D–1066

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, DECEMBER 2025.

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. ஆயர் பாடியின் தலைவன் யார்?
2. கண்ணதாசனின் இயற்பெயர் என்ன?
3. பாரதியார் எழுதிய நூல்கள் யாவை?
4. நிலா பிஞ்சு கவிதையின் மையக்கரு யாது?
5. 'எதற்காக' கவிதையின் ஆசிரியர் யார்?
6. 'கவிக்கோ' என்று அழைக்கப்படுபவர் யார்?
7. சிலப்பதிகாரத்தில் இடம்பெற்றுள்ள காண்டங்கள் எத்தனை?
8. கம்பர் - ஆசிரியர் குறிப்பு வரைக.
9. சீறாப்புராணம் - குறிப்பு வரைக.
10. தேம்பாவணி - சொல் விளக்கம் தருக.

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

பின்வரும் வினாக்களுக்குக் ஒரு பக்க அளவில் விடை தருக.

11. (அ) கோகுலத்து பசுக்களின் நிலைப்பாட்டினை விளக்குக.

(அல்லது)

(ஆ) கண்ணினின் சிறப்புகளை பாரதியார் குறிப்பிடுவனவற்றை எழுதுக.

12. (அ) உலகப்பன் பாட்டு உணர்த்தும் கருத்தினை விவரி.

(அல்லது)

(ஆ) 'வயிறு' கவிதை உணர்த்தும் செய்தினை எழுதுக.

13. (அ) பாண்டியன் நெடுஞ்செழியனின் பண்பினைச் சுட்டுக.

(அல்லது)

(ஆ) கம்பராமாயணம் - நூல் சிறப்புகளை விவரி.

14. (அ) நபிகளின் அற்புதத்தினை விளக்குக.

(அல்லது)

(ஆ) சீறாபுராணம் இயற்றிய உமறுப்புலவரின் வரலாற்றினை எழுதுக.

15. (அ) தேம்பாவணி - காட்சிப்படலம் உணர்த்தும் மையக் கருவினை விளக்குக.

(அல்லது)

(ஆ) வீரமாமுனிவர் தமிழுக்கு ஆற்றிய பணிகளை விளக்குக.

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

எவையேனும் மூன்றனுக்குக் கட்டுரை வடிவில் விடையளி.

16. "செய்யும் தொழிலே தெய்வம்" கவிதை உணர்த்தும் கருத்தினை விளக்கி வரைக.

17. நோயற்ற வாழ்வு குறித்து நாமக்கல் கவிஞர் கூறுவனவற்றை தொகுத்துரைக்க.

18. 'வழக்குரை காதை' வழி அறியலாகும் செய்திகளை கட்டுரை தருக.

19. ஈத்தங்குலை வரவழைத்த படலம் தெரிவிக்கும் செய்திகளை விளக்கி வரைக.

20. தேம்பாவணி காட்சிப்படலம் வழி காணப்படும் கருத்தினை தொகுத்துரைக்க.

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D–1067

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, DECEMBER 2025.

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. Name some communication barriers.

2. Define non-verbal communication.

3. What are the types of intonation?

4. Rearrange the following sentence.

   Rama boy a is poor who is.

5. What is a technical report?

6. Fill in the blanks with correct forms of verb.

   (a) One of the most interesting child prodigies ———— Young Wang Yani of China.

   (b) Ram and Ravi ———— friends.

7. What is a circular?

8. Name different types of essays.

9. How to start a GD topic?

10. Give some examples of gestures.

PART B — (5 × 5 = 25 marks)

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

11. (a) Give some tips for GD.

Or

(b) How gestures are used in communication?

12. (a) Prepare a newspaper report about a festival held in your city.

Or

(b) Using attention grabber, how will you introduce yourself.

13. (a) Identify the different types of sentences :

(i) Though Ram is poor, he is honest.

(ii) Having finished his home work he went out to play.

(iii) Run fast or you will miss the train.

(iv) As he is suffering from fever, he is unable to attend the class.

(v) He is poor yet he is honest.

Or

(b) Prepare a circular about the independence day celebrations to be held in your college.

14. (a) Correct the following sentences :

(i) Ravi is one of the most intelligent boy in the class.

(ii) He play football everyday.

(iii) He won the match, don't he?

(iv) He prefers coffee than tea.

(v) He returned back from England yesterday.

Or

(b) Write a paragraph on "Reading makes a full man".

15. (a) How will you prepare for a speech?

Or

(b) Explain the importance of eye contact in communication.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write an essay on various types of communication.

17. Draft a welcome address for an official meeting.

18. Discuss various steps involved in writing a paragraph.

19. Prepare a GD on the topic "Advantages of Co-education".

20. Describe the procedure involved in preparing technical reports.

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D–1068

Sub. Code

12/13712/ 0112/0312

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, DECEMBER 2025.

First Semester

Part II : ENGLISH PAPER - I

(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. Write on the role of Louisa Mebbin in Mrs. Packletide's plan to hunt the tiger in *Mrs. Packletide's Tiger*.
2. Mention the role of nature in Jim Corbett's *A Deed of Bravery*.
3. State the main argument presented by C.E. Joad in *Our Civilization.*
4. What moral lesson does B.R. Nanda convey in *A Hero on Probation?*
5. Fill in the blanks with suitable articles :
   (a) He is ———— (an/the) expert in ———— (a/the) field of computer science.
   (b) H always tells ———— (a/the) truth, no matter what.
6. Fill in the blanks with correct form of gerund :
   (a) They discussed ———— (to plan/planning) the trip.
   (b) He practiced ———— (to play/playing) the guitar for hours.

7. Briefly write on the risks of drug abuse according to Hardin B. Fones in *Dangers of Drug Abuse.*

8. What does Alpha of the Plough suggest about the changing nature of communication in *On Letter Writing?*

9. Write few of the environmental lessons in C.V. Raman's *Water-the Elixir of Life.*

10. What characteristics of Mrs. Packletide are highlighted through her pursuit of the tiger in *Mrs. Packletide's Tiger?*

PART B — (5 × 5 = 25 marks)

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

11. (a) Explore the character development of Mrs. Packletide and her motivations in *Mrs. Packletide's Tiger.*

Or

(b) Describe how Jim Corbett portrays the relationship between humans and nature in *A Deed of Bravery.*

12. (a) Describe the view of human evolution presented by Carl Sagan in Our Ancestors.

Or

(b) Analyse the criticisms of modern civilization offered by C.E. Joad in *Our Civilization.*

13. (a) Fill in the blanks with suitable articles :

(i) Can you give me ———— (a/the) pen you borrowed?

(ii) He is ———— (a/an) honest man.

(iii) She is ———— (a/the) best student in our class.

(iv) I need ———— (a/an/the) apple from that basket.

(v) They went to ———— (a/the) market to buy ———— (a/the) vegetables.

Or

(b) Fill in the blanks with suitable form of Gerund :

(i) She is interested in ———— (to learn/learning) French.

(ii) He's good at ———— (to play/playing) chess.

(iii) I don't mind ———— (to help/helping) you with your homework.

(iv) She avoided ———— (to speak/speaking) about the problem.

(v) ———— (Drive/Driving) too fast is dangerous.

14. (a) Precise the following paragraph :

In a bustling city, there lived two neighbors, Mr. Kumar and Mr. Rao, who had never gotten along. Mr. Kumar was a quiet man who valued his privacy, while Mr. Rao was a social butterfly, always eager to chat. Their differences often led to small conflicts, and they barely spoke to each other beyond the necessary greetings.

One day, during a fierce storm, a massive tree fell, damaging both their houses. With no immediate help available, they were forced to work together to clear the debris and fix the damage. As they spent hours side by side, they started talking. Mr. Rao, who had always thought Mr. Kumar was unfriendly, learned that Kumar preferred solitude because he had lost his wife recently and was still grieving. Meanwhile, Mr. Kumar realized that Rao's constant need for conversation came from living alone and feeling lonely.

The storm had passed, but a new bond formed between the two men. They started helping each other with small tasks, and soon their mutual support blossomed into an unexpected friendship. Their connection became the talk of the neighborhood, proving that sometimes, adversity brings people Closer.

Or

(b) Construct a dialogue between two friends discussing the pros and cons of social media.

15. (a) Analyse the themes of independence and aloofness as represented in *The Cat* by Catharine M. Willson.

Or

(b) What insights does B.R. Nanda provide about heroism in *A Hero an Probation?*

PART C — (3 × 10 = 30 marks)
Answer any THREE questions.

16. What does Alpha of the Plough suggest about the evolution of communication in *On Letter Writing?*

17. Explore the social implications of drug abuse as discussed by Hardin B. Fones in *Dangers of drug abuse.*

18. Change direct speech into indirect speech :
    (a) She asked, "Can you help me with this".
    (b) He said, "I am feeling tired".
    (c) She said, "I saw him at the party yesterday".
    (d) They asked, "Have you finished the project"?
    (e) He said, "I can fix the car myself".
    (f) The doctor said, "You should take your medicine regularly".
    (g) He said, "I will meet you at 5 o'clock".
    (h) She asked, "What time does the train leave".
    (i) They said, "We are leaving for the airport now".
    (j) She said, "I don't like spicy food".

19. Write a letter to your bank manager requesting the closure of your savings account.

20. Explain the contrast between the depicted bravery and actual danger in Jim Corbett's *A Deed of Bravery.*

D–1069

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,
DECEMBER 2025.

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 விடையளி.

1. வீரமாமுனிவர் எழுதிய நூல்கள் யாவை?

2. தேம்பாவணி காப்பியத்தின் பாட்டுடைத் தலைவன் யார்?

3. நீல. பத்மநாபன் எழுதிய புதினங்களின் பெயர்களைச் சுட்டுக?

4. 'வானவீதியில்' சிறுகதை யாருடைய வாழ்வியலைப் பேசுகிறது?

5. இராமன் தும்பைப்போர் நடைப்பெற்ற பொழுது சூடிய பூவின் பெயர் யாது?

6. சார்பெழுத்துக்கள் எத்தனை? அவை யாவை?

7. ஆகுபெயர் என்றால் என்ன?

8. வேற்றுமை உருபு யாவை?

9. தமிழில் தோன்றிய முதல் புதினத்தின் பெயர் என்ன?

10. பெரியபுராணம் நூலின் ஆசிரியர் யார்?

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடையளி.

11. (அ) தேம்பாவணி நூலின் சிறப்பினை எழுதுக?

(அல்லது)

(ஆ) யோசேப்பின் மாட்சியினைப் புலப்படுத்துக?

12. (அ) 'வானவீதியிலே' சிறுகதையில் இடம்பெறும் கதை மாந்தர்களின் நிலையினைச் சுட்டுக?

(அல்லது)

(ஆ) கம்பன் புறத்திணையில் இடம்பெறும் தும்பைப் போர் பற்றிய செய்திகளை எழுதுக?

13. (அ) மொழி இறுதி எழுத்துக்கள் யாவை?

(அல்லது)

(ஆ) வினா என்றால் என்ன? அதன் வகைகள் யாவை?

14. (அ) திணை குறித்து எழுதுக?

(அல்லது)

(ஆ) பாரதியாரின் கவிதைப் பணி குறித்து விளக்குக.

15. (அ) சிறுகதையின் இலக்கணம் வரைக?

(அல்லது)

(ஆ) இஸ்லாமியர்கள் தமிழுக்கு ஆற்றிய பணிகள் யாவை?

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

எவையேனும் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. தேம்பாவணி காட்சிப் படலம் உணர்த்தும் செய்திகளை தொகுத்துரைக்க?

17. கம்பன் புறத்திணையில் இடம்பெற்ற காகுத்தன் கன்னிப்போர் பற்றி விளக்குக?

18. முதலழுத்துக்கள் குறித்து கட்டுரை வரைக?

19. புதுக்கவிதை தோற்றம் வளர்ச்சி குறித்து கட்டுரை தருக?

20. வைணவ இலக்கியங்கள் குறித்து விளக்கி வரைக.

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D–1070

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, DECEMBER 2025.

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 communication skills.

2. What is meant by stimulus and response in communication?

3. Mention two guidelines for effective speaking.

4. What is phonetics in communication?

5. List two types of listening.

6. What is the purpose of technical writing?

7. Mention two components of corporate communication.

8. What is press release?

9. Define conversation skills.

10. What are soft skills in communication?

PART B — (5 × 5 = 25 marks)

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

11. (a) Explain the significance of communication skills in daily life.

Or

(b) Describe different types of listening with examples.

12. (a) Explain modes of conversation skills.

Or

(b) What are the key aspects of preparing an effective presentation?

13. (a) Discuss the significance of written communication over oval communication.

Or

(b) What are the key elements of a business proposal?

14. (a) Discuss the role of newsletters in corporate communication.

Or

(b) Explain the importance of interview skills in professional settings.

15. (a) Explain the difference between internal and external corporate communication.

Or

(b) Discuss the importance of pronunciation etiquette in communication.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the principles of effective writing with emphasis on technical and creative writing.

17. Describe the role of soft skills in professional communication.

18. Describe the various components of communication skills with examples.

19. Explain the different types of corporate communication and their significance.

20. Discuss the importance of listening skills and their impact on communication.

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D–1071

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,
DECEMBER 2025.

Second Semester

Part II : ENGLISH PAPER – II

(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 is the Friend's beauty compared to a summer's day in Shakespeare's 'Sonnet XVIII'?

2. What animal is scarified in the fourth stanza of 'Ode on a Grecian Urn'?

3. Who is Lucrezia del Fede?

4. What problem does the traveller face in 'The Road not Taken'?

5. Explain Tagore's version of 'Heaven of freedom'.

6. What sort of sounds are heard in the early morning in 'Coromandel Fishers'?

7. Why did Antonio borrow money from Shylock?

8. Who was called as a 'Second Daniel come to judgement'?

9. What was the last punishment given to Shylock?

10. Name the kinds of Essay.

PART B — (5 × 5 = 25 marks)

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

11. (a) Highlight the main theme of the poem, 'Upon Westminister Bridge'.

Or

(b) Explain briefly why unheard melodies are sweeter.

12. (a) Describe the significance of good decisions according to Robert Frost.

Or

(b) How do the soldiers cope with the war in Owen's 'Strange Meeting'?

13. (a) State briefly Rabindranath Tagore's ideals of true freedom.

Or

(b) Narrate briefly the summary of the poem, 'The Express'.

14. (a) Bring out the importance of the opening scene of 'The Merchant of Venice'.

Or

(b) Discuss briefly the significance of the Trail scene in 'The Merchant of Venice'.

15. (a) Read the following passages and make notes on it.

The animal kingdom can be divided into four categories. The first category comprises diurnal animals which are active during the day. In the second category, we have the nocturnal animals, which move about at night. Then we have to less well-known varieties, the crepuscular animals, which are active during twilight hours and the arythmic animals, which go about during both day and night. Probably such a division began when simple and weak animals began to come out in the dark to escape from diurnal predators.

How do nocturnal animals find their way in the dark? Domestic cats, as we know, have eyes that can adapt to darkness. But in the wild, the mechanisms are more sophisticated. The eyes of an owl, for example, contain a large number of rods and nerve cells. These cells respond to dim light and to changes in light intensity. Would you believe it, if you are told that an owl can detect a moving mouse in one millionth of a candle power of light of snakes make use of the sense of smell at night. Their tongue picks up small particles from objects around them and sensors at the roof of the mouth smell the particles.

Or

(b) Write a report on the celebration of Independence Day in your office.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Discuss Browning's 'Andrea del Sarto' as a dramatic monologue.

17. Analyse a critical appreciation of the poem, 'Where the mind is without Fear'.

18. Elaborate the plot of the play 'The Merchant of Venice'.

19. Write an essay on the following topic : The Right use of Leisure.

20. Read the following passages and answer the questions that follow :

The cassowaries which are two meters tall with a helmet-like crest protecting their head, are the world's most dangerous birds capable of dealing with fatal blows. The cassowary liver in the rain forests of Australia and New Guinea and are actually pretty shy animals if undisturbed. But if you get too close then these unpredictable birds turn extremely aggressive and you could receive a bone breaking kick or get sliced by its dagger-like claws. The cassowary is also one of the most difficult animals to keep in the zoo because of the frequent injuries suffered by the zoo-keepers that look after them.

(a) Which bird is supposed to be the most dangerous one in the world?

(b) Where do cassowaries live?

(c) What is the nature of cassowary if undisturbed?

(d) Why are the people afraid of keeping the birds?

(e) What is meant by 'aggressive'?

D–1072

Sub. Code
31A/13731/0131

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

Part I : TAMIL – 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 ஓரிரு வரிகளில் விடையளிக்க.

1. முல்லைப்பாட்டு – நூல் குறிப்புத் தருக.

2. ஆற்றுப்படை நூல்களைப் பட்டியலிடுக.

3. நாழிகை கணக்கர் என்போர் யார்?

4. பாடாண் திணையை வரையறுக்க.

5. ஒற்றைப்படை எண்ணிலான அகநானூற்றுப் பாடல்களின் திணை?

6. 'வேளாண் வேதம்' எனப் போற்றப்படும் அற நூல்?

7. திருக்குறளின் சிறப்பைப் போற்றி எழுந்த நூல்?

8. நான்மணிக்கடிகை ஆசிரியர் பெயரைச் சுட்டுக.

9. விமலாதித்தன் எந்நாட்டு வேந்தன்?

10. 'சுவடுகள்' நாவலில் காந்தியக் கொள்கையைப் பேசும் பாத்திரம்?

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) கார்க்காலம் குறித்த முல்லைப்பாட்டு வருணனைகளைப் புலப்படுத்துக.

(அல்லது)

(ஆ) கபிலர் பாடல்களின் தனிச் சிறப்புகளைத் தொகுத்துரைக்க.

12. (அ) ஐங்குறுநூற்று நூல் தொகுப்பு வரலாற்றை எடுத்துரைக்க.

(அல்லது)

(ஆ) பாரதம் பாடிய பெருந்தேவனார் திருமாலை எங்ஙனம் போற்றுகிறார்?

13. (அ) தலைமகன் பாசறையிலிருந்து சொல்லிய செய்தியைச் சேந்தம்பூந்தனார் வழி விளக்குக.

(அல்லது)

(ஆ) கையறுநிலையை நப்பசலையார் பாடல்கள் வழி விளக்குக.

14. (அ) பிரிவாற்றாமை குறித்து வள்ளுவர் உரைக்குமாற்றை எழுதுக.

(அல்லது)

(ஆ) நான்மணிக்கடிகை பேசும் அறக்கருத்துக்களை எடுத்துரைக்க.

15. (அ) இராசராசசோழன் நாடகக் கதைக்களத்தைச் சுருக்கி வரைக.

(அல்லது)

(ஆ) சுவடுகள் நாவல் கதைப் பொருண்மையை எடுத்துரைக்க.

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

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. கபிலரின் கவித்திறத்தைக் குறுந்தொகைப் பாடல்களின் வழி நிறுவுக.

17. குறிஞ்சித்திணையில் அமையும் ஐங்குறுநூற்றுப் பாடல்களைக் கட்டுரைக்க.

18. புறநானூற்றுப் பாடல்களால் அறியவரும் வரலாற்றுச் செய்திகளை விவரிக்க.

19. வள்ளுவர் உரைக்கும் வாழ்க்கைத் துணைநலம் பற்றியக் கருத்துக்களை எழுதுக.

20. சுவடுகள் நாவலின் ராசாத்தி பாத்திரப் படைப்பின் சிறப்பைப் புலப்படுத்துக.

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D–1073

Sub. Code
31B

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, DECEMBER 2025.

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. Mention the types of human skills.

2. What is interpersonal behaviour?

3. Explain etiquette in simple words.

4. Write the benefits of high self-esteem.

5. What is competitive negotiation?

6. What are goal setting skills?

7. Define positive attitude.

8. What is leadership style?

9. Why are human relation skills important?

10. What is stress management skills?

PART B — (5 × 5 = 25 marks)

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

11. (a) Write a short note on interpersonal behaviour.

Or

(b) Describe the characteristics of interpersonal skills.

12. (a) Explain what are the factors influencing our personality.

Or

(b) Present the importance of self-esteem.

13. (a) Describe when do you use decision making skills.

Or

(b) Write a paragraph on negotiation skills.

14. (a) Give some tips for coping with change.

Or

(b) Explain briefly on leadership skills.

15. (a) What are the elements of human relations?

Or

(b) Present the different types of counselling.

PART C — (3 × 8 = 30 marks)

Answer any THREE questions.

16. Elaborate the merits of good habits.

17. Write an essay on thinking with suitable examples.

18. Analyse the types of and importance of goal setting.

19. Explain attitudes in a detailed way.

20. Write an essay on causes and effects of stress.

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D–1074

Sub. Code
32/13732/0132

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

Part II : ENGLISH PAPER – III

(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 did Swami dream in the office?

2. What was the central conflict in the play "The Bag Comes Home"?

3. With what philosophy the postmaster consoled himself?

4. What does the old man say about the Silver Idol?

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

6. Who are the characters in "Reunion"?

7. Why did the Captain Kill Malik in "A kind of Justice"?

8. Who wrote the one-act play "The Refugee"?

9. Do as directed :

(a) Milk is more nourishing than any other food. (Into superlative)

(b) Raju is not as smart as Ravi (Into comparative)

10. What is Descriptive writing?

PART B — (5 × 5 = 25 marks)

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

11. (a) How did Swami end up catching the burglar?

Or

(b) Why did Ratan Wander near the post office?

12. (a) How has the war affected Philip's personality?

Or

(b) Describe the climax of the play "Progress".

13. (a) Why was Gaultier angry with Marion?

Or

(b) What are some of the moral failings and betrayals that John exposes in "Reunion"?

14. (a) Enumerate the types of pronoun.

Or

(b) Fill in the blanks with suitable verbs :

(i) The shop ———————— at non O'clock every morning. (open/opens)

(ii) It ———————— since eight O'clock this morning. (is raining/has been raining)

(iii) Nobody ———————— the fact. (know/knows)

(iv) I ———————— the book as soon as I finish it. (return/will return)

(v) Don't get off the train fill it ————————. (stops/stopped)

15. (a) Prepare an agenda for sports day celebration of your college.

Or

(b) Describe yourself in a paragraph.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the role played by Madame Forestier in "The Diamond Necklace".

17. Bring out the significance of the title "The Proposal".

18. Examine the challenges and internal conflicts of refugees in the play "The Refugee".

19. Write an essay on verbs.

20. Write a notice informing the students about a dance competition to be held in your college.

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D–1075

Sub. Code
41A/13741/0141

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, DECEMBER 2025.

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 ஓரிரு வரிகளில் விடை தருக.

1. அசை என்பது யாது?

2. படிமம் என்றால் என்ன?

3. அறத்தொடு நிற்றல் – பொருள் தருக.

4. கையறு நிலையின் தன்மை யாது?

5. அணி இலக்கணம் என்றால் என்ன?

6. தற்குறிப்பேற்றவணியின் சிறப்பைக் கூறுக.

7. எரிதழல் கொண்டுவா கதிரை வைத்திழந்தான் அண்ணன் கையை எரித்திடுவோம் என்றவன் யார்?

8. ஆட்டனத்தி ஆதிமந்தி என்ற காப்பியத்தின் ஆசிரியர்?

9. தொல்காப்பியம் எத்தனை அதிகாரங்களைக் கொண்டவை?

10. வேளாண் வேதம் என்று அழைக்கப்படும் நூல் எது?

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

அனைத்து வினாக்களுக்கும் ஒரு பக்க அளவில் விடை தருக.

11. (அ) வெண்பாவிற்குரிய சீர்கள் குறித்து எழுதுக.

(அல்லது)

(ஆ) தொடை விகற்பம் எத்தனை வகைப்படும்? அவை யாவை?

12. (அ) உடன்போக்கு என்பது யாது? வகைகளைக் கூறுக.

(அல்லது)

(ஆ) செவியறிவுறூஉ என்பதன் பொருளைத் தருக.

13. (அ) வேற்றுமை அணியை எடுத்துக்காட்டுடன் விளக்குக.

(அல்லது)

(ஆ) செம்மொழி சிலேடையணியின் தன்மையைப் புலப்படுத்துக.

14. (அ) இனியவை நாற்பதின் அறக்கருத்துக்களை இயம்புக.

(அல்லது)

(ஆ) ஊதாரிப் பிள்ளையின் நிலைப்பாட்டை விளக்குக.

15. (அ) நரிக்கண்ணனின் தந்திரத்தை விளக்குக.

(அல்லது)

(ஆ) மதுரைக்காஞ்சி கூறும் மதுரை மாநகரச் சிறப்பு குறித்து எழுதுக.

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

எவையேனும் மூன்று வினாக்களுக்கு மட்டும் கட்டுரை வடிவில் விடை தருக.

16. ஆசிரியப்பாவின் வகைகள் குறித்துக் கட்டுரைக்க.

17. பாடாண்படலம் கூறும் கருத்துக்களை விளக்கியுரைக்க.

18. உவமையணியின் வகைகள் குறித்து விவரிக்க.

19. பத்துப்பாட்டின் ஆற்றுப்படை நூல்களின் தன்மையை விவரிக்க.

20. பாஞ்சாலி சபதம் உணர்த்தும் நாட்டு விடுதலை உணர்வு குறித்து எழுதுக.

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D–1076

Sub. Code
41B

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, DECEMBER 2025.

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. What are counselling skills?

2. Mention managerial skills.

3. Write the difference between conceptual and technical skills.

4. Why are technical skills important in the work place?

5. Define organizational skills.

6. What is multitasking skill?

7. Name any four qualities of a leader.

8. What are understanding skills?

9. Why are skills important in society?

10. What is problem solving skill?

PART B — (5 × 5 = 25 marks)

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

11. (a) Describe how to highlight your counselling skills.

Or

(b) Present benefits of human relational skills.

12. (a) How do you develop conceptual skill?

Or

(b) How do technical skills improve job opportunities?

13. (a) Write a paragraph on the uses of organizational skills.

Or

(b) Give tips for improving multitasking skills.

14. (a) Write a note on time management.

Or

(b) Highlight any five qualities of the community.

15. (a) Write a paragraph on cooperative learning skills.

Or

(b) Short note on a cooperative social responsibility statement.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write any ten essential management skills and how to develop them.

17. Elaborate effective way of presentation skills.

18. Discuss the essential qualities of a good leader.

19. Sum up organizational skills. What they are and why you need them?

20. Write an essay on problem – solving skills.

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D–1077

Sub. Code
42/13742/0142

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Fourth Semester

Paper 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. What does Tolstoy emphasize through the journey of two old men in *Two Old Men?*

2. How does Jim Corbett use nature in *Lalajee* to influence the story's atmosphere?

3. What is the role of Professor Higgins in shaping Eliza's identity in *Pygmalion?*

4. Mention the role of colonialism in *Swami and Friends.*

5. Write Shylock's character in *The Merchant of Venice.*

6. What are the consequences of impulsive actions in *Romeo and Juliet?*

7. Mention the influence of Gandhi on Martin Luther King's philosophy of non-violence.

8. What is the role of grammar in structuring effective sentences?

9. Write the irony in *Little Girls Wiser Than Men* by Tolstoy.

10. How G.B. Shaw uses humour to address serious social themes in *Pygmalion.*

PART B — (5 × 5 = 25 marks)

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

11. (a) Delineate the role of nature in shaping the narrative of Corbett's *Lalajee.*

Or

(b) What psychological conflicts are highlighted in *A Day's Wait* by Hemingway?

12. (a) Delineate how R.K. Narayan portrays the complexities of childhood friendships in *Swami and Friends.*

Or

(b) Describe the satire of social pretensions presented in *Pygmalion.*

13. (a) Analyse the conflict between love and duty in *The Merchant of Venice.*

Or

(b) Explain the significance of parental authority and its impact on Romeo and Juliet's choices in *Romeo and Juliet.*

14. (a) Describe Martin Luther King Jr.'s leadership style as presented by R.N. Roy.

Or

(b) Explore Nehru's political philosophy as depicted in A.J. Toynbee's biography.

15. (a) Explain how the theme of innocence versus experience is explored in *Little Girls Wiser Than Men.*

Or

(b) What impact does the setting of Malgudi have on the narrative of *Swami and Friends?*

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explore the symbolic significance of the journey undertaken by the characters in Tolstoy's *Two Old Men.*

17. Discuss how Shaw uses language to emphasize class differences in *Pygmalion.*

18. Examine how Shakespeare presents different forms of love in *Romeo and Juliet.*

19. Explain how grammar rules help in structuring coherent and persuasive arguments in real life conversation.

20. Delineate how jealousy drives the plot and character development in *The Winter's Tale.*

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D–1159

Sub. Code
11313

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

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 the binomial series expansion.

2. Find the value of $\sum\left(\frac{\alpha}{\beta\gamma}\right)$ if α,β,γ are the roots of the equation $x^3+ax+b=0$.

3. State the Descarte's rule of sign.

4. Define reciprocal equations. Give an example.

5. Discuss the nature of roots of $x^3-7x+6=0$.

6. Define adjoint of a square matrix.

7. Define singular matrix. Give an example.

8. Define rank of the square matrix A.

9. Define eigen values of the matrix A.

10. If λ_1 and λ_2 are the eigen values of the matrix A, then find the eigen values of A^T.

PART B — (5 × 5 = 25 marks)

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

11. (a) Find the numerically greatest term in the expansion of $(1-x)^{-14/3}$ when $x = \frac{21}{32}$.

Or

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

12. (a) Diminish the roots of the equation $x^3 + x^2 + x - 100$ by 4.

Or

(b) Prove that the equation $x^3 - 3qx + 2r = 0$ has a double root if $q^3 = r^2$.

13. (a) Prove that the geometric mean of n positive real numbers, not all of them being equal, is greater than their harmonic mean.

Or

(b) Prove that $a^7 + b^7 + c^7 > abc(a^4 + b^4 + c^4)$, where a, b, c are distinct positive real numbers.

14. (a) Find the determinant value of the matrix $A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 1 & -2 \\ -1 & -2 & 1 \end{bmatrix}$.

Or

(b) Find k so that the rank of the matrix $\begin{bmatrix} 2 & 1 & -1 \\ 1 & 4 & 2 \\ 3 & 5 & k \end{bmatrix}$ is 2.

15. (a) Examine for consistency the following equations : $2x + 6y + z = 0, 3x + 10y - 3z = 0, y - 6z = 0$.

Or

(b) Find the eigen values of $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Sum the series $\sum_{n=1}^{\infty} \frac{2n-1}{(n+3)\,n!}$.

17. Find the Sturm's functions for the polynomial $x^4 - 2x^3 - 3x^2 + 10x - 4$.

18. Solve $x^4 - 12x^3 + 48x^2 - 72x + 35 = 0$ by removing the second term.

19. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{bmatrix}$.

20. Find the eigen values and eigen vectors of $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$.

D–1160

Sub. Code
11314

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

First Semester

CALCULUS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Find $\frac{dy}{dx}$ if $y = (2x)^x$.

2. Find $\frac{dy}{dx}$ if $x = a\cos^3 t$, $y = a\sin^3 t$.

3. Find the first and second order partial derivatives of $u = \cos x \sin y$.

4. What is meant by curvature?

5. Define evolute of the curve.

6. Evaluate $\int_0^1 \int_0^2 xy^2 dy\, dx$.

7. Define Gamma function.

8. Solve $(D^2 + 6D + 5)y = 0$.

9. Find the Laplace transform of $\sin at$.

10. Form the partial differential equation by eliminating the arbitrary constants from $z = ax + by + a^2 + b^2$.

PART B — (5 × 5 = 25 marks)

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

11. (a) If $y = e^{-x}\cos x$, prove that $y_4 + 4y = 0$.

Or

(b) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$ show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = \frac{3}{x + y + z}$.

12. (a) If $u = \sin^{-1}\left(\frac{x + y}{\sqrt{x} + \sqrt{y}}\right)$, prove that $xu_x + yu_y = \frac{1}{2}\tan u$.

Or

(b) Find the Pedal equation of the curve $r^m = a^m \sin m\theta$.

13. (a) Prove that the curvature of a circle of radius r at any point is $\frac{1}{r}$.

Or

(b) Evaluate $\int_0^{\pi} \int_0^{a\cos\theta} r\sin\theta \, dr d\theta$.

14. (a) If n is a positive integer, prove that $\lceil (n+1) = n!$.

Or

(b) Solve $(D^2 + 2D + 1)\, y = e^{-x}$.

15. (a) Solve $x^2 \frac{d^2y}{dx^2} - 2x(1+x)\frac{dy}{dx} + 2(1+x)y = x^3$.

Or

(b) Solve : $z = (x - y) = x^2 p - y^2 q$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Prove that the largest rectangle which can be inscribed in the curve $x^{2/3} + y^{2/3} = a^{2/3}$ is a square.

17. Find the envelope of the family of straight lines $\frac{x}{a} + \frac{y}{b} = 1$ where $a^2 + b^2 = k^2$.

18. By changing the order of integration and hence solve it : $\int_0^a \int_y^a xy\, dx\, dy$.

19. Prove that $\beta(m,n) = \frac{\lceil (m) \lceil (n)}{\lceil (m+n)}$.

20. Solve by using Laplace transform :
$(D^2 + 4D + 13)y = e^{-t} \sin t$, $y = 0$ and $Dy = 0$ at $t = 0$ where $D = \frac{d}{dt}$.

D–1161

Sub. Code
11323

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

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. Define direction ratios.

2. Find the direction cosines of the lines joining the points (3, –5, 4) and (1, –8, –2).

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

4. What is coplanar with an example?

5. Find the equation of the tangent plane at the origin to the sphere $x^2 + y^2 + z^2 + 8x - 6y + 4z = 0$.

6. Write the general equation of a right circular cone.

7. Write the formula of the shortest distance between two skew lines.

8. Find the equation of the sphere with centre (1, –1, 2) and radius 3.

9. Show that $Curl\left(r^n \vec{r}\right) = 0$.

10. State Green's theorem.

SECTION B — (5 × 5 = 25 marks)

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

11. (a) What is the equation of a line passing through $(a\cos^3\theta, a\sin^3\theta)$ and perpendicular to the line $x\sec\theta + y\cos ec\theta = a$?

Or

(b) Find the equation of the circle passing through the points (1, 1), (2, –1) and (3, 2).

12. (a) Find the coordinates of the foot of the perpendicular drawn from the origin to the plane $2x - 3y + z - = 0$.

Or

(b) Find the equation of the plane which contains the two parallel lines $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{3}$ and $\frac{x-3}{1} = \frac{y+2}{2} = \frac{z+4}{3}$.

13. (a) Find the equation of the cone with its vertex at the origin and whose guiding curve is given by $x^2 + y^2 + z^2 - 2x + 2y + 4z - 3 = 0$, $x^2 + y^2 + z^2 + 2x + 4y + 6z - 11 = 0$.

Or

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

14. (a) Find the equation of the sphere passing through the points (0,0,0), (1,0,0), (0, 1, 0) and (0, 0, 1).

Or

(b) Find the tangent plane of the sphere $x^2 + y^2 + z^2 - 4x - 4y - 4z + 10 = 0$ which are parallel to the plane $x - z = 0$.

15. (a) If $\vec{r}$ is the position vector of any point $P(x, y, z)$, Prove that $grad\, r^n = nr^{n-2}\vec{r}$.

Or

(b) Prove that $\vec{f} = (x^2 - yz)\vec{i} + (y - zx)\vec{j} + (z^2 - xy)\vec{k}$ is irrotational.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Show that the straight lines whose direction cosines are given by $2l - m + 2n = 0$ and $lm + mn + nl = 0$ are at right angles.

17. Find the image of the point (2, 3, 4) under the reflection in the plan $x - 2y + 5z = 6$.

18. Find the equations of the spheres which pass through the circle $x^2 + y^2 + z^2 - 2x + 2y + 4z - 3 = 0$; $2x + y + z - 4 = 0$ and touch the plane $3x + 4y - 14 = 0$.

19. Find the shortest distance and the equation of the line of shortest distance in symmetrical form of the lines $\frac{x-8}{3}=\frac{y+9}{-16}=\frac{z-10}{7}$ and $\frac{x-15}{3}=\frac{y-29}{8}=\frac{z-5}{-5}$.

20. Verify Gauss divergence theorem for the function $\vec{F}=a(x+y)\vec{i}+a(y-x)\vec{j}+z^2\vec{k}$ over the hemisphere bounded by the $x \circ y$ - plane and the under half of the sphere $x^2+y^2+z^2=a^2$.

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D–1162

Sub. Code
11324

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Second Semester

SEQUENCES AND SERIES

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define bounded sequence.

2. State Cauchy's general principle of convergence.

3. If $(a_n) \to a$, then prove that $(|a_n|) \to |a|$.

4. Prove that $\left(\frac{n!}{n^n}\right)$ converges.

5. Prove that any Cauchy sequence is a bounded sequence.

6. Test the convergence of $\sum \frac{1}{\sqrt{(n^3+1)}}$.

7. State Kummer's test.

8. State D' Alembert's ratio test.

9. Define conditionally convergent series.

10. State Abel's theorem.

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Prove that any convergent sequence is a bounded sequence.

Or

(b) Prove that $\lim_{n\to\infty} \frac{3n^2+2n+5}{6n^2+4n+7} = \frac{1}{2}$.

12. (a) Show that if $|r| < 1$, then $(nr^n) \to 0$.

Or

(b) Let (a_n) be any sequence and $\lim_{n\to\infty} \left|\frac{a_n}{a_{n+1}}\right| = l$. If $l > 1$, then prove that $(a_n) \to 0$.

13. (a) Test the convergence of the series $\sum \frac{\sqrt{(n+1)} - \sqrt{n}}{n^p}$.

Or

(b) State and prove Cauchy's Condensation test.

14. (a) State and prove Leibnitz's test.

Or

(b) Prove that any absolutely convergent series is convergent.

15. (a) Prove that $\sum_{n=2}^{\infty} \left(\frac{\sin n}{\log n}\right)$ is convergent.

Or

(b) Given $\sum \frac{1}{n^2} = s$. Prove that $1 + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{3}{4}s$.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. If $(a_n) \to a$ and $a_n \neq 0$ for all n and $a \neq 0$, then prove that $\left(\frac{1}{a_n}\right) \to \frac{1}{a}$.

17. State and prove Cauchy's first limit theorem.

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

19. State and prove Cauchy's root test.

20. State and prove Direchlet's test

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D–1163	Sub. Code
	11333

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Third Semester

DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

(CBCS 2018 – 2019 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 $\frac{dy}{dx} = \frac{2x}{x^2 + y^2 - 2y}$.

3. Solve : $y = px + \frac{a}{p}$.

4. Solve $(D^2 - 5D + 4)\, y = 0$.

5. Solve $\frac{d^3y}{dx^3} = \sin^2 x$.

6. Solve :
$(y^2 + yz + z^2)dx + (z^2 + zx + x^2)dy + (x^2 + xy + y^2)dz = 0$.

7. Eliminate a and b from $z = (a + x)(b + y)$.

8. What is meant by singular integral?

9. Solve $pq = k$.

10. Define cycloid.

PART B — (5 × 5 = 25 marks)

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

11. (a) Solve $x^2p^2 + 3xyp + 2y^2 = 0$.

Or

(b) Solve $x = y^2 + \log p$.

12. (a) Solve $(D^3 - D^2 - D + 1)\, y = 1 + x^2$.

Or

(b) Solve $(D^2 + 4)\, y = x \sin x$.

13. (a) Solve the equations $\frac{dx}{yz} = \frac{dy}{xz} = \frac{dz}{xy}$.

Or

(b) Solve $x^2 \frac{d^2y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$.

14. (a) Solve $y_2 - 4xy_1 + (4x^2 - 3)\, y = e^{x^2}$.

Or

(b) Solve : $p(1 + q^2) = q(z - 1)$.

15. (a) Obtain the complete integral of $xp^2 - ypq + y^3q - y^2z = 0$.

Or

(b) If, in a culture of yeast, the active ferment doubles itself in three hours, by what ratio will it increase in 15 hours, on the assumption that the quantity increases at a rate proportional to itself?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$.

17. Solve $x^2 \frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = e^x$.

18. Solve $\frac{d^2y}{dx^2} - \frac{3x+1}{x^2-1}\frac{dy}{dx} + y\left\{\frac{6(x+1)}{(x-1)(3x+5)}\right\}^2 = 0$.

19. Solve $px(y^2 + z) - qy(x^2 + z) = z(x^2 - y^2)$.

20. If the air resistance on a falling body of mass m exerts a retarding force proportional to the square of the velocity, the equation of motion is $\frac{dv}{dt} = g - cv^2$, where $c = \frac{k}{m}$. If $v = 0$ when $t = 0$, find v as a function of t. What is the termination velocity?

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D–1164	Sub. Code
	11334

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

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 triangle law of forces.

2. Define geometrical representation of a moment.

3. State two trigonometrical theorems.

4. Write down any two laws of frictions.

5. Derive the formula for time of flight.

6. Write down the formula for greatest distance of the projective from the inclined plane.

7. Define an impulsive force.

8. Explain :

   (a) Impinge directly

   (b) Impinge obliquely.

9. Write the Pedal equation of a circle.

10. Find the magnitude of resultant velocity and resultant acceleration.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) State and prove Lami's theorem.

Or

(b) Three like parallel forces, acting of the vertices of a triangle, have magnitudes proportional to the opposite sides. Show that their resultant passes through the in centre of the triangle.

12. (a) State all the laws of friction.

Or

(b) Prove that two couples in the same plane whose moments are equal and of the same sign are equivalent to one another.

13. (a) A body is projected with a velocity of 98 m/sec in a direction making an angle $\tan^{-1} 3$ with the horizon. Find (i) the greatest height (ii) time of flight.

Or

(b) Find the range of a projectile on the horizontal plane.

14. (a) Find the velocities of two smooth spheres after a direct impact between them.

Or

(b) Write the characteristics of the motion of a projectile.

15. (a) Obtain the Pedal equation of the circular pole at any point.

Or

(b) A particle describes the orbit $r^n = a^n \cos n\theta$ under a central force, find the law of force.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. ABCDEF is a regular hexagon and at A, act forces represented by $\overline{AB}, 2\overline{AC}, 3\overline{AD}, 4\overline{AE}$ and $5\overline{AF}$. Show that the magnitude of the resultant is $AB \cdot \sqrt{351}$ and that it makes a_n. angle $\tan^{-1}\left(\frac{7}{\sqrt{3}}\right)$ with AB.

17. Find the conditions of equilibrium of a number of coplanar forces acting at a point on a rigid body.

18. Define a projectile and show that its path is a parabola.

19. Find the Pedal equation of the some of the well known curves.

20. What is meant by central orbit? And also obtain the differential equation of a velocities in a central orbit.

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D–1165

Sub. Code
11343

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Fourth Semester

ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Prove that Q is countable.

2. Define equivalent.

3. Define a metric space.

4. Define Cauchy sequence.

5. Define homeomorphism.

6. State the inverse function theorem.

7. State Daurboux's theorem.

8. Let $T : M \to M$ be a contraction mapping, then prove that T is a continuous on M.

9. Prove that $\mathbb{R}$ with usual metric is not compact.

10. Let $M = [1,2] \cup [3,4]$ with usual metric, then prove that M is disconnected.

PART B — (5 × 5 = 25 marks)

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

11. (a) State and prove Minkowski's inequality.

Or

(b) Prove that $N \times N$ is countable.

12. (a) Let d_1 and d_2 be two matrices on M, define $d(x,y) = d_1(x,y) + d_2(x,y)$. Prove that d is a metric space on M.

Or

(b) Show that for a convergence sequence x_n the limit is unique.

13. (a) Prove that the metric space (0,1) and $(0,\infty)$ with usual metrics are homeomorphism.

Or

(b) Prove that a function $f : R \to R$ is continuous at $a \in R$ if and only if $w(f,a) = 0$.

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

Or

(b) State and prove contraction mapping theorem.

15. (a) If A and B are connected subsets of a metric space M and if $A \cap B \neq 2\phi$. Then prove that $A \cup B$ is connected.

Or

(b) Prove that $\mathbb{R}$ with usual metric is not compact.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. State and prove Holder's inequality.

17. Prove that l_2 is complete.

18. Prove that a subset A of a complete metric space M is complete if and only if A is closed.

19. Prove that any continuous mapping f defined on a compact metric space (M_1, d_1) into any other metric space (M_2, d_2) is uniformly continuous on M_1.

20. Prove that a metric space M is compact if and only if any family of closed sets with finite intersection property has non-empty intersection.

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D–1166

Sub. Code
11344

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

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 :

   18, 15, 18, 16, 17, 18, 15, 19, 17, 17.

2. Define Harmonic mean.

3. Find the normal equation for the fitting a second degree parabola.

4. Prove that : $-1 \le \gamma \le 1$.

5. Prove that : $E = (1 - \nabla)^{-1}$.

6. Write an formula for the Newton's backward interpolation formula.

7. Find whether the following data are consistent :

   $(A) = 600, (B) = 500, (AB) = 50, N = 1000$.

8. Define Fisher's index number.

9. Define the time reversal test.

10. What are any two uses of time series?

PART B — (5 × 5 = 25 marks)

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

11. (a) Find the H as for the following data.

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

Or

(b) Show that the variance of the first 'n' rotational numbers is $\frac{1}{12}(n^2 - 1)$.

12. (a) Fit a straight line to the following data.

X :	0	1	2	3	4
Y :	2.1	3.5	5.4	7.3	8.2

Or

(b) Calculate the correlation coefficient from the following data :

X:	10	12	18	24
Y:	13	18	12	25

13. (a) Give an estimate of the population in 1971 from the following table.

Year	1941	1951	1961	1971	1981	1991
Population in Lakhs	363	391	421	?	467	501

Or

(b) Find U_x from the following data, by using Lagrange's formula.

x :	0	1	2	5
U_x	2	3	12	147

14. (a) Given $(A) = 30, (B) = 25, (\alpha) = 30, (\alpha\beta) = 20$, find the value of $N, (\beta), (AB), (A\beta)$ and (αB).

Or

(b) Explain average of price relative method for the index number.

15. (a) Compute the seasonal indices for the following data by Simple average method.

Prices in different season

Season	1990	1991	1992	1993	1994
Summer	68	70	68	65	60
Monsoon	60	58	63	56	55
Autumn	61	56	68	56	55
Winter	63	60	67	55	58

Or

(b) Explain about the secular trend.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Find the mean, median and mode from the following data.

Marks :	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Number of students :	5	6	15	10	5	4	2

17. Calculate the first four central moments from the following data.

x :	0	1	2	3	4	5	6
y :	5	15	17	25	19	14	5

18. Find the correlation coefficient between x and y from the following table.

y \ x	5	10	15	20
4	2	4	5	4
6	5	3	6	2
8	3	8	2	3

19. Calculate (a) Laspeyre's (b) Paasche's (c) Fisher's Index numbers for the following data :

Commodities	Base Year 1990		Current Year	
	Price	Quantity	Price	Quantity
A	2	10	3	12
B	5	16	6.5	11
C	3.5	18	4	16
D	7	21	9	25
E	3	11	3.5	20

20. Use the method of least and fit a straight line trend to the following data given from 82 to 92. Hence estimate the trends value for 1993.

Year : 82 83 84 85 86 87 88 89 90 91 92

Production in quintals : 45 46 44 47 42 41 39 42 45 40 48

D–1167	Sub. Code
	11351

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Fifth Semester

MODERN ALGEBRA

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Show that any cyclic group is abelian.

2. Define a permutation group.

3. Define a normal subgroup.

4. Define unit with an example.

5. Define a ring.

6. State gauss lemma.

7. Define an integral domain.

8. Define a vector space.

9. Define basis.

10. Define orthogonality.

PART B — (5 × 5 = 25 marks)

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

11. (a) Prove that a subgroup of cyclic group is cyclic.

Or

(b) Prove that a non-empty subset H of a group $(G,*)$ will be a subgroup of G if and only if $a * b^{-1} \in H$, whenever $a,b \in H$.

12. (a) If H and K are finite subgroups of G of orders $O(H)$ and $O(K)$, respectively, then $O(HK) = \frac{O(H)O(K)}{O(H \cap K)}$.

Or

(b) Show that a subgroup N of G is normal iff the product of two right cosets on N is again a right coset of N.

13. (a) State and prove Fermat's theorem.

Or

(b) Show that a field is an integral domain.

14. (a) Let R be a ring with identity. Then prove that $S = \{n.1 / n \in Z\}$ is a subring of R.

Or

(b) Find all the units of $Z\left[\sqrt{-5}\right]$.

15. (a) Show that the vectors $v_1 = (0, 1, -2)$, $v_2 = (1, -1, 1)$, $v_3 = (1,2,1)$ are LI in R^3.

Or

(b) Prove that any vector space of dimension n over a field F is isomorphic to $V_n(F)$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Prove that the union of two subgroups of a group G is a subgroup iff one is contained in the other

17. Show that if R is a commutative ring with unit element and M is an ideal of R, then M is a maximal ideal of R if and only if R/M is a field.

18. State and prove Gauss' lemma.

19. State and prove Gram-Schmidt orthogonalization process.

20. Let V be a vector space over a field F. Let $S, T \subseteq V$. Then prove that

    (a) $S \subseteq T \Rightarrow L(S) \subseteq L(T)$

    (b) $L(S \cup T) = L(S) + L(T)$

    (c) $L(S) = S$ iff S is a subspace of V.

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D–1168

Sub. Code
11352

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Fifth Semester

OPERATIONS RESEARCH

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define : Linear programming problem.

2. State the canonical from of L.P.P.

3. What is meant by Big-M method?

4. What is duality?

5. Define : Initial basic feasible solution.

6. What is transportation problems?

7. Define an assignment problem.

8. What is sequencing problem?

9. Define an event.

10. Define an independent float.

PART B — (5 × 5 = 25 marks)

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

11. (a) Write any five uses of O.R.

Or

(b) Solve the following L.P.P by the graphical method

Max $z = 3x_1 + 2x_2$

Subject to $-2x_1 + x_2 \leq 1;\ x_1 \leq 2;\ x_1 + x_2 \leq 3$

and $x_1, x_2 \geq 0$.

12. (a) Solve the following LPP by Simplex method

Maximize $z = 3x_1 + 2x_2$

Subject to $2x_1 + x_2 \leq 2;\ 3x_1 + 4x_2 \geq 12$ and $x_1, x_2 \geq 0$.

Or

(b) Explain two-phase method.

13. (a) Explain the procedure to solve the LPP using dual Simple *x* method.

Or

(b) Solve by North-West corner method.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400

Requirement 200 225 275 250

14. (a) Explain Hungarian method of solving an assignment problem.

Or

(b) Solve the sequencing problem.

Jobs :	1	2	3	4	5
Machine A :	3	8	5	7	4
Machine B :	4	10	6	5	8

15. (a) Solve the following 2×2 game.

$$\begin{array}{c} \\ A \end{array} \begin{array}{c} B \\ \begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix} \end{array}$$

Or

(b) Draw the network for the project whose activities and their precedence relationships are as given below.

Activities :	A	B	C	D	E	F	G	H	I
Immediate predecessor :	–	A	A	–	D	B,C,E	F	E	G,H

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Solve the following LPP using Simple method

Maximize $z = 4x_1 + 10x_2$

Subject to $2x_1 + x_2 \leq 50$; $2x_1 + 5x_2 \leq 100$; $2x_1 + 3x_2 \leq 90$; and $x_1, x_2 \geq 0$.

17. Solve the following transportation problem.

1	2	6	7
0	4	2	12
3	1	5	11
10	10	10	

Using (a) North West Corner rule (b) Least cost method (c) Vogel's approximation method.

18. Solve the following assignment problem.

		Machines				
		M_1	M_2	M_3	M_4	M_5
Jobs	J_1	9	22	58	11	19
	J_2	43	78	72	50	63
	J_3	41	28	91	37	45
	J_4	74	42	27	49	39
	J_5	36	11	57	22	25

19. Solve the game whose pay-off matrix is given by

		Player B		
		B_1	B_2	B_3
Player A	A_1	1	3	1
	A_2	0	–4	–3
	A_3	1	5	–1

20. What is the difference between PERT and CPM?

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D–1169

Sub. Code
11353

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Fifth Semester

NUMERICAL ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Write the Newton's Raphson formula.

2. Write the relation between E and Δ.

3. What is the condition to apply Jacobi's method to solve a system of equations?

4. Write the Newton's forward interpolation formula.

5. Write the Lagrange's interpolation formula.

6. What is the n^{th} divided differences of a polynomial of the n^{th} degree?

7. Write down the formula for numerical differentiation of y with respect to x once.

8. State the trapezoidal rule to evaluate $\int_{x_0}^{x_n} y(x)\,dx$.

9. Write down the formula for $\frac{dy}{dx}$ at $x = x_n$ using backward difference operator.

10. What is the n^{th} approximation in the Picards method of successive approximation for $\frac{dy}{dx} = f(x, y)$.

PART B — (5 × 5 = 25 marks)

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

11. (a) Find the real root of the equation $x^3 - x^2 - 1 = 0$ by iteration method.

Or

(b) Evaluate $\sqrt{12}$ to four decimal places by Newton – Raphson method.

12. (a) Evaluate $\Delta[x(x+1)(x+2)(x+3)]$.

Or

(b) Find the forward difference table for the following :

x	0.160	0.161	0.162
sin x	0.159318	0.160305	0.161292

13. (a) Evaluate $\Delta^n(ax^n + bx^{n-1})$.

Or

(b) Construct a table of divided difference for the following data.

x	0	2	3	5	6
$f(x)$	1	19	55	241	415

14. (a) Find the first derivative of the function tabulated below at $x = 1.5$.

x	1.5	2.0	2.5	3.0	3.5	4.0
$f(x)$	3.375	7.0	13.625	24.0	38.875	59.0

Or

(b) Evaluate $\int_0^1 e^{-x^2} dx$ by dividing the range into 4 equal parts using Trapezoidal rule.

15. (a) Given $\frac{dy}{dx} = 3x + \frac{y}{2}$ and $y(0) = 1$. Find $y(0.1)$ using Taylor's series method.

Or

(b) Solve $y_{n+2} - 4y_n = 0$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Solve the system of equations using Gauss elimination method

$$28x + 4y - z = 32$$
$$x + 3y + 10z = 24$$
$$2x + 17y + 4z = 35.$$

17. Using Gauss – Seidal iteration method solve the system of equations

$$8x - y + z = 18$$
$$2x + 5y - 2z = 3$$
$$x + y - 3z = -6.$$

18. Using Newton's forward interpolation formula, find $f(0.2)$.

x	0	1	2	3	4	5	6
$f(x)$	176	185	194	203	212	220	229

19. Solve : $y_{n+2} - 4y_n = 9n^2$.

20. By applying the forth order Runge-Kutta method find $y(0.2)$ from $\frac{dy}{dx} = y - x$.

D–1170

Sub. Code
11354

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Fifth Semester

TRANSFORM TECHNIQUES

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Laplace theorem.

2. Find $L[\cosh at]$.

3. Prove that $L[e^{t^2}]$ does not exist.

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

5. Define odd function with example.

6. Define periodic function.

7. State the Fourier integral theorem.

8. Show that $F_c[f'(x)] = -\sqrt{\frac{2}{\pi}} f(0) + sF_s(s)$.

9. Define Z-transform.

10. Find the inverse Z-transform of $X(z) = \frac{z}{z^2+5z+6}$.

PART B — (5 × 5 = 25 marks)

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

11. (a) Find $L[t^{5/2}]$.

Or

(b) Find $L\left[\frac{e^{-at}-e^{-bt}}{t}\right]$.

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

Or

(b) Solve $\frac{d^2y}{dx^2}-\frac{2dy}{dx}+2y=0$ gives that $y=\frac{dy}{dx}=1$ at $x=0$.

13. (a) Find the Fourier constant b_n for the function $f(x)=x\cos x$ in $0\le x\le 2\pi$.

Or

(b) Find the half range cosine series for $f(x)=(x-1)^2$ in $0<x<1$.

14. (a) If $F[f(x)]=F(s)$, then prove that $F[f(x)\cos ax]=\frac{1}{2}[F(s-a)+F(s+a)]$.

Or

(b) Find the Fourier cosine transform of $f(x)=e^{-2x}+2e^{-x}$.

15. (a) Find the Z-transform of n.

Or

(b) Find the inverse Z-transform of $\frac{Z}{z^2 - 5z + 6}$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find the Laplace transform of the periodic function $f(t) = e^t$ in $0 < t < 2\pi$ with period 2π.

17. Find the Fourier series for the function $f(x) = x^2$ in $-\pi < x < \pi$.

18. Find the half-range cosine series for $f(x) = x \sin x$ in $(0, \pi)$.

19. Find the Fourier transform of $e^{-|x|}$, using Parseval's identify $\int_0^\infty \frac{dx}{(x^2+1)^2} = \frac{\pi}{4}$.

20. Solve $y_{n+2} - 3y_{n+1} - 10y_n = 0, y_0 = 1$ and $y_1 = 0$.

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D–1171	Sub. Code
	11361

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

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 if-statement.

2. Define tautology.

3. What is inconsistent?

4. Define bound variable.

5. Define linear order.

6. Find the Hamming distance between $x = 1011$ and $y = 0101$.

7. Find the incidence matrix of the graph.

8. Define complete graph.

9. Define center of a tree.

10. What is a basic cutset in tree.

PART B — (5 × 5 = 25 marks)

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

11. (a) Construct the truth table for the formula $(P \wedge Q) \vee (\neg P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$.

Or

(b) Show that $Q \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$ is a tautology.

12. (a) Show that $R \vee S$ is valid conclusion from the premises $C \vee D, C \vee D \rightarrow \neg H, \neg H \rightarrow (\neg A \wedge \neg B)$ and $(A \wedge \neg B) \rightarrow (R \vee S)$.

Or

(b) Verify the validity of the following argument. Every living thing is a plant or an animal. John's gold fish is alive and it is not a plant. All animals have hearts. Therefore John's gold fish has a heart.

13. (a) Show that every chain is a lattice.

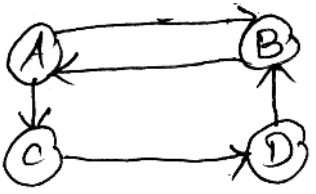
Or

(b) Let $e : B^m \rightarrow B^n$ be a group code. Show that the minimum distance of e is the minimum weight of a non-zero code word.

14. (a) Let G be a simple graph with vertices. Show that if $S(G) \geq \left\lceil \frac{n}{2} \right\rceil$, then G is connected.

Or

(b) Consider the following digraph. Use its adjacency matrix to find how many paths of length 3 exists from A to B.



15. (a) Prove that every cut-set in a connected graph G must contain atleast one edge of every spanning tree of G.

Or

(b) Show that a connected graph with n vertices and $n-1$ edges is a tree.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Obtain the principal disjunctive normal form of $P \to ((P \to Q) \wedge \neg(\neg Q \vee \neg P))$.

17. Show that
$\{(P \to q) \wedge (r \to s), (q \to t) \wedge (s \to u), \neg(t \wedge u), p \to r\} \Rightarrow \neg P.$

18. Prove that a lattice L is modular if and only if none of its sublattices is isomorphic to the pentagon lattice N_5.

19. Show that a simple graph with n vertices and k components can have at most $(n-k)(n-k+1)/2$ edges.

20. For a graph G, $K(G) \leq K'(G) \leq \delta(G)$.

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D–1172

Sub. Code
11362

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Sixth Semester

FUZZY ALGEBRA

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define membership function.

2. Write down absorption of complement property of crisp set operations.

3. Prove that for all $a,b \in [0,1]$, $u(a,b) \le u_{\max}(a,b)$.

4. Define fuzzy complement with an example.

5. What is meant by fuzzy partial ordering?

6. Define max-min composition.

7. Write down the Dempster's rule for combination.

8. Define Sugeno measure.

9. What is meant by measure of confusion?

10. State Gibb's inequality.

PART B — (5 × 5 = 25 marks)

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

11. (a) Find the union and intersection of fuzzy sets of the following data :

x :	5	10	20	30	40	50	60	70	80
$\mu_A(x)$:	0	0	0.1	0.2	0.4	0.6	0.8	1	1
$\mu_B(x)$:	0	0	0.8	1	1	1	1	1	1

Or

(b) Show that if a complement C has an equilibrium e_c, then $d_{e_c} = e_c$.

12. (a) Find the equilibrium point of the sugeno class of complement.

Or

(b) Prove that $\underset{w\to\infty}{Lim} \min[1,(a^w + b^w)^{1/w}] = \max(a,b)$.

13. (a) Given a crisp equivalence relation $R(X,X)$ prove that the family of all equivalence classes of $R(X,X)$ forms of partition on X.

Or

(b) Let $M_P = \begin{bmatrix} 0.7 & 0.5 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0.4 & 0.5 \end{bmatrix}$, $M_Q = \begin{bmatrix} 0.6 & 0.8 \\ 0 & 1 \\ 0 & 0.9 \end{bmatrix}$.

Compute $M_P \circ M_Q$.

14. (a) Consider the basic assignment $m, m(\{x_1\}) = m(A_1) = 0$, $m(\{x_1, x_2\}) = m(A_2) = 0.3$, $m(\{x_1, x_2, x_3\}) = m(A_3) = 0.4, m(\{x_1, x_2, x_3, x_4\}) = m(A_4) = m(A_5) = 0, m(A_6) = m(\{x_1, x_2, x_3, x_4, x_5, x_6\}) = 0.1$, $m(\{x_1, x_2, x_3, x_4, x_5, x_6, x_7\}) = m(A_7) = 0.2$. Find (i) the basic distribution (ii) the possibility distribution (iii) the possibility measure for $A = \{x_3, x_4, x_5\}$.

Or

(b) Show that every possibility measure π on $\mathcal{P}(x)$ can be uniquely determined by a possibility distribution function $r = X \to [0,1]$ in the formula $\pi(\alpha) = \max_{x \in A} r(x)$ for each $A \in \mathcal{P}(x)$.

15. (a) Prove that $H(X/Y) = H(X,Y) - H(Y)$.

Or

(b) Consider two sets A and B defined on the set of real numbers $X = [0,4]$ by the membership grade function $\mu_A(x) = \frac{1}{1+x}$ and $\mu_B(x) = \frac{1}{1+x^2}$. Find $\hat{f}_{c,1}(A)$ and $\hat{f}_{c,1}(B)$, where $w = 1$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. State and prove first characterization theorem of fuzzy complements.

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

18. Find $R_r : M_R = \begin{pmatrix} 0.4 & 0.5 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0.4 & 0 & 0 \\ 0 & 0 & 0.8 & 0 \end{pmatrix}$.

19. Write the relationship among classes of fuzzy measure.

20. Let m_x and m_y be marginal basic assignments on set X and Y, and let 'm' be a joint basic assignment on $X \times Y$ such that $m(A \times B) = m_X(A) \cdot m_Y(B)$ for all $A \in \mathcal{P}(x)$ and $B \in \mathcal{P}(y)$, then $E(m) = E(m_X) + E(m_Y)$.

D–1173

Sub. Code
11363

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Sixth Semester

COMPLEX ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Find the value of $(i^{72})^2$.

2. Find the square root of $-3+4i$.

3. Find the real and imaginary part of the function $f(z)=z$.

4. Define critical point.

5. Define Bessel equation.

6. State the regular singular point.

7. State Cauchy's theorem.

8. State Liouville's theorem.

9. State the Laurent's theorem.

10. Define the Taylor's series.

PART B — (5 × 5 = 25 marks)

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

11. (a) Show that graphically represent the polynomial $f(x) = x^3 - x$.

Or

(b) Show that the polynomial $p_1(x) = 8x^4 + 16x^3 - 10x^2 + 21x - 25$. Find the quotient and remainder of this polynomial divided by the polynomial $p_2(x) = 2x^2 + 3x - 1$.

12. (a) Show that the function $f(z) = z\bar{z}$ is analytic at the origin.

Or

(b) Explain about the radius of convergence with help of example.

13. (a) Show that the generating function for the infinite sequence $1, \alpha, \alpha^2, \alpha^3, \ldots$ where α is a fixed constant.

Or

(b) Explain Cauchy's criterion of convergence.

14. (a) Prove that $\lim_{n\to\infty} \frac{x^n}{n} = 0$, if $|x| < 1$.

Or

(b) Show that some elementary properties of complex integrals.

15. (a) If $f(z) = \frac{z+4}{(z+3)(z-1)^2}$ find Laurent's series expansions in $0 < |z-1| < 4$.

Or

(b) Show that the method of evaluation of definite integrate for unit circles.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain Milne Thomson method.

17. Derive the C.R equation in polar coordinates.

18. Solve $S(k)-7S(k-2)+6S(k-3)=0$, $S(0)=8, S(1)=6$ and $S(2)=22$.

19. (a) Show that $\frac{1}{z^2}=1+\sum_{n=1}^{\infty}(n+1)(z+1)^n$ when $|z+1|<1$.

(b) $\frac{1}{z^2}=\frac{1}{4}+\frac{1}{4}\sum_{n=1}^{\infty}(-1)^n(n+1)\left(\frac{z-2}{2}\right)^n$ when $|z-2|<2$.

20. State and prove Cauchy's Residue theorem.

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D–1174

Sub. Code
11364

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION,
DECEMBER 2025.

Sixth Semester

COMBINATORICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define the permutation with repetitions.

2. Define Fibonacci number.

3. What is an ordinary generating function?

4. Define recurrence relations.

5. Explain the symmetric functions.

6. Define the power sum symmetric functions.

7. Explain about the basic concept of multinomial.

8. Define cardinality of a finite set.

9. What do you mean by iterative procedure?

10. Define the Burnside's lemma.

PART B — (5 × 5 = 25 marks)

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

11. (a) How many numbers of four digits can be formed with the digits 1, 2, 3? Find the sum of all such numbers.

Or

(b) Suppose that f is defined recursively by $f(0) = 2,\ f(n+1) = 3f(n) + 2$. Find $f(1)$, $f(2)$, $f(3)$ and $f(4)$.

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

Or

(b) Suppose that a manufactured product has 2 defects per unit of product inspected. Use Poisson distribution and calculate the probabilities of finding a product without any defect, with 3 defects, and with 4 defects.

13. (a) Explain the concept of generating functions for partitions.

Or

(b) Show that the sequence $\{f_n\}$ is a solution of the recurrence relation $f_n = -3f_{n-1} + 4f_{n-2}$ if $f_n = 2(-4)^n + 3$.

14. (a) Analyse the monomial symmetric functions.

Or

(b) Briefly define the elementary symmetric functions.

15. (a) If 30 students of a class play football, 20 students play cricket and only 5 of the play both, then find the number of students who play either football or cricket.

Or

(b) Solve $f_k - 8f_{k-1} + 16f_{k-2} = 0$, where $f_2 = 16$ and $f_3 = 80$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Elaborate the concept of basic combinatorial numbers.

17. Solve $S(K) - S(K-1) - 6S(K-2) = -30$ where $S(0) = 20$, $S(1) = -5$.

18. Given is the following information:

(a) There are 20 machines in a certain factory (ie) $n = 20$.

(b) The probability of machine going out of order during any day is 0.02.

What is the probability that exactly 3 machines will be out of order on the same day? Calculate the required probability using both binomial and Poisson's distributions and state whether Poisson distribution is a good approximation of the Binomial distribution in this case.

19. Elaborate on the cardinality of a finite set giving an appropriate example.

20. Briefly define the Polya's theorem.

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