D–2065

Sub. Code
11A/13711/ 0111/0311A

DISTANCE EDUCATION

Common for B.A./B.Sc./B.B.A./B.B.A. (Banking)/B.C.A./ M.B.A. (5 Year Integrated) DEGREE EXAMINATION, MAY 2026.

First Semester

Part – I : TAMIL PAPER — I

(CBCS 2018 – 2019 Academic Year Onwards/ 2021 Calendar Year Onwards)

Time : Three hours Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் ஓரிரு வரிகளில் விடையளி.

1. கண்ணதாசன் ஸ்ரீ கிருஷ்ண கானத்தில் கண்ணனின் பெயர்களாகக் குறிப்பிடுவன யாவை?

2. பாரதியார் – குறிப்பு வரைக.

3. பாரதிதாசன் எழுதிய புகழ்ப்பெற்ற வரிகள் ஏதேனும் இரண்டினைக் குறிப்பிடுக.

4. ஞானக்கூத்தன் எழுதிய கவிதை நூல்கள் சிலவற்றைக் கூறுக.

5. சிலப்பதிகாரம் உணர்த்தும் மூப்பெரும் உண்மைகள் யாவை?

6. வசிட்டன் சீதையைப் பற்றி உரைத்த கருத்தைக் கூறுக.

7. சீறாப்புராணம் ஆசிரியர் யார்?

8. தேம்பாவணியின் பொருள் யாது? இயற்றியவர் பெயர் கூறுக.

9. வானவர் இறைவனை வணங்க எவ்வாறு ஆயர்களை அழைக்கின்றனர்?

10. சாந்தி என்னும் இடைச்சி மரியாளை நோக்கிக் கூறியது யாது?

பகுதி ஆ — ($5 \times 5 = 25$ மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் ஒரு பக்க அளவில் விடையளி.

11. (அ) கண்ணதாசன் பற்றிக் குறிப்பு வரைக.

(அல்லது)

(ஆ) பட்டுக்கோட்டையார் தொழிலின் சிறப்புகளாகக் கூறுவனவற்றைத் தொகுத்துரைக்க.

12. (அ) கண்ணன் என் விளையாட்டுப்பிள்ளை – என பாரதியார் ஏன் குறிப்பிடுகிறார்?

(அல்லது)

(ஆ) பாரதியாரின் தேச பக்தியைப் புலப்படுத்துக.

13. (அ) கண்ணகி வழக்குரைத்த திறத்தினை விவரி.

(அல்லது)

(ஆ) கம்பராமாயணம் குறிப்பு வரைக.

14. (அ) வீரமாமுனிவரின் வாழ்க்கை குறிப்பு தருக.

(அல்லது)

(ஆ) அன்னையையும் சூசை முனிவரையும் வாழ்த்தும் முறைப் பற்றி கூறுக.

15. (அ) நபிகள் நாயகம் ஈச்சங்குலை வரவழைத்த திறம் பற்றி விவரி.

(அல்லது)

(ஆ) தாய் மரியாள் கண்ணீர் மல்கக் கூறிய சொற்களை எழுதுக.

பகுதி இ — ($3 \times 10 = 30$ மதிப்பெண்கள்)

ஏதேனும் மூன்று வினாக்களுக்கு கட்டுரை வடிவில் விடையளி.

16. கண்ணனின் குறும்புத்தனங்களாக பாரதியார் கூறுவதை கட்டுரை வடிவில் எழுதுக.

17. நாமக்கல் கவிஞரின் நோயற்ற வாழ்வு பற்றிய கருத்துக்களைத் தொகுத்துரைக்க.

18. புதுக்கவிதைத் துறையில் அப்துல் ரஹ்மான் பங்கினை விவரித்து எழுதுக.

19. வழக்குரை காதையில் கண்ணகியின் வழக்கை விவரிக்க.

20. நபிகள் நாயகம் பற்றிக் குறிப்பு வரைக.

D–2066

Sub. Code
11B/0311B

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.B.A./B.B.A. (Banking)/B.C.A. M.B.A. (5 Year Integrated) DEGREE EXAMINATION, MAY 2026.

First Semester

Part I — COMMUNICATION SKILLS — I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is Lateral Communication?

2. Why is Timeliness considered as an important factor which affects communication?

3. Define Jargons.

4. State the main objective of a seminar.

5. What are the three main types of audiences?

6. Define Fragmented Sentence.

7. What do you understand by the term 'Oculesics'?

8. Define Report.

9. What are the signs which reflect bad body language?

10. List the two ways of Organising group discussion.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the importance of Communication.

Or

(b) Analyse the forms of Oral Communication.

12. (a) Elaborate the principles of Effective Communication.

Or

(b) Write a brief note on factors affecting Communication.

13. (a) Write about the process of paragraph writing.

Or

(b) Examine the steps of Essay Writing.

14. (a) What are the types of Resume. Explain.

Or

(b) Detail the format of the Good Report.

15. (a) Define Meeting. Write its objectives.

Or

(b) What are the essential elements of Report Writing?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the barriers to effective communication.

17. Elaborate the importance of Written Communication.

18. Identify the steps involved in Report Writing.

19. Analyze the essential characteristics of a Resume.

20. Group discussions are a very important aspect of Group Communication. Elucidate the statement.

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D–2067

Sub. Code
12/13712/ 0112/0312

DISTANCE EDUCATION

Common for B.A./B.Sc./B.B.A./B.B.A. (Banking) (BCA)/ M.B.A. (5 Years Integrated) DEGREE EXAMINATION, MAY 2026.

First Semester

Part II — ENGLISH – Paper – I

(CBCS 2018 – 2019 Academic Year Onwards/ 2021 CY Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What makes water one of the most powerful and wonderful things on earth?

2. In what way did the villagers help Mrs. Packletide shoot the tiger?

3. How does the author compare a Cat's reaction towards fishes and dogs?

4. Brief a note on the life and works of Carl Sagan.

5. Who gave the title of "Mahatma" to Gandhi?

6. Name the vitamin whose deficiency causes rickets.

7. What is an Article?

8. What is an imperative sentence?

9. What is Precis?

10. What are supporting sentences?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Life Cannot exist on earth without water – Explain.

Or

(b) How does Saki use human and irony in "Mrs. Packletide's Tiger"?

12. (a) Write a short note on Gandhi's experience when he first came to India after studying law in England.

Or

(b) What are the dangers of drug abuse according to Hardin B. Jones?

13. (a) What according to Carl Sagan are "Our ancestors"?

Or

(b) What are the different nutritional ingredients of food that J.B.S. Haldane talks about in his essay "Food"?

14. (a) Write a short note on "Participles"?

Or

(b) What are the rules applied to transformation of sentences from simple to compound.

15. (a) Write a note on Developing hints.

Or

(b) Brief a note on the different types of paragraph.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Examine the significance of water according to Sir. C.V. Raman.

17. Do you agree with A.G. Gardiner that letter writing is a lot art?

18. What according to you are the main pros and cons of modern civilization as enumerated by C.E. Joad in "Our Civilization"?

19. Explain definite and indefinite articles.

20. Evaluate the characteristics of good paragraph writing.

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D–2068

Sub. Code
21A/0321A

DISTANCE EDUCATION

Common for B.A./B.Sc./B.B.A./B.B.A. (Banking)/
B.C.A./M.B.A. (5 Year Integrated) DEGREE EXAMINATION,
MAY 2026.

Second Semester

Part – I : TAMIL PAPER — II

(CBCS 2018-2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் ஓரிரு வரிகளில் விடையளிக்க.

1. தேம்பாவணி இயற்றியவர் யார்? எத்தனைக் காண்டங்களையுடையது?

2. வீரமாமுனிவர் கொண்டு வந்த எழுத்துச் சீர்திருத்தம் யாது?

3. சாகித்ய அகாதமி விருது பெற்ற நீலபத்மநாபனின் நூல் எது?

4. 'கன்னிப்போர்' என்பதன் பொருள் யாது?

5. சார்பெழுத்துக்கள் எத்தனை வகைப்படும்? அவை யாவை?

6. திணை எத்தனை வகைப்படும்? அவை யாவை?

7. வேற்றுமை உருபுகளைக் குறிப்பிடுக.

8. கவியரசு கண்ணதாசனின் ஏதேனும் இரண்டு நூல்களைக் குறிப்பிடுக.

9. சிறுகதை மன்னன் என்று அழைக்கப்படுபவர் யார்?

10. பௌத்த சமயக் காப்பியங்கள் யாவை?

பகுதி ஆ — ($5 \times 5 = 25$ மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் ஒரு பக்க அளவில் விடையளிக்க.

11. (அ) தேம்பாவணி - குறிப்பு வரைக.

(அல்லது)

(ஆ) "பாலமாமியில் நிகழும் காட்சி" குறித்த வருணனைகளை தேம்பாவணி வழி விளக்குக.

12. (அ) 'கருணை மனு' சிறுகதையில் எழுத்தாளரின் கடிதச் செய்தியும் துணை வேந்தரின் செயலும் யாது? விவரி.

(அல்லது)

(ஆ) வியூகப் போர் குறித்த செய்திகளை 'கம்பன் புறத்திணை' வழி விளக்குக.

13. (அ) குற்றியலுகரம் குறித்து சான்றுடன் எழுதுக.

(அல்லது)

(ஆ) விடை வகைகள் யாவை? சான்றுடன் தருக.

14. (அ) தற்சமம், தற்பவம் என்றால் என்ன? எடுத்துக்காட்டுடன் விளக்குக.

(அல்லது)

(ஆ) மரபுக் கவிஞர்களுள் பாரதியார் பெறும் இடம் யாது?

15. (அ) சிறுகதையின் இலக்கணத்தை எழுதுக.

(அல்லது)

(ஆ) சமூகத்தில் திரைப்படத்தின் நிலை யாது? விளக்குக.

பகுதி இ — ($3 \times 10 = 30$ மதிப்பெண்கள்)

எவையேனும் மூன்று வினாக்களுக்கு கட்டுரை வடிவில் விடையளிக்க.

16. தேம்பாவணி காட்சிப்படலம் குறித்து ஒரு கட்டுரை வரைக.

17. 'அன்புள்ள கல்பனாவிற்கு' சிறுகதையின் கதைச் சுருக்கத்தை எழுதுக.

18. மொழி முதலெழுத்துக்கள், மொழி இறுதியெழுத்துக்கள் குறித்து ஒரு கட்டுரை எழுதுக.

19. வேற்றுமை, அல்வழிப் புணர்ச்சிகளைச் சான்றுடன் விளக்கி எழுதுக.

20. மக்கள் தொடர்பில் இதழ்களின் பங்கு குறித்து ஒரு கட்டுரை வரைக.

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D–2069

Sub. Code
21B/0321B

DISTANCE EDUCATION

Common for B.A./B.Sc./B.B.A./B.B.A. (Banking)/B.C.A./
M.B.A. (5 Year Integrated) DEGREE EXAMINATION,
MAY 2026.

Second Semester

Part I : COMMUNICATION SKILLS – II

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define non-verbal communication with an example.

2. What are the essential elements of communication process?

3. What are vowels?

4. How does context embedded situation help in teaching pronunciation?

5. What is technical skill?

6. Why is listening a difficult skill?

7. What is tone?

8. What is editing?

9. What is proposal?

10. Define Stakeholders.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) List the skills required in oral communication.

Or

(b) Discuss the merits and demerits of written communication.

12. (a) Why is correct English Pronunciation so difficult?

Or

(b) How are vowels classified? Explain.

13. (a) What is the difference between personal and interpersonal skills?

Or

(b) Discuss the different skills required during Interview.

14. (a) Discuss the purpose of writing.

Or

(b) List the characteristics of technical writing.

15. (a) Write a short note on newsletter.

Or

(b) What are press realeases? How can press realeases be made effective?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the various methods of skill development for use in organizations.

17. Discuss the Ten Commandments of Good speaking with real-life examples.

18. Describe the various elements related to voice and their importance in relation to business presentation.

19. Describe the format, characteristics and types of proposals.

20. What is writing style? Discuss the characteristics of an effective writing style.

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D–2070

Sub. Code
22/13722/ 0122/0322

DISTANCE EDUCATION

Common for B.A./B.Sc./B.B.A./B.B.A. (Banking)/B.C.A./M.B.A. (5 Year Integrated) DEGREE EXAMINATION, MAY 2026.

Second Semester

Part II : ENGLISH PAPER — II

(CBCS 2018 – 19 Academic Year Onwards/ 2021 Calendar Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What influenced Shakespeare's sonnets?

2. How does the poet see London?

3. What is the main theme of "Ode on a Grecian Urn'?

4. When did Browning write Andrea del Sarto?

5. At which point in the woods, the poet Robert Frost had reached?

6. What is the tone of the poem "Strange Meeting'?

7. What is the first poem of Gitanjali?

8. Who is the real protagonist in the Merchant of Venice?

9. What are the four elements of report writing?

10. How do you write a comprehension question?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Discuss the theme of unfaithfulness in Shakespeare's sonnets.

Or

(b) What poetic techniques are used in "Ode on a Grecian Urn"?

12. (a) Write a summary of “Song 36” from "Gitanjali' by Rabindranath Tagore?

Or

(b) How is Rabindranath Tagore's religious philosophy reflected in ‘Gitanjali’?

13. (a) Justify the title of the poem “The Road Not Taken”. Is it appropriate for the poem?

Or

(b) Sketch the character of Antonio in the Merchant Of Venice.

14. (a) ‘Andrea del Sarto’ is a dramatic monologue. Elucidate.

Or

(b) Write a critical appreciation of the poem “The Express”?

15. (a) How do you write Essay writing and note-making?

Or

(b) What are the five main sections of standard report writing?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Bring out the symbolism in the poem "The Road Not Taken".

17. Discuss the theme of friendship in "The Merchant of Venice".

18. Explain the use of imagery in Keat's "Ode on a Grecian Urn".

19. Would you consider Robert Browning to be an optimist or a pessimist?

20. Why does Owen use two soldiers to expose the reality of war in "Strange Meeting"?

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D–2071

Sub. Code
31A/13731/ 0131

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2026.

Third Semester

Part – I : TAMIL PAPER — III

(CBCS 2018 – 2019 Academic Year Onwards/ 2021 Calendar Year Onwards)

Time : Three hours Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. முல்லைப் பாட்டின் ஆசிரியர் பெயர் என்ன?

2. பத்துப்பாட்டில் மிகக் குறைந்த அடிகளையுடைய நூல் எது?

3. எட்டுத்தொகையில் அகநூல்கள் எத்தனை? அவை யாவை?

4. 'ஐங்குறுநூறு' – பெயர்க்காரணம் தருக.

5. ஐங்குறுநூறில் குறிஞ்சித் திணையைப் பாடியவர் யார்?

6. 'மஞ்ஞை' – என்ற சொல்லின் பொருள் தருக.

7. அகநானூற்றின் வேறு பெயர் என்ன?

8. 'உலகப் பொதுமறை' எனப் போற்றப்பெறும் நூலின் பெயரைக் கூறுக.

9. இராசராச சோழன் நாடகத்தில் இராசராசனின் மகள் யார்?

10. சுவடுகள் நாவலின் கதைத் தலைவன் பெயர் என்ன?

பகுதி ஆ — ($5 \times 5 = 25$ மதிப்பெண்கள்)

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) பாசறையின் இயல்பை முல்லைப்பாட்டு எங்ஙனம் காட்டுகிறது?

(அல்லது)

(ஆ) கொடியோர் நாக்கு எத்தகையது எனக் குறுந்தொகை தலைவி வருந்துகிறாள்?

12. (அ) அகநானூற்றின் அமைப்பும் சிறப்பும் குறித்து உரைக்க.

(அல்லது)

(ஆ) காரியைப் பற்றி மாறோக்கத்து நப்பசலையார் பாடிய பாடற்கருத்தினை விளக்குக.

13. (அ) அறிவுடைமை அதிகாரம் உணர்த்தும் செய்திகளைத் தருக.

(அல்லது)

(ஆ) எவற்றிலிருந்து எவை பிறக்குமென நான்மணிக்கடிகை பட்டியலிடுகிறது?

14. (அ) ஐங்குறுநூறு 'மஞ்ஞைப்பத்து' உரைக்கும் செய்திகளைத் தொகுத்துரைக்க.

(அல்லது)

(ஆ) கருவூர்க் கோசிகனாரின் நற்றிணைப் பாடல் கருத்துக்களை விளக்குக.

15. (அ) இராசராச சோழன் தஞ்சை பெரிய கோவிலைக் கட்டிய திறத்தை விவரிக்க.

(அல்லது)

(ஆ) சுவடுகள் நாவலில் வரும் ரகுபதியின் பாத்திரப் படைப்பைக் கூறுக.

பகுதி இ — ($3 \times 10 = 30$ மதிப்பெண்கள்)

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. முல்லைப்பாட்டு உணர்த்தும் கருத்துகளைத் தொகுத்துரைக்க.

17. சோழன் குளமுற்றத்துத் துஞ்சிய கிள்ளி வளவனை, மாறோக்கத்து நப்பசலையார் பாடிய புறநானூற்றுப் பாடல் கருத்துகளை நும்பாடப்பகுதி வழி எடுத்துரைக்க.

18. வாழ்க்கைத் துணைநலம், பிரிவாற்றாமை அதிகாரக் கருத்துகளை விரித்துரைக்க.

19. இராசராச சோழ மன்னனின் பண்புநலன்களை விளக்குக.

20. சுவடுகள் நாவலில் இடம்பெறும் காந்தியக் கருத்துகளைத் தொகுத்துரைக்க.

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D–2072	Sub. Code
	31B

DISTANCE EDUCATION

Common For B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2026.

Third Semester

Part I — HUMAN SKILLS DEVELOPMENT — I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Give two examples for non-verbal communication.

2. What are the three levels of human mind?

3. Who is an introvert?

4. Mention two barriers to success in life.

5. State two qualities of high self esteem.

6. Define hypocrisy.

7. What are the two types of attitude?

8. Name two therapies for healing of the mind.

9. What is the advantage in accepting one's mistakes?

10. How is positivity created?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the various types of skills for personality development.

Or

(b) Define feedback and illustrate its importance.

12. (a) Explain the power of advanced thinking.

Or

(b) Define character and list its components which help in building one's personality.

13. (a) Discuss the advantages of goal setting and working towards it.

Or

(b) Outline any two human skills that improve human personality.

14. (a) Trace the qualities of a person with low self esteem.

Or

(b) Describe the steps involved in decision making.

15. (a) "Year attitude determines your altitude" – Substantiate this statement with examples.

Or

(b) Bring out the major reasons for internal and external conflict.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write an essay on the merits of good habits and on the ways of developing them.

17. Illustrate the secrets behind the application of attitude in different situations.

18. Analyze the importance of motivation in human encounters and in work place.

19. Discuss the various methods of overcoming stress and stress building situations.

20. Evaluate the characteristics of an efficient leader.

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D–2073

Sub. Code
32/13732/0132

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2026.

Third Semester

Part II

Paper III — ENGLISH

(CBCS 2018 – 2019 Academic Year Onwards/
2021 Calendar Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What habit of Swami did father find disgraceful?

2. What was a shock to the Verger?

3. How did the Post Master feel and spend his time?

4. What is the central conflict in 'The Boy Comes Home'?

5. What was the cause of quarrel between Mrs. Meldon and Prof. Corrie?

6. Why was Pierre pinched? How did he defend himself before Judge Gaston?

7. What happens to the soldiers in 'A Kind of Justice'?

8. Where does the action of the play 'Refugee' supposed to take place?

9. Transform the sentences as directed :

(a) Ravi runs faster than Suresh.

(Change into Positive)

(b) No other metal is so strong as iron.

(Change into superlative degree)

10. Define an agenda.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) How did Swami help in preventing the burglary?

Or

(b) What efforts are made by the Loisels to repay the loan?

12. (a) Describe the place of Ulapur in 'The Post Master'.

Or

(b) Sketch the character of Lomov in 'The Proposal'.

13. (a) Explain briefly the role of Jack Drake in the play 'The Silver Idol'.

Or

(b) Describe the physical and mental conditions of Mrs. Meldon after the death of her son Eddie.

14. (a) Bring out the important themes of the play 'Reunion'.

Or

(b) How do the refugees show their love to their motherland?

15. (a) Briefly present verb and its types.

Or

(b) What are the formats of a descriptive writing?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain how did Verger become a rich man.

17. Who did you sympathise more with in 'The Boy Comes Home' – Uncle James or Philip? Give reasons.

18. Justify Hugh Chesterman's 'The Pre and the Tart' as a humourous play.

19. Comment on the theme of Margaret Atwood's 'A Kind of Justice'.

20. Elucidate pronoun and its types with suitable examples.

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D–2074

Sub. Code
41A/13741/ 0141

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2026.

Fourth Semester

Part I – TAMIL – Paper IV

(CBCS 2018 – 2019 Academic Year Onwards/ 2021 Calendar Year Onwards)

Time : Three hours Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. யாப்பு இலக்கணம் என்றால் என்ன?

2. தளை என்பது யாது?

3. முதற்பொருள் என்றால் என்ன?

4. வஞ்சினக் காஞ்சி என்பதன் பொருளைக் கூறுக.

5. அணிகளுக்கெல்லாம் தாயாக விளங்கும் அணி எது?

6. சிலேடை என்பதன் பொருளைத் தருக.

7. நெடுந்தொகை என வழங்கப்படும் நூல் யாது?

8. 'பாண்டியன் பரிசில்' கதிரைவேல் மன்னன் மகள் பெயர் என்ன?

9. சங்கம் என்ற சொல் முதன் முதலில் வழங்கிய நூல்?

10. சேக்கிழார் பெரியபுராணத்திற்கு வழங்கிய பெயர் என்ன?

பகுதி ஆ — ($5 \times 5 = 25$ மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் ஒரு பக்க அளவில் விடை தருக.

11. (அ) அடி எத்தனை வகைப்படும்? அவை யாவை?

(அல்லது)

(ஆ) வெண்பாவின் பொது இலக்கணத்தைக் கூறுக.

12. (அ) வரைவு கடாதல் வகைகள் குறித்து எழுதுக.

(அல்லது)

(ஆ) செவியறிவுறூஉ என்பதனைச் சான்றுடன் விளக்குக.

13. (அ) உவமையணியின் பொதுவிலக்கணத்தை எழுதுக.

(அல்லது)

(ஆ) பிறிது மொழிதல் அணியை விவரி.

14. (அ) திரிகடுகம் கூறும் அறக்கருத்துக்களைப் புலப்படுத்துக.

(அல்லது)

(ஆ) 'பாண்டியன் பரிசு' காவியத்தின் சமூகச் சிந்தனைகளை எழுதுக.

15. (அ) பெரியபுராணம் குறித்து விளக்குக.

(அல்லது)

(ஆ) பாஞ்சாலி சபதம் கூறும் அருச்சனன் பாத்திரப் படைப்பை வெளிப்படுத்துக.

பகுதி இ — ($3 \times 10 = 30$ மதிப்பெண்கள்)

எவையேனும் மூன்று வினாக்களுக்கு மட்டும் கட்டுரை வடிவில் விடை தருக.

16. புதுக்கவிதையில் குறியீடு, படிமம் பெறுமிடத்தை ஆராய்க.

17. அறத்தொடு நிற்றலின் வகைகளை விளக்குக.

18. உருவக அணியின் வகைகளைச் சான்றுடன் விவரிக்க.

19. எட்டுத்தொகை அகநூல்களின் சிறப்பினைத் தொகுத்தெழுதுக.

20. இரட்டைக் காப்பியங்கள் குறித்துக் கட்டுரைக்க.

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D–2075

Sub. Code
41B

DISTANCE EDUCATION

Common For B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2026.

Fourth Semester

Part – I : HUMAN SKILLS DEVELOPMENT — II

(CBCS 2018-2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Name the types of Management skills.

2. Define Human relational skills.

3. Explain conceptual skills.

4. What are technical skills?

5. What is the use of multitasking skill?

6. Mention the examples of organizational skills.

7. How do you understand your skills?

8. Define community.

9. Describe problem solving in simple words.

10. Write the meaning of social responsibility.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Write a short note on Techniques of counselling.

Or

(b) Write any five essential human relational skills.

12. (a) Highlight the importance of conceptual skills.

Or

(b) Write a paragraph on presentation skills.

13. (a) Give some examples for multitasking skills.

Or

(b) Write a paragraph on leadership skills.

14. (a) Describe why understanding skills are important.

Or

(b) Write short note on aspects of community.

15. (a) Present some tips for problem solving skills.

Or

(b) What are the steps of social responsibility?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Elaborate counsellor skills in the work place.

17. Present technical skills with proper examples.

18. Write an essay on organizational skills.

19. Analyse understanding skills related to community and society.

20. Explain cooperative learning skills with suitable examples.

D–2076

Sub. Code
42/13742/0142

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2026.

Fourth Semester

Part II — ENGLISH — Paper IV

(CBCS 2018 – 2019 Academic Year Onwards/
2021 Calendar Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. How does the father entertain the sick son in "A Day's Wait"?

2. What made the children forget their dispute?

3. Why does the crowd upset with the note taker?

4. Why does Swami burn his cap?

5. How does Tybalt react to Romeo's presence at the party.

6. What caused Leontes to repent his actions?

7. Who signed into the law "the Civil rights Act of 1964"?

8. Why was Nehru upset in 1960?

9. Change the phrase into clause in the following sentence :

(a) He is confident <u>of winning the match</u>.

(b) <u>His arrival</u> was totally unexpected.

10. Write the objective of group discussion.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Examine the moral of the story "Two Old Men".

Or

(b) Analyse the role played by the Old Woman in "Little Girls Wiser than Men".

12. (a) How does Higgins treat Eliza?

Or

(b) Describe Swami's missing episode.

13. (a) Discuss the characteristics of a tragic hero.

Or

(b) Comment on Leontes' reunion with Hermione.

14. (a) How were the uncouchables discriminated in India?

Or

(b) How was Nehru helpful to Toynbee in the second meeting?

15. (a) Expand the following proverb into a paragraph procrastination is the thief of time.

Or

(b) Write a conversation between you and your father, thanking him for buying a new mobile phone for you.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Elaborate on the pains of Cholera disease as shown in “Lalajee”.

17. Trace the elements of humour in R.K. Narayan’s "Swami and Friends".

18. How is the theme of loyalty and friendship depicted in “The Merchant of Venice”.

19. Discuss Martin Luther King as a peaceful warrior.

20. Write a group discussion on the topic “Merits and demerits of Cashless Economy”.

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D–2158	Sub. Code
	11313

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

First Semester

CLASSICAL ALGEBRA

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State D'Alembert's Ratio test.

2. Solve : $x^3 - 3x^2 - 4x + 12 = 0$.

3. If α, β, γ are the roots of $x^3 + px^2 + qx + r = 0$. Find $(1+\alpha^2)(1+\beta^2)(1+\gamma^2)$.

4. Write a note on Horner's method.

5. Write the working procedure of Newton's method,

6. Define a column matrix.

7. Define rank of a $m \times n$ matrix.

8. Define non-singular matrix with an example.

9. Define eigen vectors.

10. Prove that the matrix A and its transpose A^T have the same characteristic roots.

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Find the coefficient of x^n in the expansion of $\frac{x+1}{(x-1)^2(x-2)}$.

Or

(b) Form the equation of the lowest degree with rational coefficients whose roots are $3+\sqrt{5}$ and 1.

12. (a) Solve $x^4-8x^3+19x^2-12x+2=0$ by removing the second term.

Or

(b) Prove that $(n!)^2 > n^n$ for $n > 2$.

13. (a) Prove without expanding $\begin{vmatrix} a^3 & a^2 & 1 \\ b^3 & b^2 & 1 \\ c^3 & c^2 & 1 \end{vmatrix} = (ab+bc+ca)\begin{vmatrix} a^2 & a & 1 \\ b^2 & b & 1 \\ c^2 & c & 1 \end{vmatrix}$.

Or

(b) Prove that $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$.

14. (a) If A and B be two symmetric matrices of the same order, then prove that :

(i) $A+B$ is symmetric

(ii) AB is symmetric if and only if $AB=BA$.

Or

(b) Solve $x+y+z=9$, $2x+5y+7z=52$, $2x+y-z=0$ by Cramer's rule.

15. (a) Find the eigen vectors of the matrix $A=\begin{pmatrix}1 & 3\\ 4 & 5\end{pmatrix}$.

Or

(b) Prove that $A=\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{bmatrix}$ satisfies its characteristic equation. Also find its inverse.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Sum to infinity the series $\frac{15}{16}+\frac{15.21}{16.24}+\frac{15.21.27}{16.24.32}+\ldots.$

17. Solve $x^6-4x^5-11x^4+40x^3-11x^2-4x-1=0$ if one of its roots is $\sqrt{2}+\sqrt{3}$.

18. Prove that $\begin{vmatrix} 1+a, & 1 & 1 & 1 \\ 1 & 1+a_2 & 1 & 1 \\ 1 & 1 & 1+a_3 & 1 \\ 1 & 1 & 1 & 1+a_4 \end{vmatrix} = a_1 a_2 a_3 a_4 \left(1+\frac{1}{a_1}+\frac{1}{a_2}+\frac{1}{a_3}+\frac{1}{a_4}\right)$.

19. If $A = \begin{pmatrix} 1 & 0 \\ -1 & 1 \end{pmatrix}$, then prove that $A^2 - 2A + I_2 = 0$. Hence find A^{50}.

20. State and prove that Cayles-Hamilton theorem.

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D–2159	Sub. Code
	11314

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

First Semester

CALCULUS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Find $\frac{dy}{dx}$ if $y = a^x$.

2. Find the n^{th} derivative of $x^3 e^{ax}$.

3. If $u = xy / x + y$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = u$.

4. Find the asymptote of $x^3 + y^3 = 3axy$.

5. Evaluate $\int xe^x dx$.

6. Write Bernoulli's formula.

7. Evaluate $\int_0^1 \int_0^2 (2x + 3) dy dx$.

8. Define Jacobian.

9. Define Beta and Gamma function.

10. Prove that $\Gamma_1 = 1$.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Find y_n if $y = \log \dfrac{2x+3}{3x+2}$.

Or

(b) Find the radius of curvature to the curve $x^4 + y^4 = 2$ at (1, 1).

12. (a) Find the evolute of the parabola $y^2 = 4ax$.

Or

(b) Find the $P - r$ equation of the curve $r = a(1 - \cos\theta)$.

13. (a) Prove that $\displaystyle\int_0^{\pi/2} \frac{\sqrt{\sin x}\, dx}{\sqrt{\sin x} + \sqrt{\cos x}} = \frac{\pi}{4}$.

Or

(b) Evaluate $I = \int x^3 e^{2x} dx$.

14. (a) Evaluate $\displaystyle\iint_D x^2 y^2 dx dy$ where D is the circular disc $x^2 + y^2 \leq 1$.

Or

(b) Evaluate $\displaystyle\int_0^2 \int_0^3 \int_0^4 xyz\, dz\, dy\, dx$.

15. (a) Prove that : $\int_0^{\infty} \frac{x^8(1-x^6)}{(1+x)^{24}}\,dx = 0$.

Or

(b) Prove that $\beta(m,n) = 2\int_0^{\pi/2} \sin^{2m-1} x \cos^{2n-1} x\,dx$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. If $y = \cos(m \sin^{-1} x)$ prove that $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} + (m^2 - n^2)y_n = 0$.

17. Find the asymptotes of $x(x^2 - y^2) - y(x+y) - x + 1 = 0$.

18. Evaluate $I = \int_0^{\pi/2} \log \sin x\,dx$.

19. By changing order of integration evaluate $\int_0^3 \int_1^{\sqrt{4-y}} (x+y)\,dx\,dy$.

20. Solve the equation $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} - 3y = \sin t$ given that $y = \frac{dy}{dt} = 0$ when $t = 0$ by Laplace transform.

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D–2160

Sub. Code
11323

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Second Semester

ANALYTICAL GEOMETRY AND VECTOR CALCULUS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Find the general equation of a circle with centre (–3, –4) and radius 3.

2. Find the direction cosines of the line which is equality inclined to the axes.

3. Find the equation of the plane of the plane passing through (1, 1, 0), (1, 2,1) and (–2, 2, –1).

4. Define Cone.

5. Find the condition for the plane $lx + my + nz = p$ to be a tangent plane to the sphere

   $x^2 + y^2 + z^2 + 2ux + 2vy + 4wz + d = 0$.

6. Define Cylinder.

7. Define Skew lines.

8. Find the centre and radius of the sphere $2x^2 + 2y^2 + 2z^2 - 2x + 2y - 4z - 5 = 0$

9. Find the unit normal to the surface $x^3 - xyz + z^3 = 1$ at (1, 1, 1).

10. State Guass divergence theorem.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Find the angle between the two lines $x - 2y + 5 = 0$ and $x + 3y - 5 = 0$.

Or

(b) Find the equation of the circle described on the chord $3x + y + 5 = 0$ of the circle $x^2 + y^2 = 16$ diameter.

12. (a) Find the equation of the plane containing the point (–1, 7, 2) and the line $\frac{x+3}{2} = \frac{y+2}{3} = \frac{z-2}{-2}$.

Or

(b) Find in symmetrical form, the equations of the orthogonal projection of the line $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-4}{4}$ on the plane $3x + 4y + 5z = 0$.

13. (a) Find the equation of the right circular cone with vertex at (2, –1, 4), line $\frac{x-2}{1} = \frac{y+1}{2} = \frac{z-4}{-1}$ as the axis and semi-vertical angle $\cos^{-1}\left(\frac{4}{\sqrt{6}}\right)$.

Or

(b) Find the equation of the right circular cylinder whose axis is $x = 2y = -z$ and radius 4.

14. (a) Find the equation of a cylinder whose generators are parallel to the line $\frac{x}{2}=\frac{y}{1}=\frac{z}{3}$ and whose guiding curve is the ellipse $x^2+2y^2=1$ and $z=0$.

Or

(b) Find the shortest distance between the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$. Are they coplanar?

15. (a) Find the angle between the surface $z=x^2+y^2-3$ and $x^2+y^2+z^2=9$ at (2, –1, 2).

Or

(b) If $\vec{F}=x^2\vec{i}+xy^2\vec{j}$, evaluate the line integral $\int_C \vec{F}.d\vec{r}$ from (0, 0) to (1, 1) along the path $y=x$.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Show that the angle between diagonals of a cube is $\cos^{-1}\left(\frac{1}{3}\right)$.

17. Prove that the homogeneous second degree equation $ax^2+by^2+cz^2+2fyz+2gzx+2hxy=0$ represents a pair of planes if $abc+2fgh-af^2-bg^2-ch^2=0$. Also prove that the angle between the planes is

$$\tan^{-1}\left[\frac{2\left(f^2+g^2+h^2-ab-bc-ca\right)^{1/2}}{a+b+c}\right]$$

18. Show that the lines $\frac{x-2}{1}=\frac{y-4}{2}=\frac{z-5}{2}$ and $\frac{x-5}{2}=\frac{y-8}{3}=\frac{z-7}{2}$ are coplanar and find the equation of the plane containing them.

19. Prove that the two spheres

$S_1 = x^2 + y^2 + z^2 - 2x + 4y - 4z = 0$;

$S_2 = x^2 + y^2 + z^2 + 10x + 2z + 10 = 0$ touch each other and find the point of contact.

20. Verify Stoke's theorem for $\vec{F} = (2x - y)\vec{i} - yz^2\vec{j} + y^2z\vec{k}$ where S is the upper half surface of the under half of the sphere $x^2 + y^2 + z^2 = 1$ and C is its boundary.

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D–2161	Sub. Code
	11324

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Second Semester

SEQUENCES AND SERIES

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define sequence. Give an example.

2. Prove that any Convergent sequence is a bounded sequence.

3. Show that $\lim_{n\to\infty} n^{1/n} = 1$.

4. Prove that any Convergent sequence is a Cauchy sequence.

5. Define infinite series.

6. State Comparison test.

7. Test the convergence of the series $\sum \frac{2^n n!}{n^n}$.

8. State Cauchy's integral test.

9. Define absolutely convergent.

10. State Merten's theorem.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Prove that $\lim_{n\to\infty} \frac{n+1}{n} = 1$.

Or

(b) If $(a_n) \to \infty$ and $(a_n) \neq 0$ for all $n \in N$, then prove that $(1/a_n) \to 0$.

12. (a) State and prove Cauchy's first limit theorem.

Or

(b) Let $a_n = 1 + \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + ... + \frac{1}{n}$. Show that (a_n) diverges to ∞.

13. (a) Prove that $\frac{1}{n}[(n+1)(n+2)....(n+n)]^{1/n} \to \frac{4}{e}$.

Or

(b) Prove that every sequence (a_n) has a monotonic subsequence.

14. (a) Test the convergence of the series $\sum \frac{1^2 + 2^2 + ... + n^2}{n^4 + 1}$.

Or

(b) State and prove Leibnitz's test.

15. (a) State and prove that Dirichlet's test.

Or

(b) Given $\sum \frac{1}{n^2} = S$. Prove that

$$1 + \frac{1}{3^2} + \frac{1}{5^2} + ... = \frac{3}{4} S.$$

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Show that $\lim_{n \to \infty} \left(a^{1/n}\right) = 1$ where $a > 0$ is any real number.

17. State and prove Cesaro's theorem.

18. Let (a_n) be a Cauchy sequence. If (a_n) has a subsequence $\left(a_{n_k}\right)$ converging to l, then $(a_n) \to l$.

19. State and prove Kummer's test.

20. State and prove Abel's theorem.

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D–2162	Sub. Code
	11333

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Third Semester

DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define : Exact differential equation.

2. Solve $a(xdy + 2ydx) = xy\,dy$.

3. Solve $p^2 - 9p + 18 = 0$.

4. Solve $\frac{dx}{x} = \frac{dy}{y} = \frac{dz}{z}$.

5. Define : Total differential equations.

6. Solve $yz(ax + y + z)dx + zx(x + ay + z)dy + xy(x + y + az)dz = 0$.

7. Form a partial differential equation by eliminating a, b from $z = (x^2 + a)(y^2 + b)$.

8. Define : general integral.

9. Solve $\sqrt{p} + \sqrt{q} = 1$.

10. Define : Free fall.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Solve $(xy + 2x^2y^2)y\,dx + (xy - x^2y^2)x\,dy = 0$.

Or

(b) Solve the differential equation $x^2p^2 + 3xyp + 2y^2 = 0$.

12. (a) Solve $(D^2 - 3D - 4)y = e^{2x}$.

Or

(b) Solve $x^2\dfrac{d^2y}{dx^2} - 3x\dfrac{dy}{dx} - 5y = \sin \log x$.

13. (a) Solve $\dfrac{dx}{yz} = \dfrac{dy}{zx} = \dfrac{dz}{xy}$.

Or

(b) Solve $\dfrac{d^2y}{dx^2} + n^2y = \sec nx$.

14. (a) Eliminating the arbitrary function f and g from $z = f(x + ay) + g(x - ay)$.

Or

(b) Solve $p^2 + q^2 = npq$.

15. (a) Solve $pxy + pq + qy = yz$.

Or

(b) A system of rectangular hyperbola pass through the fixed points $(\pm a, 0)$ and have the origin as centre; show that the orthogonal trajectories are given by $(x^2 + y^2)^2 = 2a^2(x^2 - y^2) + c$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Solve $\sin px \cos y = \cos px \sin y + p$

17. Solve $(D^2 + 1)y = x^2 e^{2x} + x \cos x$.

18. Solve the differential equation by the method of variation of parameters $\frac{d^2y}{dx^2} + a^2 y = \sec ax$.

19. Solve $z = px + qy + \sqrt{1 + p^2 + q^2}$.

20. Solve $(p^2 + q^2)y = qz$. P.D.E. by Charpit's method.

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D–2163

Sub. Code
11334

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Third Semester

MECHANICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State Lami's theorem.

2. State Harker's law.

3. Write a conditions on equilibrium of three forces acting on rigid body.

4. Define the cone of friction.

5. Define the angle of friction.

6. Write the expression for the horizontal range on an inclined plane.

7. Define time of flight of the projectile.

8. Define oblique impact.

9. From Kapler's Second Law. Show that $\frac{1}{2}r^2\theta$ is a constant.

10. What is meant by central forces?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) ABC is a given triangle. Forces P, Q, R acting along the lines OA, OB, OC are in equilibrium. Prove that $P : Q : R = a^2\left(b^2 + c^2 - a^2\right) : b^2\left(c^2 + a^2 - b^2\right) : c^2\left(a^2 + b^2 - c^2\right)$ if 'Q' is circum centre of the triangle.

Or

(b) Find the magnitude and direction of the resultant of two forces acting at a print.

12. (a) State and prove the theorem on three coplanar forces.

Or

(b) Find the condition on equilibrium of a particle on a rough inclined plane.

13. (a) If a_1 and a_2 be the greatest paths in the two paths of a projectile with a given velocity for a given range R. Then prove that $R = 4\sqrt{n_1 n_2}$.

Or

(b) A stone is thrown with a velocity of 39.2 m/Sec at 30° to the horizontal. Find at what times it will be of a height of 14.7 m.

14. (a) Derive on expression for direct impact of two smooth spheres.

Or

(b) If the displacement of a moving point at any time be given by an equations of the form $x = a\cos nt + b\sin t$, then show that the motion is a simple harmonic motion.

15. (a) Obtain the equation for Pedal equation to the central orbit.

Or

(b) Find the differential equations of a central orbit in p-r co-ordinates.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. State and prove Varigon's theorem.

17. With usual notation of a catenary show that $y = ccash\left(\frac{x}{c}\right)$.

18. Show that the path of projectile in a parabola.

19. Find the loss of kinetic energy due to oblique impact.

20. Derive the velocity and acceleration in polar coordinates.

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D–2164

Sub. Code
11343

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Fourth Semester

ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Show that any countable infinite set is equivalent to a proper subset of itself

2. State Minkowski's inequality.

3. Prove that any finite subset A of a metric space (m, d) is bounded.

4. Define closure.

5. State Taylor's formula.

6. State mean values theorem for derivatives.

7. Define existence of Riemann integral.

8. Define contraction mapping.

9. Prove that any compact metric space is totally bounded.

10. Define compact metric space.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Show that $(0,1]$ is uncountable.

Or

(b) State and prove Holder's inequality.

12. (a) Prove that any metric space (M, d) each open ball is an open set.

Or

(b) Let A, B be subsets of R. Prove that $\overline{A \times B} = \overline{A} \times \overline{B}$

13. (a) State and prove Inverse function theorem.

Or

(b) State and prove Roll's theorem.

14. (a) State and prove Daurboux's theorem.

Or

(b) Prove that every continuous function on [a, b] is Riemann integrable.

15. (a) Prove that if f is a non constant real valued continuous function on R then the range of f is uncountable.

Or

(b) State and prove Heine Borel theorem.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. If f and g are real valued functions, if f is continuous at a, and if g is continuous at f(a), then prove that $g \circ f$ is continuous at a.

17. State and prove Baire's category theorem,

18. State and prove Cantor's intersection theorem.

19. State and prove the first Fundamental theorem of calculus.

20. Prove that in a metric space M the following are equivalent

    (a) M is compact.

    (b) Any infinite subset of M has a limit point.

    (c) M is sequentially compact.

    (d) M is totally bounded and complete.

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D–2165	Sub. Code
	11344

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Fourth Semester

STATISTICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Find the Arithmetic mean of the following series :
   61.7, 71.8, 65.3, 70, 69.8

2. Define Geometric mean.

3. Find the normal equation for the fitting a straight line.

4. Prove that the arithmetic mean of the regression coefficients is greater than or equal to the correlation coefficient.

5. Prove that : $E = 1 + \Delta$.

6. Write a formula for Lagrange's Theorem.

7. Find whether the following data are consistent.
   $N = 600$, $(A) = 300$, $(B) = 400$, $(AB) = 50$.

8. Define Bowley's Index Number.

9. Define the factor reversal test.

10. What are the steps for simple average method.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Find the G.M. for the following data :

Marks :	0-10	10-20	20-30	20-40
Number of Students :	5	8	3	4

Or

(b) For a frequency distribution (f_i / x_i), show that $\beta_2 \geq 1$.

12. (a) Fit a curve $y = ax^b$ for the following data.

X :	1	2	3	4
Y :	2.99	4.25	5.22	6.10

Or

(b) Calculate rank correlation coefficient for the following data :

X :	5	2	1	4	6	3
Y :	4	5	3	2	1	6

13. (a) State and prove the Fundamental theorem for the finite differences.

Or

(b) Find U_x for the following data, by using Gregory-Newton's formula :

U_0	U_1	U_2	U_3	U_4
1	11	21	28	29

14. (a) Check whether the attributes A and B are independent, given that $(AB) = 256$, $(\alpha B) = 768$, $(A\beta) = 48$, $(\alpha\beta) = 144$.

Or

(b) Explain aggregate method for the Index number.

15. (a) What are the components of a time series.

Or

(b) Find the advantages and disadvantages for the method of Semi averages.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find the A.M., G.M. and H.M. for the following data :

Class :	0-10	10-20	20-30	30-40	40-50
Frequency :	15	10	7	5	3

17. Fit a second degree parabola from the following data :

X :	0	1	2	3	4
Y :	1	5	10	22	38

18. Calculate the Regression lines X on Y and Y on X from the following data :

X :	3	6	5	4	4	6	7	5
Y :	3	2	3	5	3	6	6	4

19. Estimate the population for the year 1945 by using Newton-Gregory formula from the following data :

Year :	1941	1951	1961	1971	1981	1991
Population :	2500	2800	3200	3700	4350	5225

20. Calculate (a) Laspayres (ii) Paasche's (iii) Fisher's Index Numbers for the following data :

Commodities	Base Year		Current Year	
	Price	Quantity	Price	Quantity
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

D–2166

Sub. Code
11351

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Fifth Semester

MODERN ALGEBRA

(CBCS 2018 – 2019 & Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Define complement of a set.

2. Define a permutation group and example.

3. Show that any unit in R cannot be zero-divisor.

4. Define cosets with an example.

5. Define automorphism with an example.

6. Define maximal ideal.

7. Define a quotient ring.

8. Define subspace.

9. Define homomorphism with an example.

10. Define a nullity.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Let $f : A \to B, g : B \to C$ be two functions. Then prove that

(i) $g \circ f$ is $1-1 \Rightarrow f$ is $1-1$.

(ii) $g \circ f$ is onto $\Rightarrow 9$ is Onto.

Or

(b) Let G be a group. Then prove that

(i) Identity element of G is unique.

(ii) For any $a \in G$, the inverse of a is unique.

12. (a) State and prove Euler's theorem.

Or

(b) State and prove Lagrange's theorem.

13. (a) Prove that only isomorphism $f : \mathbb{Q} \to \mathbb{Q}$ is the identity map.

Or

(b) Show that any Euclidean domain R has an identity element.

14. (a) Show that $R[x]$ is an integral domain iff R is an integral domain.

Or

(b) Prove that any subset of a linearly independent set is linearly independent.

15. (a) Prove that the intersection of two subspaces of a vector space is a subspace.

Or

(b) Let V be a finite dimensional vector space over a field F. Show that any linearly independent set of vectors in V is part of a basis.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Let A and B be two subgroups of a group G. Then prove that AB is a subgroup of G iff $AB = BA$.

17. State and prove Cayley's theorem.

18. State and prove the fundamental theorem of homomorphism.

19. State and prove Division algorithm.

20. Let V be a vector space over a field F and S be a non-empty subset of V. Then prove that

(a) $L(S)$ is a subspace of V.

(b) $S \subseteq L(S)$

(c) If W ia any subspace of V such that $S \subseteq W$, then $L(S) \subseteq W$.

D–2167	Sub. Code
	11352

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Fifth Semester

OPERATIONS RESEARCH

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define : Operation Research.

2. What are the three components of Linear Programming Problem?

3. What is Artificial Variable?

4. State fundamental theorem of Duality.

5. What is a Balanced Transportation Problem?

6. What is degeneracy of a Transportation Problem?

7. What is the objective of an assignment problem?

8. Narrate “Ideal time on a machine”.

9. Define a two-person zero sum games.

10. Define a network.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the development of O.R.

Or

(b) Use two phase simplex method to :

Maximize $Z = 5x_1 + 3x_2$

Subject to $2x_1 + x_2 \leq 1$; $x_1 + 4x_2 \geq 6$ and $x_1, x_2 \geq 0$.

12. (a) Show that the dual of dual is the primal.

Or

(b) Explain North West Corner Method.

13. (a) Give the mathematical formulation of Assignment problem.

Or

(b) Solve the following assignment problem.

		Jobs				
		1	2	3	4	5
Person	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

14. (a) Explain the sequencing problem of an Jobs and a three machines.

Or

(b) Find the total elapsed time for the sequencing problem.

Task	A	B	C	D	E	F	G	H	I
M_1	2	5	4	9	6	8	7	5	4
M_2	6	8	7	4	3	9	3	8	11

15. (a) Solve the rectangular game whose payoff matrix for player A is $\begin{pmatrix} -1 & -2 & 8 \\ 7 & 5 & -1 \\ 6 & 0 & -12 \end{pmatrix}$.

Or

(b) Compute the earliest start, earliest finish latest start and latest finish of each activity of the project given below :

Activity :	1-2	1-3	2-4	2-5	3-4	4-5
Duration (in days)	8	4	10	2	5	3

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the feature of OR.

17. Solve the transportation problem :

		Destination				Supply
		A	B	C	D	
Source		11	20	7	8	50
		21	16	20	12	40
		8	12	18	9	70
Demand		30	25	35	40	

18. Solve the following sequencing problem given as optimal solution if passing is not allowed.

		Machines			
		M_1	M_2	M_3	M_4
Jobs	A	13	8	7	14
	B	12	6	8	19
	C	9	7	18	15
	D	8	5	6	15

19. Solve the following two-person zero-sum game stable.

Player A	I	II	III	IV
1	5	–10	9	0
2	6	7	8	1
3	8	7	15	1
4	3	4	–1	4

20. The following table indicates the details of a project. The durations are in days. 'a' refers to optimistic time, 'm' refers to most likely time and 'b' refers to pessimistic time duration.

Activity	1-2	1-3	1-4	2-4	2-5	3-5	4-5
a	2	3	4	8	6	2	2
m	4	4	5	9	8	3	5
b	5	6	6	11	12	4	7

(a) Draw the network.

(b) Find the critical path.

(c) Determine the expected standard deviation of the completion time.

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D–2168	Sub. Code
	11353

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Fifth Semester

NUMERICAL ANALYSIS

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Find the first approximation to the root of $x^3 - 2x - 5 = 0$ between 2 and 3 by bisection method.

2. Show that a root of $x^3 - 6x - 13 = 0$ lies between 3 and 4.

3. Write down the Newton's backward interpolation formula.

4. Write the Gauss backward interpolation formula.

5. Write the Trapezoidal formula.

6. Write the formula for $\frac{dy}{dx}$ at $x = xn$ using backward difference operator.

7. Write any two merits of Gauss elimination method.

8. State Gauss-Jordan method.

9. Write down the Taylor's series expansion.

10. Write R.K formula of fourth order.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Find a real root of the equation $x \sin x + \cos x = 0$, using bisection method.

Or

(b) Find by Newton-Raphson method the real root of $x \log_{10} x = 1.2$.

12. (a) Using Newton's forward difference formula find the sum $S_n = 1^3 + 2^3 + x^3 + \ldots + n^3$.

Or

(b) Estimate $\exp(1.85)$ from the following table :

x :	1.7	1.8	1.9	2.0	2.1	2.2	2.3
exp (x) :	5.474	6.050	6.686	7.389	8.166	9.025	9.974

13. (a) Find $\frac{dy}{dx}$ at $x = 1.5$ from the following data :

x :	1.5	2.0	2.5	3.0	3.5	4.0
y :	3.375	7.0	13.625	24.0	38.875	59.0

Or

(b) Evaluate the integral $\int_0^{10} \frac{dx}{1+x^2}$ using

(i) Trapezoidal rule

(ii) Simpson one third rule.

14. (a) Solve by using Gauss-Elimination method

$$x + y + z = 9$$
$$2x - 3y + 4z = 13$$
$$3x + 4y + 5z = 40$$

Or

(b) How will you compare Gauss-elimination method and Gauss-seidal method?

15. (a) Use Taylor series method, find $y(1.1)$ from $\frac{dy}{dx} = x + y$, $y(1) = 0$.

Or

(b) Evaluate $y(0.1), y(0.2)$ from the equation $y' = \frac{1}{2}(1+x)y^2$, $y(0) = 1$ by R.K. second order method.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find the root of $2x = \cos x + 3$ correct to three decimal places by iteration method.

17. Find the value of $f(x)$ corresponding to $x = 27$ from the given values :

x :	14	17	31	35
$f(x)$:	68.7	64	44	39.1

18. Dividing the range into sin equal parts, find the approximate value of $\int_0^{\frac{\pi}{2}} \sin x \, dx$ by

(a) Simpson's $\frac{3}{8}$ rule

(b) Simpson's $\frac{1}{3}$ rule.

19. Solve the system

$$5x - 2y + 3z = 18$$
$$x + 7y - 3z = -22$$
$$2x - y + 6z = 22$$

using Gauss-Jordan method.

20. Using Picard's method, find the first and second approximation :

D–2169

Sub. Code
11354

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Fifth Semester

TRANSFORM TECHNIQUES

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Find $K\left[t^3\right]$.

2. Prove that $L[\cos at] = \frac{s}{s^2 + a^2}$, $(s > 0)$.

3. Find $L^{-1}\left[\frac{1}{s^2 - 25}\right]$.

4. Define even function.

5. Find a_0 if $f(x) = x, -\pi \le x \le \pi$.

6. Find the half range sine series of $f(x) = x$ in $(0, \pi)$.

7. State shifting property of Fourier Transform.

8. Find the Fourier sine transform of $f(x) = e^{-x}$.

9. Define Z--Transform.

10. State initial value theorem in Z-Transform.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) State and prove Linear property of Laplace Transform.

Or

(b) Find $L^{-1}\left[\frac{s}{(s+2)^2+1}\right]$.

12. (a) Solve $\frac{d^2y}{dt^2}+2\frac{dy}{dt}+5y=0$ where $y=2, \frac{dy}{dt}=-4$ at $t=0$ using Laplace Transform.

Or

(b) If $f(x)=x(2\pi-x),\ 0\le x\le 2\pi$, find the Fourier Co-efficient of a_n.

13. (a) Find the half range sine series of $f(x)=x-x^2$ in (0, 1).

Or

(b) Find the Fourier integral of the function $f(x)=\begin{cases}\frac{\pi}{2}, & |x|<1\\ 0, & |x|>1\end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin\lambda}{\lambda}d\lambda=\frac{\pi}{2}$.

14. (a) State and prove Change of scale property of Fourier Transform.

Or

(b) Find the Fourier cosine transform of $\frac{1}{a^2+x^2}$

15. (a) Find the Z-Transform of $\frac{1}{n+1}$.

Or

(b) Find $Z^{-1}\left[\frac{2z^2+3z}{(z+2)(z-4)}\right]$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Evaluate the following:

(a) $L\left[t^2\cos t\right]$.

(b) $L\left[t^2e^{-t}\cos t\right]$.

17. Solve $y''-3y'+2y=e^{-t}$ given $y(0)=1,\ y'(0)=0$ using Laplace Transform.

18. Find the Fourier series expansion of $f(x)=x^2$ in $-\pi\le x\le\pi$.

19. State and prove Parseval's Identity in Fourier Transforms.

20. Find the inverse Z-Transform of $\frac{z}{(z-1)^2(z+1)}$.

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D–2170	Sub. Code
	11361

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Sixth Semester

DISCRETE MATHEMATICS

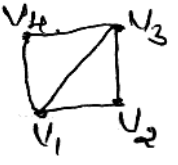
(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Contradiction.
2. Show that $\neg\neg P \Leftrightarrow P$.
3. Define conjunctive normal form.
4. Define free variable.
5. Draw the Hasse diagram of $(D(12), \leq)$.
6. Define group code.
7. Define spanning subgraph.
8. Find the adjacency matrix of the graph



9. Define Cut–Vertex.
10. Define Eulerian graph.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Show that $\left(\neg P \wedge \left(\neg Q \wedge R\right)\right) \vee \left(Q \wedge R\right) \vee \left(P \wedge R\right) \Leftrightarrow R$.

Or

(b) Obtain a disjunctive normal form of $\neg\left(P \vee Q\right) \leftrightarrow \left(P \wedge Q\right)$.

12. (a) Show that $P \to S$ can be derived from the premises $\neg P \vee Q, \neg Q \vee R, R \to S$.

Or

(b) Verify the validity of the following argument :

All men are mortal : Socrates is a man;

Therefore Socrates is a mortal.

13. (a) Show that every distributive lattice is modular.

Or

(b) Show that the (2,5) encoding function defined by $e(00) = 00000$; $e(01) = 01110$; $e(10) = 10101$; $e(11) = 11011$ is a group code.

14. (a) Let G be a simple graph and the minimum degree $\delta(G) \geq 2$. Show that G contains a cycle of length $\geq \delta + 1$.

Or

(b) Let G be a graph and u and v be two distinct vertices of G. Show that if there is a $u - v$ walk in G, then there is also a $u - v$ path in G.

15. (a) Prove that a graph G with n vertices is a tree if and only if it has $n-1$ edges and no cycle.

Or

(b) In a connected graph G, prove that any minimal set of edges containing at least one edge of every spanning tree of G is a cut-set.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Obtain the principles conjunctive normal form of the formula $(\neg P \to R) \wedge (Q \leftrightarrow P)$.

17. Show that if $p \to q$, $q \to r$, $\neg(p \wedge r)$ and $p \vee r$, then r.

18. Let B be a finite Boolean algebra and let A be the set of all atoms of B. Show that the Boolean algebra B is isomorphic to the Boolean algebra $P(A)$.

19. Prove that a simple graph with n vertices most be connected if it has more than $(n-1)(n-2)/2$ edges.

20. State and prove the Cayley's formula.

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D–2171	Sub. Code
	11362

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Sixth Semester

FUZZY ALGEBRA

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define level set of a fuzzy set.

2. Find the scalar cardinally of the fuzzy set $A = \frac{1}{x} + \frac{1}{y} + \frac{1}{z}$

3. Write the standard operations on fuzzy set.

4. Define dual point.

5. Define height of a fuzzy relation.

6. Write the matrix form of max-min composition.

7. Define fuzzy measure.

8. Define body of evidence.

9. Define measure of dissonance.

10. Explain any two aspects the concept of information.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Show that all α-cuts of any fuzzy set 'A' defined on $R^n \quad (n \geq 1)$ are converse 'A' if and only if $\mu_A[\lambda_r + (1-\lambda)s] \geq \min[\mu_A(r), \mu_A(s)]$ for all $r, s \in R^n$ and all $\lambda \in [0,1]$.

Or

(b) Prove that every fuzzy complement has atmost one equilibrium.

12. (a) Prove that the sugeno complements are monotonic non increasing for all $\lambda \in (-1, \infty)$.

Or

(b) If a complement 'C' has an equilibrium e_c if and only if $d_{e_c} = e_c$.

13. (a) Let 'R' be a binary relation defined by the following membership matrix.

$$M_R = \begin{pmatrix} 1 & 0 & 0.7 \\ 0.3 & 0.2 & 0 \\ 0 & 0.5 & 1 \end{pmatrix}$$ obtained its resolution form.

Or

(b) Solve the following fuzzy relation equations

$$P_0 = \begin{pmatrix} 0.9 & 0.6 & 1 \\ 0.8 & 0.8 & 0.5 \\ 0.6 & 0.4 & 0.6 \end{pmatrix} = [0.6 \;\; 0.6 \;\; 0.5].$$

14. (a) Let $X = \{a,b,c,d\}$ be the universal set giving basic assignment $m(\{a,b,c\}) = 0.5$; $m(\{a,b,d\})=0.2$, $m(X) = 0.3$. Determine the corresponding plansibility measure.

Or

(b) Prove : Given consonant of evidence $(\Im, m)$ the associated belief and plaussible measure passess the following property $Bel(A \cap B) = \min \{Bel(A), Bel(B)\}\ \forall A, B \in \beta(X)$.

15. (a) Prove that $H(X,Y) \leq H(X) + H(Y)$.

Or

(b) Prove that $H(Y) \geq H(Y/X)$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Consider the fuzzy set A, B and C defined on the interval $x = [0,10]$ of real members by the membership grade function $\mu_A(x) = \frac{x}{x+2}$, $\mu_B(x) = 2^{-x}$, $\mu_C(x) = \frac{1}{1+10(x-2)^2}$.

Determine the mathematical formulae and graphs of the following.

(a) $\overline{A}, \overline{B}, \overline{C}$

(b) $A \cap B, B \cap C$

(c) $\overline{A \cup B}$, $\overline{A \cup C}$.

17. Prove that $\lim_{w \to \infty} i_w(a,b) = \min(a,b)$.

18. Prove the following propositions.

(a) When $R(X,X)$ is strictly antisymmetric crisis relation, then $R \wedge R^{-1} = \phi$.

(b) When $R(X,X)$ is max-min transitive then $R \circ R \subseteq R$.

19. Prove that a belief measure Bel on a finite power set $P(x)$ is a probability measure if and only if A's basis assignment 'm' is given by $m(\{3 \times 3\})$ = $Bel(\{X\})$ and $m(A) = 0$ for all subsets of 'x' that are not single terms.

20. Prove that the functions $\mathrm{p}\, I(N) = \log_2 N$ is the only function that satisfies heartly axioms on Information's.

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D–2172	Sub. Code
	11363

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION, MAY 2026.

Sixth Semester

COMPLEX ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is a complex ring.

2. Define the function of a complex variable.

3. Prove that $\frac{dw}{dz} = \frac{\partial w}{\partial x} = -i.\frac{\partial w}{\partial y}$

4. Define the Power series.

5. Define the Fibonacci numbers.

6. State Bessel equations.

7. Define cross ratio.

8. Define Cauchy's theorem for a rectangle.

9. Define the singular point.

10. State the Cauchy's Residue theorem.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the Cauchy's Riemann equations.

Or

(b) Explain Milne Thomson method.

12. (a) Solve $y''+y=0$.

Or

(b) Show that the sequence $\{x_n\}$ is convergent when $x_n = 1+\frac{1}{2!}+\frac{1}{3!}+\ldots+\frac{1}{n!}$

13. (a) Show that every bilinear transformation preserves the Cross-ratio.

Or

(b) Find all the bilinear transformations which transform the unit circle $|z|\leq 1$ into unit circle $w|z|\leq 1$.

14. (a) Find $\int_c dz$.

Or

(b) State and prove Cauchy's theorem.

15. (a) State and prove Laurent's theorem.

Or

(b) State and prove Rouche's theorem.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. If f(z) is analytic, show that f(z) is a constant, if

(a) $f'(z) = 0$ everywhere.

(b) $\overline{f(z)}$ is also analytic.

(c) R f(z) is a constant.

(d) $|f(z)|$ is a constant.

17. State and prove Abel's limit theorem.

18. Discuss briefly the Schwarz's lemma.

19. Prove that Cauchy's Integral Formula.

20. State and prove Taylor's theorem.

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D–2173	Sub. Code
	11364

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2026.

Sixth Semester

COMBINATORICS

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define Stirling number.

2. Define the characteristic roots of the recurrence relation.

3. What do you understand by generating functions for partitions?

4. What is meant by finbonacci numbers?

5. Define the monomial symmetric functions.

6. Explain the elementary symmetric functions.

7. Define the term multinomials.

8. What is meant by inclusion and exclusion principle?

9. What do you understand by Polya theory?

10. Define permutation groups.

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) How many different words can be made out of the letters which form the word ALLAHABAD?

Or

(b) Using recursive definition for polynomial expression prove that $F(n)=3n^3-8n^2+2n+4$ is a third-degree polynomial expression.

12. (a) Find the recurrence relation satisfying $y_n=A(3)^n+B(-4)^n$.

Or

(b) How would you use a Poisson distribution to find approximately the probability of exactly 5 successes in 100 trials the probability of success in each trial being $p=0.1$?

13. (a) Consider the expressions that define a recurrence relation. The sequence is 1, 1, 5, 13, 41, 121, 365,... Find a formula for the $(n+1)^{\text{th}}$ number in the sequence. $x_n=2x_{n-1}+3x_{n-2}$; for $n\geq 2$, $x_0=1, x_1=1$.

Or

(b) Determine whether the sequence $\{f_n\}$ is a solution of the relation $f_n=2f_{n-1}-f_{n-2}$ for $n=2,3,4,$ where $f_n=3n$ for every non-negative integer n.

14. (a) Discuss briefly the symmetric functions with the help of example.

Or

(b) Analyse the power sum symmetric functions.

15. (a) State and prove cardinality theorem.

Or

(b) Find a solution to the recurrence relation $C_n = -3C_{n-1} - 3C_{n-2} - C_{n-3}$ for $n \geq 3$, with initial conditions $c_0 = 1, c_1 = -2$ and $c_2 = 1$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe the unordered samples with/without repetition.

17. Solve the fibonacci sequence $\{f_n\}$ defined by $f_n = f_{n-1} + f_{n-2}$ for $n \geq 2$ with intial conditions $f_0 = 1$ and $f_1 = 1$.

18. A fair coin is thrown 10 times. The random variable X is the number of heads coming upwords. Using binomial probability function, find the probabilities of all possible values of X can take and then verify that binomial distribution has a mean $\overline{X} = np$ and variance $\sigma^2 = npq$.

19. Discuss briefly the inclusion and exclusion principles giving appropriate exampels.

20. Let $S = \{1, 2, 3, 4, 5\}$. If $f = (2, 3)$ and $g = (1\ 4)$, Show that $f \circ g = g \circ f$.