac{1}{\alpha^i}$, $i = 1, 2, \ldots, n$ then find the value of $P(A_1 \cup A_2 \cup \ldots \cup A_n)$.

(c) A problem in Statistics is given to three students A, B and C, whose chance of solving it are ½, ¾ and ¼ respectively. What is the probability that the problem will be solved if all of them try independently. (5,3,4)

7. (a) State Bayes' theorem.

In answering a multiple choice test, an examinee either knows the answer or he guesses or he copies. Suppose each question has four choices. Let the probability that examinee copies the answer is 1/6 and the probability that he guesses is 1/3. The probability that his answer is correct given that he copied the answer is 1/8. Suppose an examinee answers a question correctly, what is the probability that he really knows the answer ?

(b) If $\frac{(A)}{N} = x, \frac{(B)}{N} = 2x, \frac{(C)}{N} = 3x$ and $\frac{(AB)}{N} = \frac{(BC)}{N} = \frac{(CA)}{N} = y$,

then, using the conditions of consistency of attributes show that

$0 < y \leq x \leq ¼$. (7,5)

8. (a) Let $A_1, A_2, \ldots, A_n$ be the events in the domain of probability function P, such that $P\left[\bigcup_{i=1}^{n} A_i\right] \leq \sum_{i=1}^{n} P[A_i]$. Using this relationship, prove that :

(i) $P\left[\bigcap_{i=1}^{n} A_i\right] \geq 1 - \sum_{i=1}^{n} P[\bar{A}_i]$, and

(ii) $P\left[\bigcap_{i=1}^{n} A_i\right] \geq \sum_{i=1}^{n} P[A_i] - (n-1)$.

(b) Given that (A) = (α) = (B) = (β) = (C) = (γ) = N/2 and (ABC) = ($\alpha\beta\gamma$), then show that

$$2(ABC) = (AB) + (AC) + (BC) - N/2. \qquad (7,5)$$

26/11/16 (M) (5)

[This question paper contains 6 printed pages.]

Sr. No. of Question Paper : 1796 **GC-3** **Your Roll No.....**

Unique Paper Code : 32371101

Name of the Paper : Descriptive Statistics

Name of the Course : **B.Sc. (Hons.) Statistics under CBCS**

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **6** questions in all.
3. Question No. **1** is compulsory.
4. Attempt 5 more questions selecting **three** questions from **Section A** and **two** from **Section B.**
5. Use of simple calculator is allowed.

1. Fill in the blanks :

(i) $|x + 6| + |x - 4| + |x| + |x + 10| + |x + 3|$ is least for x = _____ .

(ii) For a platykurtic distribution γ_2 is _____ .

(iii) For a discrete distribution standard deviation is _____ than mean deviation about mean.

(iv) If Corr(X, Y) = 0.8, $\sigma_x = 2.5$ and $\sigma_y = 3.5$, then Var(3X-2Y) is _____ .

(v) If X_1, X_2, and X_3 are three variables, then partial correlation coefficient $r_{23.1}$ = _____ .

(vi) Correlation coefficient is the _____ of regression coefficients.

(vii) The acute angle between two lines of regression is given by _____.

(viii) In case of n attributes, the total number of ultimate class frequencies is _____ and number of positive class frequencies is _____.

(ix) If $P(A) = \frac{3}{4}$ and $P(B) = \frac{5}{8}$, then lower limit of $P(A \cap B)$ is _____.

(x) Milk is sold at the rates of 8, 10 and 12 rupees per litre in three different months. Assuming that equal amounts were spent on milk by a family in the three months, the average price of milk is _____.

(xi) Arithmetic mean of 100 observations is 50 and standard deviation is 10. If 5 is subtracted from each of the observations and then it is divided by 4 then new arithmetic mean is _____ and standard deviation is _____.

(xii) A, B and C are three mutually exclusive and exhaustive events associated with a random experiment. If P(B) = (3/2), P(A) and P(C) = (½) P(B) then P(A) is _____ and $P(\bar{A} \cap \bar{B})$ is _____. (1,1,1,1,1,1,1,1,1,2,2,2)

SECTION A

2. (a) (i) Prove that the sum of the squares of the deviations of a set of observations is minimum when taken about mean.

(ii) Let r be the range and s be the standard deviation of a set of observations $x_1, x_2, \ldots, x_n$. Prove that $s \leq r$.

(b) In a frequency table, the upper boundary of each class interval has a constant ratio to the lower boundary. Show that the geometric mean G may be expressed by the following formula :

$$\log G = x_0 + \frac{c}{N}\sum_i f_i (i-1),$$

where, x_0 is the logarithm of the mid value of the first interval and c is the logarithm of the ratio between upper and lower boundaries. (6,6)

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where, H is the harmonic mean of the values $x_1, x_2, \ldots, x_n$ and σ^2 is the variance.

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(6,6)

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Deduce that (ii) $R_{1.23} \geq r_{12}$

(iii) $R_{1.23}^2 = r_{12}^2 + r_{13}^2$, if $r_{23} = 0$

(iv) $1 - R_{1.23}^2 = \frac{(1-\rho)(1+2\rho)}{(1+\rho)}$, provided all coefficients of zero order are equal to ρ.

(b) Given that $Y = kX + 4$ and $X = 4Y + 5$ are the lines of regression of Y on X and X on Y respectively, show that $0 \leq k \leq 1/4$. If $k = \frac{1}{16}$, find mean of two variables and the coefficient of correlation between them.

(7,5)

SECTION B

6. (a) Four tickets marked 00, 01, 10 and 11 respectively are placed in a bag. A ticket is drawn at random five times, being replaced each time. Find the probability that the sum of the numbers on the tickets thus drawn is 23.

(b) If $A_1, A_2, \ldots, A_n$ are n independent events with $P(A_i) = 1 - \frac{1}{\alpha^i}$, $i = 1, 2, \ldots, n$ then find the value of $P(A_1 \cup A_2 \cup \ldots \cup A_n)$.

(c) A problem in Statistics is given to three students A, B and C, whose chance of solving it are ½, ¾ and ¼ respectively. What is the probability that the problem will be solved if all of them try independently. (5,3,4)

7. (a) State Bayes' theorem.

In answering a multiple choice test, an examinee either knows the answer or he guesses or he copies. Suppose each question has four choices. Let the probability that examinee copies the answer is 1/6 and the probability that he guesses is 1/3. The probability that his answer is correct given that he copied the answer is 1/8. Suppose an examinee answers a question correctly, what is the probability that he really knows the answer ?

(b) If $\frac{(A)}{N} = x, \frac{(B)}{N} = 2x, \frac{(C)}{N} = 3x$ and $\frac{(AB)}{N} = \frac{(BC)}{N} = \frac{(CA)}{N} = y$,

then, using the conditions of consistency of attributes show that

$0 < y \leq x \leq ¼$. (7,5)

8. (a) Let $A_1, A_2, ..., A_n$ be the events in the domain of probability function P, such that $P\left[\bigcup_{i=1}^{n} A_i\right] \le \sum_{i=1}^{n} P[A_i]$. Using this relationship, prove that :

(i) $P\left[\bigcap_{i=1}^{n} A_i\right] \ge 1 - \sum_{i=1}^{n} P[\bar{A}_i]$, and

(ii) $P\left[\bigcap_{i=1}^{n} A_i\right] \ge \sum_{i=1}^{n} P[A_i] - (n-1)$.

(b) Given that $(A) = (\alpha) = (B) = (\beta) = (C) = (\gamma) = N/2$ and $(ABC) = (\alpha\beta\gamma)$, then show that

$$2(ABC) = (AB) + (AC) + (BC) - N/2. \qquad (7,5)$$

(4)

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1797 **GC-3** **Your Roll No.....**

Unique Paper Code : 32371109

Name of the Paper : Calculus

Name of the Course : **B.Sc. (Hons.) Statistics under CBCS**

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. From the remaining attempt **five** questions, selecting at least one from each section.

1. Attempt any **five** parts :

(a) Show that $\lim_{x\to 0} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1}$ does not exist.

(b) Evaluate $\lim_{x\to 0} \frac{x\cos x - \log(1+x)}{x^2}$.

(c) Prove that $\int_0^\infty \frac{x^c}{c^x} dx = \frac{\Gamma(c+1)}{(\log c)^{c+1}}$, $c > 1$.

(d) Evaluate $\int_0^1 \int_0^1 \frac{1}{\sqrt{(1-x^2)(1-y^2)}} dx\, dy$.

(e) Solve $(1 + y^2)dx = (\tan^{-1} y - x)dy$.

(f) $(D^2 - 3D + 2)y = 3\sin x$.

(g) Find partial differential equation of all planes a distance of a units from origin.

(h) Solve partial differential equation $(y - z)p + (z - x)q = x - y$. (5×3)

SECTION – I

2. (a) Determine the minimum value of $x^2 + y^2 + z^2$ subject to the condition

$$x + 2y - 4z = 5.$$

(b) If $y = \cos(m(\sin^{-1} x))$, show that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$ and hence evaluate $y_n(0)$. (6,6)

3. (a) If A, B and C are the angles of a triangle such that

$\sin^2 A + \sin^2 B + \sin^2 C = \sqrt{3}$, prove that $\frac{dA}{dB} = \frac{\tan B - \tan C}{\tan C - \tan A}$.

(b) Find the position and nature of the double points on the curve

$$(y - 2)^2 = x(x - 1)^2.$$ (6,6)

SECTION – II

4. (a) Prove that $\int_0^{\frac{\pi}{2}} \frac{d\theta}{\sqrt{a\cos^4\theta + b\sin^4\theta}} = \frac{\Gamma^2\left(\frac{1}{4}\right)}{4\sqrt{\pi}(ab)^{\frac{1}{4}}}$.

(b) Assuming the validity of differentiation under integral sign, prove that

$$\int_0^{\infty} e^{-x^2} \cos \alpha x \, dx = \frac{\sqrt{\pi}}{2} e^{-\frac{1}{4}\alpha^2}.$$ (6,6)

5. (a) Find the limit, when n trends to infinity, of the sum : $\sum_{r=1}^{n-1} \frac{1}{n}\sqrt{\frac{n+r}{n-r}}$.

(b) Change the order of integration in $\int_0^{3a}\int_{x^2/4a}^{3a-x} F(x,y)\,dy\,dx$ and hence evaluate when $F(x,y) = x + y$. (6,6)

SECTION – III

6. Solve the following differential equations :

(i) $(x^2y - 2xy^2)dx - (x^3 - 3x^2y)dy = 0$

(ii) $(1-x^2)\frac{dy}{dx} + 2xy = x(1-x^2)^{\frac{1}{2}}$ (6,6)

7. Solve any two of the following differential equations :

(i) $x^2\frac{d^2y}{dx^2} + 7x\frac{dy}{dx} + 13y = \log x$

(ii) $(1+2x)^2\frac{d^2y}{dx^2} - 6(1+2x)\frac{dy}{dx} + 16y = 8(1+2x)^2$

(iii) $(D^2 + 2D + 1)y = 2x + x^2$ (6,6)

P.T.O.

SECTION – IV

8. Solve any two of the following partial differential equations :

(i) $(x^2 - y^2 - z^2)p + 2xyq = 2xz$

(ii) $x^2p^2 + y^2q^2 = z^2$

(iii) $(D^2 + DD' - 6D'^2)z = y \cos x$ (6,6)

9. (a) Solve $p^2 + q^2 = 1$ using variable separation method.

(b) Solve the partial differential equation $\frac{\partial^2 z}{\partial x^2} + x^2 \frac{\partial^2 z}{\partial y^2} = 0$. (6,6)

(7)

is question paper contains **4+2** printed pages]

Roll No. | | | | | | | | | | |

No. of Question Paper : **2272**

ique Paper Code : **32375101** **GC-3**

me of the Paper : **Statistical Methods**

me of the Course : **B.A. (Hons.)/B.Com. (Hons.)/B.Sc. (Hons.) under CBCS Generic Elective**

mester : **I**

ation : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Section A is compulsory.

Attempt any *Five* questions, selecting at least *two* questions from each of the Sections B and C.

Use of simple calculator is allowed.

Section A

Answer the following :

(*i*) If in a series, 20 percent values are greater than 150, then ..... = 150. 1

(*ii*) The algebraic sum of deviations about mean is 1

(*iii*) Two lines of regression intersect at the point 1

(*iv*) The limits of rank correlation coefficient are ..... and 1

(*v*) If two attributes A and B are completely associated, then the Yule's coefficient of Association (Q) = ... 1

(*vi*) When $R_{1.23} = 0$, then X_1 is ..... with X_2 and X_3. 1

(*vii*) For a leptokurtic frequency distribution, coefficient β_2 is 1

(*viii*) For the Series I and Series II of observations on X and Y, respectively,

$$\bar{x} = 18, \sigma_x^2 = 9, \bar{y} = 10, \sigma_y^2 = 4.$$

Which series is more consistent ? Give reason. 2

(*ix*) Define the variables

$$U = \frac{X - 2}{100} \text{ and } V = \frac{Y - 100}{2}.$$

It is known that

$$r(U, V) = 0.75,$$

find $r(X, Y)$. Give reason. 2

(*x*) Obtain the arithmetic mean and variance of first n natural numbers. 2

(*xi*) The average marks for statistics in a class of 30 was 52. The top six students had an average of 31. What was the average marks of the other students ? 2

Section B

2. (*a*) Compare ordinal and interval scales of measurement giving suitable examples. 6

(*b*) For the following continuous frequency distribution, draw an appropriate chart : 6

Age (in Years)	No. of Boys
2—5	6
5—8	6
8—11	9
11—14	5
14—17	3

(*a*) For a frequency distribution

$$x_i/f_i,\ i = 1, 2, ..., n,$$

show that the sum of squares of the deviations of a set of values is minimum when taken about mean. 6

(*b*) The mode of the following wage distribution is known to be Rs. 34. Find the values of missing frequencies : 6

Wages (in Rs.)	Frequency
0—10	4
10—20	16
20—30	60

30—40	f_1
40—50	f_2
50—60	6
60—70	4
Total	230

4. (*a*) Define harmonic mean. Describe its merits and demerits. Where is it used ?

(*b*) If G_x is the geometric mean of N x's and G_y is the geometric mean of N y's, t the geometric mean G of the 2N values is given by $G^2 = G_x G_y$.

5. (*a*) Define central moments of a frequency distribution. Obtain the relation between the cer moments (μ_r) of order r in terms of moments μ_r' about any point A. Hence, obtain relations for μ_2, μ_3 and μ_4.

(*b*) In a frequency distribution, the coefficient of skewness based on quartiles is 0.5. If sum of the upper and lower quartiles is 28 and the median is 11, find the value first and third quartiles.

Section C

6. (*a*) Explain the principle of least squares. Describe the method of fitting an exponential cu

$$y = ae^{bX}$$

to a set of n points (x_i, y_i), $i = 1, 2, \ldots\ldots, n$.

(*b*) Define Spearman's rank correlation coefficient. Prove that :

$$r = 1 - \frac{6\sum_i d_i^2}{n\left(n^2-1\right)}$$

where d_i is the difference between the ranks of the ith individual,

$$i = 1, 2, \ldots\ldots, n.$$

Discuss the case when the ranks are repeated. 7

(*a*) Define regression coefficients b_{YX} and b_{XY}. State and prove any *three* properties of the regression coefficients. 7

(*b*) Define multiple correlation coefficient $R_{1.23}^2$. With usual notations, show that :

$$1 - R_{1.23}^2 = \left(1 - r_{12}^2\right)\left(1 - r_{13.2}^2\right).$$

Also deduce that :

$$1 - R_{1.23}^2 = \frac{(1-\rho)(1+2\rho)}{(1+\rho)},$$

provided all the coefficients of zero order are equal to ρ. 5

(*a*) Discuss the association of attributes A and B. Find whether A and B are independent, positively associated or negatively associated, in each of the following cases ; 7

(*i*) N = 1000, (A) = 470, (B) = 620, and (AB) = 320

(*ii*) (A) = 490, (AB) = 294, (α) = 570, and (αB) = 380

(*iii*) (AB) = 256, (αB) = 768, (Aβ) = 48, and ($\alpha\beta$) = 144.

(*b*) Define Yule's coefficient of association for the two attributes A and B. Investigate the association between darkness of eye-colour in father and son from the following data : 5

Fathers with dark eyes and sons with dark eyes	:	50
Fathers with dark eyes and sons with not dark eyes	:	79
Fathers with not dark eyes and sons with dark eyes	:	89
Fathers with not dark eyes and sons with not dark eyes	:	782

(16)