

D-6658

Sub. Code

11A

DISTANCE EDUCATION
COMMON FOR
B.A./B.Sc./B.B.A/B.B.A(Banking)/B.C.A./M.B.A. (5 Years
Integrated) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

First Semester

Part I - TAMIL - Paper I

(CBCS 2018 - 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. பாரத போர் முடிக்க கண்ணன் எடுத்தது யாது?
2. ஆயர்பாடியில் தாய்மடியில் மாயக்கண்ணன் தூங்கியது எவ்வாறு?
3. இருக்கிறதெல்லாம் பொதுவாய்ப் போனால் என்ன நடக்காது ?
4. 'பாதரமாதா திருப்பள்ளி எழுச்சி' பாடியவர் ?
5. நாமக்கல் கவிஞரின் இயற்பெயரைக் குறிப்பிடுக.
6. 'எதற்காக' என்ற கவிதையின் ஆசிரியர் யார் ?
7. சிலப்பதிகாரம் எத்தனைக் காதைகளால் அமைந்துள்ளது ?

8. தயரதன் மந்திர ஆலோசனை நடத்த காரணம் யாது ?
9. உமறுப்புலவர் - சிறு குறிப்பு வரைக.
10. தேம்பாவணி நூல் குறிப்புத் தருக.

பகுதி ஆ — (5 × 5 = 25 மதிப்பெண்கள்)

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) கண்ணன் புகழ் பாடும் இயற்கைப் பொருட்களைக் கண்ணதாசன் எங்ஙனம் விளங்குகிறார்?
(அல்லது)
(ஆ) 'நெஞ்சில் குடியிருக்கும்' என்ற பாடலில் காதலர்கள் உரையாடுமாற்றை விவரிக்க.
12. (அ) பாரதியார் கூறும் 'உலக வழக்கம்' குறித்த செய்திகளை எடுத்துரைக்க.
(அல்லது)
(ஆ) பிறைநிலவுப் பற்றி கவிஞர் பெ.தூரன் கவிப்பாடுமாற்றை எழுதுக.
13. (அ) பாரதத்தின் பெருமையும் நோயின் வலிமையும் என நாமக்கல் கவிஞர் எவற்றைக் கூறுகிறார்?
(அல்லது)
(ஆ) மீராவின் பவிதைகள் தரும் கருத்துக்களை எழுதுக.
14. (அ) வாயில் காவலர்க்குத் தன்வரவினைக் கண்ணகி எங்ஙனம் உரைத்தாள்?
(அல்லது)
(ஆ) தசரதன் இராமனுக்கு உரைத்த அறிவுரைகளை எடுத்தெழுதுக.

15. (அ) ஆயர்கள் கன்னித்தாயை வணங்கி வரவேற்ற நிகழ்வை விளக்கி எழுதுக.

(அல்லது)

(ஆ) நபிகள் ஈத்தங்குலை வரவழைத்தமைக்கான காரணத்தை எழுதுக.

பகுதி இ — (3 × 10 = 30 மதிப்பெண்கள்)

பின்வரும் வினாக்களுக்கு மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. பாரத மாதாவின் திருப்பள்ளி எழுச்சிச் சிறப்பை விவரிக்க.

17. பாரதிதாசன் உலகிற்குக் காட்டும் வழியை நும் பாடப்பகுதியால் எடுத்துரைக்க.

18. சிற்பி, 'சர்ப்ப யாகம்' கவிதை வழி உரைக்கும் செய்திகளை விரிந்துரைக்க.

19. கண்ணகி வழக்குரைத்த பாங்கை இளங்கோவடிகள் பாடுமாற்றை எழுதுக.

20. தேம்பாவணி காட்சிப் படலச் செய்திகளைத் தொகுத்துரைக்க

D-6659

Sub. Code

11B

DISTANCE EDUCATION

**Common for B.A./B.Sc./B.B.A./B.B.A.(Banking)/B.C.A./M.B.A.
(5 Years Integrated) DEGREE EXAMINATION.**

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

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. State the importance of Communication.**
- 2. What are Principles of Effective Communication?**
- 3. Define Oral Communication.**
- 4. Write the Functions of intonation**
- 5. What are the advantages and uses of Words and Phrases?**
- 6. Bring out the types of Non-Verbal Communications.**
- 7. Explain the Report Writing.**

8. Briefly explain Layout.
9. Define Logical Presentation.
10. Mention any two steps that involved in Written Communication.

PART B — (5 × 5 = 25 marks)

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

11. (a) Write a short note on Effective communication.

Or

- (b) What are types of communication?

12. (a) Explain the forms of Oral Communication and its Importance.

Or

- (b) Write about the Preparation of speech.

13. (a) State the characteristics of an effective sentence.

Or

- (b) Define Final Draft.

14. (a) Write about body language and postures in Non-Verbal Communication.

Or

- (b) What are the types of Report Writing?

15. (a) Define Logical Presentation.

Or

- (b) Write the steps involved in the application for Employment and curriculum vitae.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write an essay on Communication and its importance.
 17. Define Intonation and how its function important in Oral Communication.
 18. What is mean by Written Communication and write the advantage of words and phrases
 19. Distinguish between the paragraph writing and Essay Writing.
 20. Explain Group discussion in Official Communication.
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Sub. Code

12

DISTANCE EDUCATION

COMMON For B.A/B.Sc/ BBA/ BBA (Banking)/B.C.A/M.B.A
(5 Years Integrated) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

First Semester

Part II- ENGLISH PAPER –I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Why water is called as the Elixir of life?
2. What is the irony in Mrs. Packletide's Tiger?
3. How did Carl Sagan change the world?
4. What are the effects of sensual drugs?
5. Define Gerund.
6. What is the difference between modals & Semi modals?
7. What are the two basic rules for Direct and Indirect speech?

8. Define tenses and its types.
9. What is descriptive paragraph?
10. Define Dialogue Writing.

PART B — (5 × 5 = 25 marks)

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

11. (a) What makes water one of the most powerful and wonderful thing on the earth?

Or

- (b) In what way did the villagers help Mrs. Packletide shoot the tiger?

12. (a) What is the authors view is essential to Indian civilization?

Or

- (b) What are the impacts of Drug Abuse.

13. (a) Define Articles and its types with examples.

Or

- (b) Write a short notes on modals.

14. (a) Briefly explain Preposition with suitable examples.

Or

- (b) What are rules for Direct and Indirect speech?

15. (a) Bring out the format of Formal Letter Writing.

Or

- (b) List out the features of Paragraph writing.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Illustrate the concept of “The Cat” by Catharine M. Willson.
17. “The Hazards of Drug Abuse” in Dangers of Drug Abuse.
18. Analyse the idea of “Our Civilization” by C.E. Foad.
19. Define transformation of sentences Write its types with example
20. Develop the following hints into a readable passage and give a suitable title.

A rich farmer - lot of land - cattle and servants - two sons - happy life - After some years younger son unhappy - asked for his share of the property - wouldn't listen to father's advice - got his share - sold them all - went away to another country-fell into bad ways - soon all money gone - poor - no one to help him - understood his mistake.

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Sub. Code

11313

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

First Semester

Mathematics

CLASSICAL ALGEBRA

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write the expansion of $(1 + x)^{-1}$
2. State Fundamental Theorem of Algebra.
3. Write a note on Horner's method.
4. If α, β, γ are the roots of $x^3 + qx + r = 0$, find $(\beta + \gamma)(\gamma + \alpha)(\alpha + \beta)$.
5. Define a diagonal matrix.

6. Find the transpose of $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$.
7. Find the determinant of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 0 & 2 & 2 \end{bmatrix}$,
8. State the working rule to test the consistency of given system of equations.
9. Define : Eigen value.
10. State Cayley-Hamilton theorem.

PART B — (5 × 5 = 25 marks)

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

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

Or

- (b) Diminish the roots of the equation $x^4 - 4x^3 - 7x^2 + 22x + 24 = 0$ by 1.
12. (a) Show that the equation $x^6 + 3x^2 - 5x + 1 = 0$ has two real roots and four imaginary roots.

Or

- (b) Find the positive root of $x^3 - 2x - 5 = 0$.
13. (a) If $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 \\ 2 & -1 \end{bmatrix}$, find $A + 5B$.

Or

- (b) Mention the types of Matrices.

14. (a) Find the inverse of $\begin{bmatrix} 1 & 2 & 4 \\ 2 & 1 & 2 \\ 4 & 2 & 1 \end{bmatrix}$

Or

(b) Find the Eigen vectors for $\begin{bmatrix} 1 & 3 \\ 4 & 2 \end{bmatrix}$

15. (a) Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$.

Or

(b) Show that $x - y + 2z = 5$, $3x + y + z = 8$ and $2x - 2y + 3z = 7$ are consistent.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Sum to ∞ the series

$$1 - \frac{1}{4} + \frac{1}{4} \cdot \frac{3}{8} = \frac{1}{4} \cdot \frac{3}{8} \cdot \frac{5}{12} + \dots$$

17. Solve the equation $x^4 - 6x^3 + 11x^2 - 10x + 2 = 0$ given that $2 + \sqrt{3}$ is a root.

18. Find positive root of $2x^3 - 3x - 6 = 0$.

19. Show that the equations $2x + 6y = -11$, $6x + 20y - 6z = -3$
 $6y - 18z = -1$ are not consistent.

20. Find all the Eigen values and Eigen vectors of

$$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}.$$

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11314

DISTANCE EDUCATION
B.Sc. DEGREE EXAMINATION.
MAY 2021 EXAMINATION
&
MAY 2020 ARREAR EXAMINATION
First Semester
Mathematics
CALCULUS

(CBCS 2018 – 2019 Academic year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. If $y = ae^{mx} + Be^{-mx}$, prove that $y_2 = m^2 y$.
2. Find the centre of curvature of the curve $y = x^2$ at the origin.
3. Evaluate $\int \frac{1}{x \log x} dx$.
4. Evaluate $\int_0^{\pi/2} x \sin x dx$.
5. Find the integrating factor of the differential equation $\frac{dy}{dx} = y \cot x = 2x \sin x$.
6. Solve $(D^2 + D + 1)y = 0$.

7. Evaluate $\int_0^{\pi/2} \sin^5 x \cos^3 x dx$.

8. Prove that $L(\cos ax) = \frac{s}{s^2 + a^2}$.

9. Form the partial differential equation by eliminating the arbitrary constants from $z = (x + a)(y + b)$.

10. Solve $p + q = 1$.

SECTION B — (5 × 5 = 25 marks)

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

11. (a) If $y = \sin^{-1} x$, Prove that $(1 - x^2)y_2 - xy_1 = 0$.

Or

(b) Find the equation of the normal to the curve $x = a(\theta - \sin \theta)$, $y = a(1 - \cos \theta)$ at $\theta = \pi/2$.

12. (a) Find the envelope of the family of lines $y = mx + \frac{a}{m}$, where a is a constant.

Or

(b) Prove that $\int_0^{\pi/2} \log \tan x dx = 0$.

13. (a) Show that $\int_0^{\pi/2} \frac{\cos \theta}{1 + \sin \theta} d\theta = \log 2$.

Or

(b) Solve $(1 + y^2)dx + (x - \tan^{-1} y)dy = 0$.

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

Or

(b) Form the differential equation of family of circles with radius r and with centres on the y axis (r is arbitrary).

15. (a) Find $L\left(\frac{1 - \cos x}{x}\right)$.

Or

(b) Eliminate the arbitrary function from $z = f(y/x)$ and form a partial differential equation.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find the maximum and minimum of $f(x, y) = 2(x^2 - y^2) - x^4 + y^4$.

17. Evaluate $\int e^{ax} \sin bx \, dx$.

18. Solve $(D^2 - 1)y = xe^{3x}$.

19. Using laplace transformation solve the following differential equation $y'' + 4y' + 13y = 2e^{-x}$ given $y(0) = 0$ and $y'(0) = -1$.

20. Find the complete integral of $px + qy = pq$ using charpits method.

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Sub. Code

21A

DISTANCE EDUCATION

**COMMON FOR B.A./B.Sc./B.B.A./B.B.A. (Banking)/B.C.A./
M.B.A. (5 Years Integrated) DEGREE EXAMINATION.**

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Second Semester

Part I – TAMIL PAPER – II

(CBCS 2018 – 19 Academic year onwards)

Time : Three hours

Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. வீரமாமுனிவரின் பிற நூல்கள் யாவை?
2. வீரமாமுனிவர் சூசையப்பரை எவ்வாறு அழைக்கிறார்?
3. உழிஞைப் போர் என்றால் என்ன?
4. தாய் கதையின் மையக்கரு எது?
5. முதலெழுத்துக்கள் யாவை?
6. வினைச்சொல் என்றால் என்ன?
7. தமிழுக்குத் தொண்டு செய்த கிறித்துவ தமிழறிஞர்கள் சிலரைக் குறிப்பிடுக.
8. புதினம் என்றால் என்ன?
9. ந. பிச்சமூர்த்தி குறிப்பு வரைக.
10. பெரிய புராணம் எதனை விளக்குகிறது?

பகுதி ஆ — (5 × 5 = 25 மதிப்பெண்கள்)

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) இறைவன் பொறை, மீடி, தாழ்வு கொண்டதன் காரணங்கள் யாவை?

(அல்லது)

(ஆ) நற்பலன் தருபவன் இறைவன் எனும் கூற்றினை வீரமாமுனிவர் வழி நின்று விவரி.

12. (அ) வானவீதியின் - சிறுகதையில் காணலாம் சமுதாயச் செய்திகளைத் தருக.

(அல்லது)

(ஆ) இகல் மதில் குடிமி கொண்ட மண்ணு மங்கலம் பற்றி நீவிர் அறிவது யாது?

13. (அ) அல்வழிப்புணர்ச்சியை சான்றுடன் விளக்குக.

(அல்லது)

(ஆ) மொழி இறுதியெழுத்து பற்றி நீவிர் அறிவது யாது?

14. (அ) இதழ்கள் தமிழுக்கு ஆற்றிவரும் செய்திகள் எவை? விளக்குக.

(அல்லது)

(ஆ) பெரிய புராணத்தில் தரப்படும் செய்திகள் எவை? விளக்குக.

15. (அ) இருபதாம் நூற்றாண்டில் உரைநடை வளர்ச்சிக்குப் பங்களிப்பு செய்த எவரேனும் இருவர் குறித்த செய்திகளைத் தருக.

(அல்லது)

(ஆ) சமண சமயத்தவர்கள் தமிழுக்கு ஆற்றிய தொண்டுதனை சுருக்கித் தருக.

பகுதி இ — (3 × 10 = 30 மதிப்பெண்கள்)

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. நும் பாடப் பகுதியில் அமைந்துள்ள தேம்பாவணி காட்சிப்படலத்தில் வீரமாமுனிவர் காட்டும் இறை பக்தியை விளக்குக.
17. கம்பன் புறத்திணையில் காணப்படும் தும்பைப் போர் குறித்து கட்டுரை வரைக.
18. ஆகுபெயரின் இலக்கணம் கூறி அதன் வகைகளைச் சான்றுகளுடன் விளக்குக.
19. வைணவர்கள் தமிழுக்கு ஆற்றிய தொண்டு குறித்து கட்டுரை வரைக.
20. இக்கால இலக்கியங்களில் புதுக்கவிதையின் தோற்றம் வளர்ச்சி குறித்து கட்டுரை வரைக.

D-6662

Sub. Code

21B

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.B.A./B.B.A.
(Banking)/B.C.A./M.B.A. (5 YRS INTEGRATED) DEGREE
EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Second Semester

Part I — COMMUNICATION SKILLS – II

(CBCS 2018-19 Academic Year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What are the codes of communication?
2. Explain the process of responding a communication.
3. Bring out the ways to improve one's fluency in spoken English.
4. Define labio-dental sounds with examples.
5. Explain the back vowels.
6. What is the significance of listening?
7. What is meant by emotional mode on conversation?
8. What is a reference in a resume?

9. Give details of goodwill letters.
10. Bring out the importance of technical writing.

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Discuss the process of encoding and decoding a language in communication.

Or

- (b) Write a note on the various responses of communication.

12. (a) Write a note on the articulation of the consonants of English.

Or

- (b) Define and explain triphthongs.

13. (a) Give a brief account of presentation skills.

Or

- (b) What is the significance of telephonic interview?

14. (a) What are the guidelines to be followed while attending an interview?

Or

- (b) Write a paragraph on the topic “Health is Wealth”.

15. (a) Discuss the guidelines to publish an article in a newspaper.

Or

- (b) Enumerate the role played by an editor in a journal.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE of the following questions.

16. 'Communication skills allow you to understand and be understood by the others' – Discuss.
 17. Discuss the salient features of speaking English effectively.
 18. Write an essay on the types of purposes of writing.
 19. You are annoyed by the milk supply of the State Dairy Corporation. Write to the Chairman.
 20. Take a book you know well and write an alternate ending that is the exact opposite of the real ending.
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D- 6663

Sub. Code

22

DISTANCE EDUCATION

COMMON FOR BA/B.SC/BBA/BBA(BANKING)/BCA/MBA
FIVE YEAR INTEGRATED DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Second Semester

PART II – ENGLISH PAPER – II

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Why did Wordsworth compose the poem “Lines” composed upon Westminster Bridge?
2. Describe the urn in the poem “Grecian Urn”.
3. What are the symbolic elements in “The Road Not Taken”?
4. Describe the war elements in “Strange Meeting”.
5. Why is “Gitanjali” considered as a song offering?
6. What is the relation between Antonio and Shylock in “The Merchant of Venice”?

7. Explain two types of essays.
8. What is the purpose of writing a report?
9. When do you write a Newsletter?
10. Write two significant Characteristics of interview skills.

PART B — (5 × 5 = 25 marks)

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

11. (a) Consider Shakespeare as a sonneteer.

Or

(b) Discuss the character of Lucrezia in “Andrea Del Sarto”.
12. (a) Consider Wilfred Owen as a war poet in “Strange Meeting”.

Or

(b) Discuss the theme of “Gitanjali”.
13. (a) Critically analyse Sarojini Naidu’s “The Coromandel Fishers”.

Or

(b) Enumerate the background of the poem “The Express”.
14. (a) Discuss the “Pound of Flesh” scene in “The Merchant of Venice”.

Or

(b) Discuss the character of Bassanio in “The Merchant of Venice”.

15. (a) Write a report on the recently celebrated college day function.

Or

- (b) Write a letter to the principal complaining about the lack of library facilities.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Critically appreciate “Grecian Urn” by John Keats.
17. Consider “The Road Not Taken” as an allegory.
18. Justify the title “The Coromandel Fishers” by Sarojini Naidu.
19. Consider “The Merchant of Venice” as a Romantic comedy.
20. Attempt a creative writing on the topic: “If you could be any famous person for a day, who would you want to be? Why?”
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D-6693

Sub. Code

11323

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Second Semester

ANALYTICAL GEOMETRY AND VECTOR CALCULUS

(CBCS 2018–19 Academic Year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define radical axis.
2. Find the equation of the circle whose centre is origin and radius 5.
3. Find the direction cosines of the straight line joining the points (1,2,-4) and (2,1,-3).
4. Write the condition for two straight lines to be parallel.
5. Write the general equation of a right circular cone.
6. Write the equation of a right circular cylinder whose axis is $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$.
7. Define skew lines.

8. Find the centre and radius of the sphere.

$$x^2 + y^2 + z^2 - 12x + 2y - 4z + 16 = 0.$$

9. Define irrotational vector.

10. Find gradient of $\phi = x^3 + yz^2 + zx$.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions. Choosing either (a) or (b).

11. (a) Find the angle between the two lines $2x - 3y = 10$ and $x + y = 5$.

Or

- (b) Find the limiting points of the system of circles coaxal with $x^2 + y^2 - 6x - 6y + 4 = 0$; $x^2 + y^2 - 2x - 4y + 3 = 0$.

12. (a) Find the equation of the plane through the intersection of the planes $3x - y + 2z - 4 = 0$ and $x + y + z - 2 = 0$ and passing through the point (2, 2, 1).

Or

- (b) Find the distance between the parallel planes $2x - 2y + z + 3 = 0$ and $4x - 4y + 2z + 5 = 0$.

13. (a) Find the equation of the cone whose vertex is (α, β, γ) and the base is $ax^2 + by^2 = 1; z = 0$.

Or

- (b) Find the equation of the right circular cylinder, whose axis is $\frac{x}{2} = \frac{y}{3} = \frac{z}{6}$ and radius 4.

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

15. (a) Prove that $\nabla f(r) = \frac{f'(r)}{r} \vec{r}$.

Or

- (b) Find $\text{curl curl } f$ at the point $(1, 1, 1)$ if $f = x^2yi + xzj + 2yzk$.

SECTION C — $(3 \times 10 = 30 \text{ marks})$

Answer any THREE questions

16. Find the equation of the circles which pass through the points of intersection of $x^2 + y^2 - 2x + 1 = 0$, $x^2 + y^2 - 5x - 6y + 4 = 0$ and which touch the line $2x - y + 3 = 0$.
17. Find the image of the point $(1, 3, 4)$ under the reflection in the plane $2x - y + z + 3 = 0$.
18. Find the equation of the cylinder whose generator are parallel to the line $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}$ and whose guiding curve is the ellipse $x^2 + 2y^2 = 1$; $z = 0$.

19. Find the shortest distance and the equation of the line of shortest distance in symmetrical form of the lines

$$\frac{x-8}{3} = \frac{y+9}{-16} = \frac{z-10}{7} \text{ and } \frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$$

20. Evaluate $\iint_s f \cdot n \, ds$ where $f = (x + y^2)i - 2xj + 2yzk$ and s is the surface of the plane $2x + y + 2z = 6$ in the first octant.
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D-6694

Sub. Code

11324

DISTANCE EDUCATION
B.Sc. DEGREE EXAMINATION.
MAY 2021 EXAMINATION
&
MAY 2020 ARREAR EXAMINATION
Second Semester
Mathematics
SEQUENCES AND SERIES
(CBCS 2018–19 Academic Year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Write first five terms of the sequence $a_n = \frac{2-3n}{2+3n}$.
2. Prove that any convergent sequence is a bounded sequence.
3. Prove that if $(a_n) \rightarrow a$ and $k \in R$ then $Ka_n \rightarrow Ka$.
4. Show that $\lim_{n \rightarrow \infty} \left(\frac{1^2 + 2^2 + \dots + n^2}{n^3} \right) = \frac{1}{3}$.
5. Show that $\lim_{n \rightarrow \infty} (1 + 1/2 + \dots + 1/n) = 0$.
6. Show that the series $1 + 2 + 3 + \dots$ diverges to ∞ .

7. Show that the series $(1 - \frac{1}{2} + \frac{1}{3} - \dots)$ converges.
8. Prove that every bounded sequence has a convergent subsequence.
9. Define absolute convergence of the infinite series with example.
10. State Riemann's theorem.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions. Choosing either (a) or (b).

11. (a) Show that $\lim_{n \rightarrow \infty} n^{\frac{1}{n}} = 1$.

Or

- (b) Show that a sequence cannot converge to two different limits.

12. (a) Let $a_n = \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n}$ show that (a_n) converges.

Or

- (b) Show that $\lim_{n \rightarrow \infty} (1 + \frac{1}{n})^n = \lim_{n \rightarrow \infty} (1 + \frac{1}{1!} + \frac{1}{2!} + \dots + \frac{1}{n!})$.

13. (a) Prove that any Cauchy sequence is a bounded sequence.

Or

- (b) Test the convergence of the series $\sum \frac{n^2 + 1}{5^n}$.

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

Or

- (b) Prove Leibnitz's test (ie) Let $\sum (-1)^{n+1} a_n$ be an alternating series whose terms a_n satisfy the following
- (i) (a_n) is a monotonic decreasing sequence
 - (ii) $\lim_{n \rightarrow \infty} a_n = 0$ Then the given alternating series converges.

15. (a) Test the converges of the series,

$$\left(\frac{1}{2} + \frac{1}{3}\right) + \left(\frac{1}{2^2} + \frac{1}{3^2}\right) + \left[\frac{1}{2^3} + \frac{1}{3^3}\right] + \dots$$

Or

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

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions

16. Prove the Cauchy's first limit theorem i.e If $(a_n) \rightarrow l$ then $\left(\frac{a_1 + a_2 + \dots + a_n}{n}\right) \rightarrow l$.
17. Prove Kummer's test. ie Let $\sum a_n$ be a given series of positive terms and $\sum \frac{1}{d_n}$ be a series of positive terms diverging to ∞ . Then

- (a) $\sum a_n$ converges if $\lim_{n \rightarrow \infty} (d_n \frac{a_n}{a_{n+1}} - d_{n+1}) > 0$ and

- (b) $\sum a_n$ diverges if $\lim_{n \rightarrow \infty} (d_n \frac{a_n}{a_{n+1}} - d_{n+1}) < 0$.

18. Prove Dirichlet's test. (ie) $\sum a_n$ be a series whose sequence of partial sums (S_n) is bounded. Let (b_n) be a monotonic decreasing sequence converging to zero then. the series $\sum a_n b_n$ converges.

19. Test the convergence of the series

$$1 + \frac{3}{7}x + \frac{3.6}{7.10}x^2 + \frac{3.6.9}{7.10.13}x^3 + \dots$$

20. Prove Abel's theorem. (ie) If $\sum a_n$ and $\sum b_n$ converges to a and b respectively and if the Cauchy product $\sum C_n$ converges to C then $C = ab$.

D-6664

Sub. Code

31A

DISTANCE EDUCATION

**Common for B.A./B.Sc./B.C.A./M.B.A. (5 Year Integrated)
DEGREE EXAMINATION.**

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Third Semester

Tamil

Part I – TAMIL – PAPER III

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. முல்லைப்பாட்டின் ஆசிரியர் பெயரைத் தருக.
2. 'நெடுந்தொகை' என அழைக்கப்படும் எட்டுத் தொகை நூல் எது?
3. குறிஞ்சித்திணைக்கான உரிப்பொருளைக் குறிப்பிடுக.
4. பரணர் பாடியப் பாடல்களின் எண்ணிக்கையைத் தருக.
5. நற்றிணை – பெயர்க்காரணம் கூறுக.
6. பாசறை – சிறுகுறிப்பு வரைக.

7. பாடாண்திணையை வரையறு.
8. திருக்குறள் எப்பா வகையால் இயற்றப்பட்டுள்ளது?
9. நான்மணிக்கடிகையின் ஆசிரியர் யார்?
10. இராசராசனின் தமக்கையார் பெயரை எழுதுக.

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

பின்வரும் வினாக்களுக்கு ஒருபக்க அளவில் விடை தருக.

11. (அ) ஐங்குறுநூற்றைப் பற்றி விரிவாக எழுதுக.

(அல்லது)

(ஆ) குறிஞ்சித் திணையின் சிறப்புகளைத் தொகுத்துரைக்க.

12. (அ) பரணரின் புலமைத் திறத்தைப் பாராட்டியுரைக்க.

(அல்லது)

(ஆ) அகநானூற்று நூலின் அமைப்பும் பகுப்பும் குறித்து எழுதுக.

13. (அ) நற்றிணையில் சிலப்பதிகாரச் சாயல் அமைந்த பாடலை எடுத்துரைக்க.

(அல்லது)

(ஆ) கையறுநிலையைத் துறைகளுடன் விளக்குக.

14. (அ) அறிவுடையார் குறித்து வள்ளுவர் உரைக்குமாற்றை எழுதுக.

(அல்லது)

(ஆ) யார் யார் உயிர் வாழ மாட்டார்கள் என நான்மணிக்கடிகை கூறுகின்றது?

15. (அ) இராசஇராசசோழன் நாடகத்தின் சதைச்சுருக்கத்தை எழுதுக.

(அல்லது)

(ஆ) சுவடுகள் நாவலின் 'இராசாத்தி' பாத்திரப் படைப்பை மதிப்பிடுக.

பகுதி இ — (3 × 10 = 30 மதிப்பெண்கள்)

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. முல்லைநில இயல்புகளை முல்லைப்பாட்டின் வழி விரித்துரைக்க.
17. குறிஞ்சிக்குக் கபிலர் என்பார் கருத்தை நும் பாடப் பகுதியால் விளக்குக.
18. நப்பசலை பாடல்களின் கருத்துக்களைத் தொகுத்துரைக்க.
19. தலைமகன் பாசறையிலிருந்து பேசுமாற்றைச் சேந்தம்பூதனார் வழி விளக்குக.
20. 'சுவடுகள்' என்னும் நாவலின் கதைக்கருவை விளக்கி வரைக.

D-6665

Sub. Code

31B

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A./M.B.A (5 yrs Integrated)
DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Third Semester

Part I — HUMAN SKILLS DEVELOPMENT — I

(CBCS 2018-19 Academic Year onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define Interpersonal Behaviour.
2. Write about developing Skills.
3. What is mean by Etiquette?
4. What are significance of thinking ahead?
5. What is Self-acceptance?
6. What are the types of Goat Setting?
7. Write the importance of change Resistance.
8. Define Competitive Negotiation.

9. What are the canons of good human relations?
10. What is mean by stress?

PART B — (5 × 5 = 25 marks)

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

11. (a) What are the merits of good habits?

Or

- (b) Write the features of Interpersonal Behaviour?

12. (a) Write the Difference between Self-Concept and Self-Esteem.

Or

- (b) What are the Etiquettes in using mobile and telephones?

13. (a) Write the characteristic and style of leadership.

Or

- (b) Explain the importance of Goal setting.

14. (a) Write the structure and style of Negotiating skills?

Or

- (b) How to develop the positive attitudes?

15. (a) Write about the conflict Management.

Or

- (b) Explain the consequences of Anger Management.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write about Human skills and its Habits.
 17. Explain about self-concept and its Meanings.
 18. What is mean by Decision Making Skills and what are the steps involved in Decision Making?
 19. Define Attitudes and How to develop the Positive attitude?
 20. Elaborate Human Relation Skill and the Need of good human relations.
-

D-6666

Sub. Code

32

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A./MBA (5 Yrs. Integrated)
DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Third Semester

English

Part II — ENGLISH PAPER — III

(CBCS 2018-19 Academic Year onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What method does Swami use to get out of his father's challenge?
2. Who is Ratan?
3. What is the Verger's Opinion about reading?
4. How does Mr. James change his attitude?
5. Who was Eddie and how was he killed?
6. What sort of proposal is Anton Chekhov play the proposal about?
7. Write a short analysis of 'Progress' by St. John Ervine.

8. Who are Jean and Pierre in 'The Pie and the Tart'?
9. What are the travail in "The Refugee"?
10. Define Noun with examples.

PART B — (5 × 5 = 25 marks)

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

11. (a) Explain the Sense of Belonging and separation in 'Post Master'.

Or

- (b) What happened between the vicar and the Verger?

12. (a) How does Philip prove himself a mature and responsible man?

Or

- (b) How differently professor Henry Corrie and Mrs. Meldon think about war?

13. (a) Discuss the clash of tradition and modernity as presented in the boy comes here.

Or

- (b) Explain the James R. Waugh 'The Silver Idol'.

14. (a) Write the Jean's trick in 'The pie and the Tart'.

Or

- (b) Give a note on four friends experience in Reunion.

15. (a) Explain Parts of Speech.

Or

(b) How do you write an agenda for a meeting?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. What is the central idea of the story The Diamond Necklace?
17. Why marriage proposal important to all the characters in “The Proposal” by Aton Chekhov.
18. Sketch the character of Gaultier from ‘The Pie and the Tart’.
19. Explain the political, Economical issues in Asif Currimbhoy’s ‘The Refugee’.
20. Differentiate verb and adverb with suitable examples.

D-6695

Sub. Code

11333

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

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. Verify whether $(x^2 - y)dx + (y^2 - x)dy = 0$ is exact.
2. Solve $p^2 - 9p + 18 = 0$.
3. Solve $(D^2 + 4)y = 0$.
4. Solve $\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{xy}$.
5. Verify the condition of integrability of $3x^2dx + 3y^2dy - (x^3 + y^3 + e^{2z})dz = 0$.
6. Form the partial differential equation by eliminating the arbitrary constants a, b, c from $z = ax + by + ab$.
7. Solve $x^2p + y^2q = z^2$.

8. Solve $pe^y = qe^x$.
9. Define Brachistochrone problem.
10. Define orthogonal trajectories.

PART B — (5 × 5 = 25 marks)

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

11. (a) Solve $ydx - xdy + 3x^2y^2e^{x^3} dx = 0$.

Or

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

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

Or

(b) Given that $y = x$ is a particular solution of the differential equation

$x^2y'' - 2x(1+x)y' + 2(1+x)y = x^3$. Find its general solution.

13. (a) Solve

$$yz^2(x^2 - yz)dx + zx^2(y^2 - xz) + xy^2(z^2 - xy)dz = 0.$$

Or

(b) Solve $x^2y'' + 4xy' + 2y = e^x$.

14. (a) Form a partial differential equation by eliminating the arbitrary function ϕ from

$$\phi(x + y + z, x^2 + y^2 - z^2) = 0.$$

Or

- (b) Solve $(y^2 + z^2)p - xyq + xz = 0$.

15. (a) Solve $p + q + pq = 0$.

Or

- (b) Solve $4(1 + 2^3) = 9z^4 pq$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Solve : $(x^3 - 3xy^2)dx - (y^3 - 3x^2y)dy = 0$.

17. Solve : $(2x + 1)^2 y'' - 2(2x + 1)y' - 12y = 6x$.

18. Using method of variation of parameters, solve

$$\frac{d^2y}{dx^2} + 4y = \tan 2x.$$

19. Solve by charpits method

$$pxy + pq + qy - yz = 0.$$

20. Find the orthogonal trajectories of the family of coaxal circles $x^2 + y^2 + 2gx + k = 0$, where g is the parameter and k is the constant.

D-6696

Sub. Code

11334

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Third Semester

MECHANICS

(CBCS 2018 – 2019 Academic year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State the parallelogram law of forces.
2. State the resolved parts theorem.
3. Define moment of a force.
4. Define a couple.
5. Define friction.
6. Define a common catenary.
7. Give the formula for finding the horizontal range of the projectile.
8. The velocity of either body in a direction perpendicular to the common normal is unaffected by impact-Give reasons.

9. Define a simple harmonic motion.
10. What is meant by the equiangular spiral?

SECTION B — ($5 \times 5 = 25$ marks)

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

11. (a) The resultant of two forces P and Q is at right angles to P . Show that the angle between the forces is $\cos^{-1}[-P/Q]$.

Or

- (b) State and prove the Lami's theorem.

12. (a) Prove : If three coplanar forces acting on a rigid body keep it in equilibrium, they must be either be concurrent or be all parallel.

Or

- (b) Find the equilibrium of a body on a rough inclined plane under a force parallel to the plane.

13. (a) A uniform chain of length l is suspended from two points A, B in the same horizontal line. If the tension at A is twice that at the lowest point, show that the span AB is $\frac{l}{\sqrt{3}} \log(2 + \sqrt{3})$.

Or

- (b) A particle is thrown over a triangle from one end of a horizontal base and grazing the vertex falls on the other end of the base. If A, B are the base angles, and α the angle of projection, show that $\tan \alpha = \tan A + \tan B$.

14. (a) A jet of water leaves a nozzle of 3 cm diameter at a speed of 2 m/sec. and impinges normally on a plane inelastic wall so that the velocity of the water is destroyed on reaching the wall. Calculate in gm. weight the thrust on the wall.

Or

- (b) Discuss the oblique impact of two smooth spheres.
15. (a) A particle is moving with S.H.M. and while making an oscillation from one extreme position to the other, its distances from the centre of oscillation at three consecutive seconds are x_1, x_2, x_3 . Prove that the period of oscillation is $2\pi / \cos^{-1} \left(\frac{x_1 + x_3}{2x_2} \right)$.

Or

- (b) With the usual notations, Prove that

(i) $\frac{1}{p^2} = u^2 + \left(\frac{du}{d\theta} \right)^2$

(ii) $\frac{h^2}{p^3} \cdot \frac{dp}{dr} = P$.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. ABCDEF is a regular hexagon and at A, act forces represented by \overrightarrow{AB} , $2\overrightarrow{AC}$, $3\overrightarrow{AD}$, $4\overrightarrow{AE}$ and $5\overrightarrow{AF}$. Show that the magnitude of the resultant is $AB \cdot \sqrt{351}$ and that it makes an angle $\tan^{-1} \left(\frac{7}{\sqrt{3}} \right)$ with AB.
17. A beam of weight W hinged at one end is supported at the other end by a string so that the beam and the string are in a vertical plane and make the same angle θ with the horizon. Show that the reaction at the hinge is $\frac{w}{4} \sqrt{8 + \operatorname{cosec}^2 \theta}$.

18. Show that the path of a projectile is a parabola.
19. A smooth circular table is surrounded by a smooth rim whose interior surface is vertical. Show that a ball projected along the table from a point A on the rim in a direction making an angle α with the radius through A will return to the point of projection after two impacts if $\tan \alpha = \frac{e^{(3/2)}}{\sqrt{1+e+e^2}}$. Also prove that, when the ball returns to the point of projection, its velocity is to its original velocity as $e^{(3/2)}:1$.
20. Find the law of force towards the pole under which the curve $r^n = a^n \cos n\theta$ can be described.
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D-7172

Sub. Code

41A

DISTANCE EDUCATION

Common for B.A/B.Sc/B.C.A DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Fourth Semester

PART I TAMIL PAPER IV

(CBCS 2018-19 Academic year onwards)

Time : Three hours

Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. அந்தாதித் தொடை - குறிப்பு வரைக.
2. அகவற்பா எனப்படும் பா யாது?
3. கீர்த்தனை எத்தனைப் பகதிகளைக் கொண்டது?
4. பெருத்திணை என்றால் என்ன?
5. கையறுநிலை - கொருள் விளக்கம் தருக.
6. பிறிது மொழிதல் அணியை விளக்குக.
7. 'புலவலாற்றப்படை' எனக் குறிப்பிடப்படும் ஆற்றுப்படை நூல் யாது?

8. இரட்டைக் காப்பியங்கள் எவை?
9. இயேசு காவியம் - ஆசிரியர் குறிப்பு வரைக.
10. 'பாஞ்சாலி சபதம்' காப்பியத்தின் முதன்மைப் பாத்திரம் யார்?

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) அசை என்றால் என்ன? அதன் வகைகளை விளக்கி வரைக.

(அல்லது)

(ஆ) வெண்பாவின் இலக்கணத்தைச் சான்று காட்டி விளக்குக.

12. (அ) அன்பின் ஐந்திணைகளுக்கான விளக்கங்களை எழுதுக.

(அல்லது)

(ஆ) 'செவியறிவுறாஉ' என்பதை விளக்கிச் சான்று காட்டுக.

13. (அ) உவமை அணி இலக்கணத்தை வகைகளுடன் விளக்குக.

(அல்லது)

(ஆ) மொழி நடையில் நிறுத்தல் குறிகளை எவ்வெவ்விடங்களில் பயன்படுத்த வேண்டும்?

14. (அ) அகநானூறு குறித்த செய்திகளைத் தொகுத்துரைக்க.

(அல்லது)

(ஆ) திருக்குறள் பெருமைகளை நும் பாடப் பகுதியால் எடுத்துரைக்க.

15. (அ) சிலப்பதிகாரத்தின் தனிச்சிறப்புகளைப் புலப்படுத்துக.

(அல்லது)

(ஆ) சிற்பியின் 'மௌன மயக்கங்கள்' கவிதைகளை மதிப்பிடுக.

பகுதி இ — (3 × 10 = 30 மதிப்பெண்கள்)

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. தொடை வகைகளைச் சான்றுகளுடன் கட்டுரைக்க.
17. காஞ்சித்திணையின் துறைகளைச் சான்றுகள் காட்டி விளக்குக.
18. செய்யுள் படைப்பில் அணி இலக்கணம் பெறுமிடத்தை எடுத்துரைக்க.
19. சங்க இலக்கியங்களின் வெவ்வித தன்மைகளை விரித்துரைக்க.
20. பாஞ்சாலி பாத்திரப் படைப்பில் பாரதியார் காட்டும் முக்கியத்துவத்தைக் கட்டுரைக்க.

D-7173

Sub. Code

41B

DISTANCE EDUCATION
COMMON FOR B.A./B.Sc./B.C.A. DEGREE EXAMINATION
MAY 2021 EXAMINATION
&
MAY 2020 ARREAR EXAMINATION
Fourth Semester

PART – I HUMAN SKILLS DEVELOPMENT - II

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What are the roles of counsellor?
2. What is mean by communication?
3. Explain Organization skills.
4. What are the causes of Multi tasking skills?
5. Define leader.
6. What are the technical skills?
7. Explain the human system understanding skills.
8. Write about the organization and their major interaction.

9. How do you plan your Presentation?
10. What are the importances of problem solving skills?

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Define counselling and state the techniques of counselling.

Or

- (b) Give description about attention.

12. (a) Explain the conceptual skills.

Or

- (b) Write about the organization skills and its importance.

13. (a) What are the qualities of a good leader?

Or

- (b) Write the preparing and planning for presentation skills.

14. (a) Define society and their major interaction.

Or

- (b) What are the major interactions in human system with organisation?

15. (a) Define problem solving skills.

Or

- (b) What is mean by cooperative learning skills?

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write the importance and techniques of counselling.
 17. Define technical skills. What are the tools and procedure of technical skills?
 18. Explain the causes and responsibilities of multi-tasking skills.
 19. Elaborate the understanding skills in human system.
 20. What are the causes of making social responsibilities?
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D-7174

Sub. Code

42

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Fourth Semester

PART II ENGLISH PAPER - IV

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Who is Schatz in 'A Day's wait'?
2. Write about Efim and Elisha in "Two old Men"
3. What happens during the Ambassador's garden party in 'Pygmalion'?
4. Discuss Swami's character as youthful.
5. How Romeo is affected by Balthazar's news?
6. Who is Polixenes?
7. Who is Leontes in Shakespeare's The Winter's tale?
8. Define phrase with examples.

9. What are the Concord rules?
10. What is question tag?

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Why does the boy tell his father to leave the sickroom in "A Day's wait"?

Or

- (b) Explain the central theme of 'Two old men'.
12. (a) In 'Pygmalion', how does Higgins display his passion and respect for the English language?

Or

- (b) Why does Higgins agree to educate the flower girl in Shaw's 'Pygmalion'?
13. (a) Write about the "Predators" Hallucination in 'Swami and friends'.

Or

- (b) Compare and contrast the Venice and Belmont in "The Merchant of Venice".
14. (a) Write the opening scene of the play "The Winter's Tale".

Or

- (b) Why is Nehru's speech called as Captivator of hearts?

15. (a) What is the significance of the first meeting held by Nehru?

Or

- (b) Expand the following proverb: The child is father of the man.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write a critical appreciation of Jim Corbett's 'Lalajee'.
17. How are Victorian social classes represented in Pygmalion?
18. Write about Bassano's reaction to Antonio's willingness to sign the bond.
19. Write an essay on Phrase and Clause with suitable examples.
20. What are the skills required for group discussion?
-

D-7216

Sub. Code

11343

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Fourth Semester

ANALYSIS

(CBCS 2018 – 19 Academic year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define an uncountable set.
2. Let (M, d) be a metric space. Let $x \in M$. Show that $\{x\}^c$ is open.
3. If A and B are closed subset of R . Prove that $A \times B$ is a closed subset in $R \times R$.
4. Define complete metric space.
5. Prove that composition of two continuous function is continuous.
6. State mean value theorem.
7. Define connected metric space.
8. Prove that $(0,1)$ with usual metric is not compact.

9. Let $T : M \rightarrow M$ be a contraction mapping. Prove that T is continuous on M .
10. Define uniform convergence.

SECTION B — ($5 \times 5 = 25$ marks)

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

11. (a) Let d_1 and d_2 be two metrics on M . Define $d(x, y) = d_1(x, y) + d_2(x, y)$. Prove that d is a metric on M .

Or

- (b) Prove that $(0, 1]$ is uncountable.
12. (a) Prove that in any metric space (M, d) each open ball is an open set.

Or

- (b) Let M be a metric space and $A \subseteq M$. Then prove that $\overline{A} = A \cup D(A)$.
13. (a) Prove that the function $f : (0, 1) \rightarrow \mathbb{R}$ defined by $f(x) = \frac{1}{x}$ is not uniformly continuous.

Or

- (b) Prove that any compact subset A of a metric space (M, d) is closed.
14. (a) Prove that every continuous function is Riemann integrable.

Or

- (b) For any partition p of $[a, b]$, prove that $m[f : p](b - a) \leq L[f : p] \leq U[f : p] \leq M[f : p](b - a)$.

15. (a) If A and B are connected subsets of a metric space M and $A \cap B \neq \emptyset$. Prove that $A \cup B$ is connected.

Or

- (b) State and prove intermediate value theorem.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. State and prove Holder's inequality.
17. State and prove Cantor's intersection theorem.
18. State and prove
- (a) Fundamental theorem of calculus.
- (b) Any compact subset A of a metric space M is bounded.
19. Prove that a subspace of R is connected iff it is an interval.
20. State and prove contraction mapping theorem.

D-7217

Sub. Code

11344

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Fourth Semester

STATISTICS

(CBCS 2018-19 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Show that arithmetic mean of first n natural numbers is $\frac{1}{2}(n + 1)$.
2. Calculate G.M. and H.M. for 2, 4, 6, 27.
3. What do you mean by curve fitting?
4. Prove that $-1 \leq \gamma \leq 1$.
5. Write Spearman's formula for rank correlation.
6. Prove that regression coefficients are independent of change of origin but dependent on change of scale.

7. Find whether the following data are consistent.
 $N = 600; (A) = 300; (B) = 400; (AB) = 50.$
8. Define index number.
9. What do you mean by price relatives?
10. Define time series and give an example.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Find mean median and mode for the data 6, 8, 2, 5, 9, 5, 6, 5, 2, 3.

Or

- (b) Calculate first four central moments for

$x: 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6$

$f: 5 \quad 15 \quad 17 \quad 25 \quad 19 \quad 14 \quad 5$

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

$x: 0 \quad 1 \quad 2 \quad 3 \quad 4$

$f: 1 \quad 1.8 \quad 3.3 \quad 4.5 \quad 6.3$

Or

- (b) Find correlation coefficient for the following data:

Length 3 4 6 7 10

Weight 9 11 14 15 16

13. (a) Prove that the arithmetic mean of the regression coefficient is greater than or equal to the correlation coefficient.

Or

- (b) If $x = 4y + 5$ and $y = kx + 4$ are the regression lines of x on y and y on x respectively. Show that $0 \leq k \leq \frac{1}{4}$.
14. (a) Find U_5 given that $U_1 = 4$, $U_2 = 7$, $U_4 = 13$ and $U_7 = 30$ by Lagrange's formula.

Or

- (b) Find the frequencies of the remaining positive classes for the following data:
- $$N = 1800 \quad (A) = 850 \quad (B) = 780 \quad (C) = 326$$
- $$(AB\gamma) = 200 \quad (A\beta C) = 94 \quad (\alpha BC) = 72 \quad (ABC) = 50.$$
15. (a) Check whether the attributes A and B are independent for $(A) = 30$, $(B) = 60$, $(AB) = 12$, $N = 150$.

Or

- (b) Explain the types of index numbers.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find coefficient of skewness for the following data :
- | | | | | | | | |
|------------|---|---|---|----|----|----|----|
| Size: | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Frequency: | 3 | 6 | 9 | 13 | 8 | 5 | 4 |

17. Give the equations of the two regression lines $4x - 5y + 33 = 0$ and $20x - 9y = 107$. Decide which is the equation of the regression of y on x .

18. By using Gregory-Newton's formula find U_x and estimate $U_{1.5}$ and U_9 .

U_0	U_1	U_2	U_3	U_4
1	11	21	28	29

19. Explain :

- (a) Time reversal test
- (b) Factor reversal test
- (c) Commodity reversal test.

20. Calculate index numbers by using Laspeyre's method, Paache's method, Bowley's method.

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-7218

Sub. Code

11351

DISTANCE EDUCATION
B.Sc. DEGREE EXAMINATION.
MAY 2021 EXAMINATION
&
MAY 2020 ARREAR EXAMINATION
Fifth Semester
Mathematics
MODERN ALGEBRA

(CBCS 2018-19 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define equivalence relation and give an example.
2. Prove that in an abelian group $(ab)^2 = a^2b^2$.
3. Let H and K are two subgroups of a finite group G such that $|H| > \sqrt{|G|}$ and $|K| > \sqrt{|G|}$ then prove that $H \cap K \neq \{e\}$.
4. Prove that every subgroup of an abelian group is a normal subgroup.
5. Prove that any unit in R cannot be a zero divisor.

6. Let R be a ring with Identity 1. If I is an ideal of R and $1 \in I$ then $I = R$.
7. Prove that the polynomial $f(x) = x^2 + 8x - 2$ is irreducible over \mathbb{Q} .
8. Prove that the union of two subspaces of a vector space need not be a subspace.
9. Define inner product space.
10. Let V be an innerproduct space and let S_1 and S_2 be subsets of V . If $S_1 \subseteq S_2$ then prove that $S_2^\perp \subseteq S_1^\perp$.

PART B — (5 × 5 = 25 marks)

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

11. (a) Show that $f : R \rightarrow R$ defined by $f(x) = 2x - 3$ is a bijection and find its inverse. Compute $f \circ f^{-1}$ and $f^{-1} \circ f$.

Or

- (b) Let G denote the set of all matrices of the form $\begin{pmatrix} x & x \\ x & x \end{pmatrix}$ where $x \in R^*$. Prove that G is a group under matrix multiplication.
12. (a) Let G be a group, and a be an element of order n in G . Prove that $a^m = e$ iff n divides m .

Or

- (b) Let $f : G \rightarrow G'$ be a Homomorphism. Prove that f is 1-1 iff $\ker f = \{e\}$.

13. (a) Prove that Z_n is a field iff n is prime.

Or

(b) Define integral domain and prove that the characteristic of an integral domain D is either 0 or a prime number.

14. (a) Find the g.c.d. of $16 + 7i$ and $10 - 5i$ in the ring R of Gaussian integers.

Or

(b) Let V be a vector space over a field F . Let $S, T \subseteq V$. then prove the following.

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

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

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

15. (a) Let V and W be vector spaces over a field F . Let $T : V \rightarrow W$ be an isomorphism. Prove that T maps a basis of V on to a basis of W .

Or

(b) State and prove Schwartz's inequality.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. State and prove Cayles theorem.

17. Let A and B are two subgroups of a group G . Prove that AB is a subgroup of G iff $AB = BA$.

18. Let R be a commutative ring with identity. Let P be an ideal of R . Prove that P is a prime ideal iff R/P is an integral domain.

19. State and prove division algorithm.
20. Let V be a finite dimensional vector space over a field F . Let A and B are subspaces of V . Prove that $\dim(A + B) = \dim A + \dim B - \dim(A \cap B)$.
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D-7219

Sub. Code

11352

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Fifth Semester

OPERATIONS RESEARCH

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define optimum solution for L.P.P.
2. What do you mean by slack variables?
3. State complementary slackness theorem.
4. Define integer programming problem.
5. Give an example for a balanced transportation problem.
6. State any two difference between transportation and assignment problem.
7. When will you say that the assignment problem is unbalanced?

8. Find the saddle point of

$$\begin{matrix} & & & A \\ & & & \\ B & \begin{pmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{pmatrix} \end{matrix}$$

9. Define Total Float of an activity.
10. What is the difference between Total Float and Free Float?

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Explain briefly about Graphical method.

Or

- (b) Write the dual of the following LPP

$$\text{Maximize } Z = x_1 + 2x_2 + x_3$$

$$\text{Subject to } 2x_1 + 2x_2 - x_3 \leq 2$$

$$-2x_1 + x_2 - 5x_3 \leq -6$$

$$4x_1 + x_2 + x_3 \leq 6$$

$$\text{and } x_1, x_2, x_3 \geq 0.$$

12. (a) Explain cutting plane method for Integer programming problem.

Or

- (b) Find starting solution of the following transportation problem by least cost method.

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

$$10 \quad 10 \quad 10$$

13. (a) Explain MODI method.

Or

(b) Write the mathematical formulation of an Assignment problem.

14. (a) For the set of data given below, determine the sequence that minimises the total elapsed time.

		Jobs				
		A	B	C	D	E
Machines	1	5	4	8	7	6
	2	3	9	2	4	10

Or

(b) For what value of λ the game with the following matrix is strictly determinable.

		Player B		
		B1	B2	B3
Player A	A1	λ	6	2
	A2	-1	λ	-7
	A3	-2	4	λ

15. (a) Solve graphically $\begin{bmatrix} 2 & 7 \\ 3 & 5 \\ 11 & 2 \end{bmatrix}$.

Or

(b) Determine the critical path.

Activity:	1-2	1-3	2-4	2-5	3-4	3-5
Duration:	8	4	10	2	5	3

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Solve the following L.P.P. graphically

Maximize $Z = 100x_1 + 40x_2$

Subject to $5x_1 + 22x_2 \leq 1000$;

$3x_1 + 2x_2 \leq 900$;

$x_1 + 2x_2 \leq 500$

and $x_1, x_2 \geq 0$.

17. Solve the following L.P.P.

Maximize $Z = 3x_1 + 2x_2$

Subject to $2x_1 + x_2 \leq 2$;

$3x_1 + 4x_2 \geq 12$

and $x_1, x_2 \geq 0$.

18. Solve the transportation problem.

	1	2	3	4	Supply
I	21	16	25	13	11
II	17	18	14	23	13
III	32	27	18	41	19
Demand	6	10	12	15	

19. Describe briefly about Hungarian Method.

20. Solve the following game

$$A \begin{matrix} & \text{B} \\ \begin{pmatrix} 2 & 5 \\ 4 & 1 \end{pmatrix} \end{matrix}$$

D-7220

Sub. Code

11353

DISTANCE EDUCATION

B.Sc. DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Fifth Semester

Mathematics

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 algebraic equation of degree n .
2. What do you mean by finite differences?
3. Write Cramer's rule.
4. What is Gauss Forward Formula?
5. Define the operator μ .
6. Write the first derivation of Newton's forward interpolation formula.
7. Define trapezoidal rule for numerical integration.

8. Solve $\frac{dy}{dx} = x + y^2 + 1$ given $y(0) = 0$ by Picard's method.
9. For $\frac{dy}{dx} = x + y, y(0) = 0$ find A_0, B_0 by Runge-Kutta method.
10. Define prediction error.

PART B — (5 × 5 = 25 marks)

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

11. (a) Find the positive root of $x^3 - x - 1 = 0$ by the method of false position.

Or

- (b) Solve by Gauss elimination method
$$\begin{matrix} 4x - 3y = 11 \\ 3x + 2y = 4 \end{matrix}$$
.

12. (a) State and prove fundamental theorem for finite differences.

Or

- (b) Prove that $E = e^{nD}$.

13. (a) If $y(75) = 246, y(80) = 202, y(85) = 118, y(90) = 40$ find $y(79)$.

Or

- (b) Find θ at $x = 84$

$x :$	40	50	60	70	80	90
$\theta :$	184	204	226	250	276	304

14. (a) Find $y'(x)$

$x:$	0	1	2	3	4
$y(x):$	1	1	15	40	85

Hence find $f'(x)$ at $x = 0.5$.

Or

(b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule with $n = 0.2$.

15. (a) Solve $\frac{dy}{dx} = 1 - y, y(0) = 0$ using Euler's method. Find y at $x = 0.1$ and 0.2 .

Or

(b) Derive Adam's predictor corrector method.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Find a real root of the equation $x^3 - 3x + 1 = 0$ lying between 1 and 2 by using bisection method.

17. Solve by Newton Raphson method $x^3 + x - 1 = 0$.

18. Apply stirlings formula to find $y(25)$ for

$x:$	20	24	28	32
$y:$	2854	3162	3544	3992

19. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 51$

x : 50 60 70 80 90

y : 19.96 36.65 58.81 77.21 94.61

20. Using Taylor's theorem, find $y(0.1), y(0.2), y(0.3)$ for

$\frac{dy}{dx} = 1 + xy$ with $y_0 = 2$.

D-7221

Sub. Code

11354

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

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. Find $L(\cos at)$.
2. Evaluate $\int_0^{\infty} e^{-2t} \sin 3t \, dt$.
3. Find $L^{-1}\left[\frac{1}{s(s^2 + a^2)}\right]$.
4. What do you mean by odd function and even function?
5. Define z -transform.
6. Find $(1-x)^{-1}$.
7. Find $z[e^{at}]$.
8. If $f(x)$ is an even function, expand it in Fourier series.
9. State initial value theorem on z -transformation.
10. Write the conditions for Fourier expansion of $f(x)$.

PART B — (5 × 5 = 25 marks)

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

11. (a) Find $L(\sin^2 2t)$.

Or

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

12. (a) Show that $x^2 = \frac{\pi^2}{3} + 4 \sum_{n=1}^{\infty} (-1)^n \frac{\cos nx}{n^2}$ in $(-\pi < x < \pi)$.

Or

(b) Express $f(x) = \frac{1}{2}(\pi - x)$ as Fourier series in $(0, 2\pi)$.

13. (a) Find sine series for $f(x) = c$ in the range 0 to π .

Or

(b) Express $f(x) = c - x$ where $0 < x < c$ as a half range cosine series with period $2c$.

14. (a) Find $z(n)$.

Or

(b) Determine $z[a^n]$.

15. (a) Prove the linearity of z -transformation.

Or

(b) Find $z(n-2)$.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Find $L(t^n)$. Deduce for $n = 0$, $n = 1$, $n = 2$, $n = \frac{1}{2}$ and $n = -\frac{1}{2}$.
 17. Find $L^{-1}\left(\frac{1}{(s^2 + a^2)^2}\right)$.
 18. Find Fourier series with period 3 to represent $f(x) = 2x - x^3$ in the range $(0, 3)$.
 19. Find $z[n^3]$.
 20. Evaluate $z[2^n \sin h 3n]$.
-

D-7222

Sub. Code

11361

DISTANCE EDUCATION
B.Sc., DEGREE EXAMINATION.
MAY 2021 EXAMINATION
&
MAY 2020 ARREAR EXAMINATION
Sixth Semester
Mathematics

DISCRETE MATHEMATICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL Questions.

1. Define tautology.
2. State rule P of inference.
3. What do you mean by quantifiers?
4. Define relation and give an example.
5. Define (a) Isolated vertex (b) Pendant vertex.
6. Define adjacency matrix of a graph.
7. What do you mean by chromatic polynomial?
8. Define centre of a tree.

9. Give an example of a spanning tree.
10. Define Euler graph.

SECTION B — (5 × 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b)

11. (a) Show that $(P \rightarrow Q) \wedge (R \rightarrow Q)$ and $(P \vee R) \rightarrow Q$ are equivalent formulae.

Or

- (b) Show that $\neg Q, P \rightarrow Q \Rightarrow \neg P$.

12. (a) Prove that every distributive lattice is modular.

Or

- (b) Show that $(m, m+1)$ parity check code can detect one error.

13. (a) Let G be a graph. Then $\sum d(v) = 2\varepsilon$ where, $\varepsilon = |E(G)|$.

Or

- (b) Write a note on complete graph and draw K_4 and K_5 .

14. (a) Prove that every non trivial tree has atleast two vertices of degree one.

Or

- (b) Draw all possible trees with four vertices.

15. (a) Prove that in a tree T a vertex V is a cut vertex iff $\deg(v) \neq 1$.

Or

- (b) State the properties of Cutset.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any Three Questions.

16. Verify whether (a) $(P \vee Q) \rightarrow P$ is a tautology. (b) $(Q \vee R) \rightarrow (P \wedge \neg R)$ is a tautology.
17. Show that a lattice L is distributive iff for all $a, b, c \in L$, $(a \vee b) \wedge c \leq a \vee (b \wedge c)$.
18. Let G be a simple graph with n vertices. Show that if $f(G) \geq \left\lceil \frac{x}{2} \right\rceil$ then G is connected.
19. Let G be a graph and $e \in E(G)$. Then show that $\tau(G) = \tau(G - e) + \tau(G, e)$.
20. Prove that every cycle has an even number of edges in common with any cut set.

D-7223

Sub. Code

11362

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Sixth Semester

FUZZY ALGEBRA

(CBCS 2018–19 Academic Year onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define a strong α -cut with an example.
2. Find the value of
 - (a) $[2,5] - [1,3]$
 - (b) $[4,10]/[1,2]$
3. Define Fuzzy compatibility relation.
4. Define Fuzzy Homomorphism.
5. How will you define standard composition of binary fuzzy relations?

6. Define necessity measure.
7. State any four arithmetic operations on closed intervals.
8. Define possibility measure.
9. What are conditional uncertainties?
10. Define syntactic and semantic concept of information.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions. Choosing either (a) or (b).

11. (a) Write a note on Extension principle.

Or

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

12. (a) Let A,B be two fuzzy numbers whose membership functions are given by

$$A(x) = \begin{cases} (x+2)/2 & \text{for } -2 < x \leq 0 \\ (2-x)/2 & \text{for } 0 < x < 2 \\ 0 & \text{otherwise.} \end{cases}$$

$$B(x) = \begin{cases} (x-2)/2 & \text{for } 2 < x \leq 4 \\ (6-x)/2 & \text{for } 0 < x \leq 6 \\ 0 & \text{otherwise.} \end{cases}$$

Calculate fuzzy numbers $A + B$ and A / B .

Or

- (b) Describe the role of strong α -cuts in fuzzy set theory.

13. (a) Let a given finite body of evidence (\mathcal{F}, m) be nested. Then prove that the associated belief and plausibility measures have the following properties : for all $A, B \in \mathcal{P}(X)$,
- (i) $Bel(A \cap B) = \min[Bel(A), Bel(B)]$
- (ii) $Pl(A \cup B) = \max[Bel(A), Bel(B)]$.

Or

- (b) Describe in detail the properties of Fuzzy morphism.
14. (a) Briefly explain about possibility distribution function.

Or

- (b) Write a note on possibility distribution function.
15. (a) Explain the measure of confusion.

Or

- (b) Explain the entropy like measures.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions

16. (a) Let $f : X \rightarrow Y$ be crisp function, then show that $A \in f(x)$, for all $\alpha \in [0, 1]$, $\alpha^+[f(A)] = f(\alpha^+ A)$.
- (b) State and prove the second characteristics theorem of fuzzy complement.
17. Prove that every possibility measure on a finite power set is uniquely determined by a possibility distribution function $r : X \rightarrow [0,1]$.

18. Narrate the following types of fuzzy relations with suitable example for each :

- (a) Reflexive
- (b) Symmetric
- (c) Transitive
- (d) Antireflexive
- (e) Irreflexive.

19. Explain the measures of nonspecificity.

20. Prove that the inequality

$$-\sum_{i=1}^n p_i \log_2 p_i \leq -\sum_{i=1}^n p_i \log_2 q_i$$

D-7224

Sub. Code

11363

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION.

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Sixth Semester

COMPLEX ANALYSIS

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Harmonic function.
2. What do you mean by power series?
3. Prove that the transformation $w = \bar{z}$ is not a bilinear transformation.
4. Find fixed points for the transformation $w = \frac{1+z}{1-z}$.
5. Find $\int_C \frac{dz}{z-3}$ where C is the circle $|z-2|=5$.
6. State Morera's theorem.
7. What do you mean by zero of order r for $f(z)$?
8. Find singular point for $f(z) = \frac{1}{z}$.
9. What is essential singularity?
10. Define residue of $f(z)$.

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Verify C.R. equations for $f(z) = |z|^2$.

Or

- (b) Let $f = u + iv$ be an analytic function in D . Then V is a harmonic conjugate of u if and only if u is a harmonic conjugate of $-v$.

12. (a) Given $v(x, y) = x^4 - 6x^2y^2 + y^4$. Find $f(z) = u(x, y) + iv(x, y)$ such that $f(z)$ is analytic.

Or

- (b) Find radius of convergence for $\sum_{n=1}^{\infty} \frac{z^n}{n}$.

13. (a) Find the bilinear transformation which maps the points $z_1 = 2$, $z_2 = i$, $z_3 = -2$ onto $w_1 = 1$, $w_3 = -1$ respectively.

Or

- (b) Find the general bilinear transformation which maps the unit circle $|z|=1$ onto $|w|=1$ and the points $z=1$ to $w=1$ and $z=-1$ to $w=-1$.

14. (a) Evaluate $\int_C \frac{\sin z}{\left(z - \frac{\pi}{2}\right)^2} dz$ where C is the circle $|z|=2$.

Or

- (b) Find $\int_C \frac{e^z}{z^n} dz$ where C is the circle $|z|=1$.

15. (a) Find the Taylor's series for $f(z) = \frac{1}{z}$ about $z = 1$.

Or

- (b) Find the residue of $\frac{1}{(z^2 + a^2)^2}$ at $z = ai$.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. By giving counter example. Prove that C.R. equations are not sufficient for differentiability.
17. Let f be an analytic function defined in a region D and $z_0 \in D$. If $f'(z_0) \neq 0$. Prove that f is conformal at z_0 .
18. State and prove Cauchy's integral formula.
19. If $f(z)$ and $g(z)$ are analytic inside and on a simple closed curve C and if $|g(z)| < |f(z)|$ on C , then prove that $f(z) + g(z)$ and $f(z)$ have the same number of zeros inside C .
20. Evaluate $\int_C \tan z dz$ where C is $|z| = 2$.
-

D-7225

Sub. Code

11364

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION

MAY 2021 EXAMINATION

&

MAY 2020 ARREAR EXAMINATION

Sixth Semester

COMBINATORICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define stirling numbers of the first kind.
2. In how many ways can 5 men and 5 women seated in a round table if no two women may be seated side by side?
3. Define ordinary generating function.
4. Define Lexicographic ordering.
5. Define multinomial number.
6. Define Euler function $\phi(a)$.
7. Define Subgroup.

8. Define cycle index of a group G .
9. Define Polya – Substitution.
10. Define primitive period.

SECTION B — ($5 \times 5 = 25$ marks)

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

11. (a) Prove that the number of surjections of the n -set into the m -set A is $m!s_n^m$.

Or

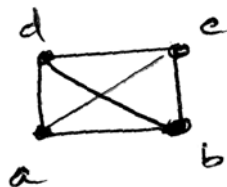
- (b) Calculate the co-efficient of t^{12} in $\left(\frac{1-t^6}{1-t}\right)^4$.

12. (a) Prove that every element $\sigma \in S_n$ can be written as a product of disjoint cycles.

Or

- (b) Prove that $\phi(n) = n \prod_{i=1}^k \left(1 - \frac{1}{P_i}\right)$, where $P_1, P_2 \dots P_k$ are distinct prime factors of n , not equal to 1.

13. (a) Find the chromatic polynomial of the graph.



Or

- (b) What is menage number? Explain with suitable example.

14. (a) Discuss the problem of Fibonacci.

Or

- (b) Prove that the number of circular necklace patterns with n -beads and at most c colours is $\frac{1}{n} \sum_{d|n} \phi\left(\frac{n}{d}\right) c^d$ where ϕ is Euler's function.

15. (a) What is $(z(E_m)) [z(s_n)]$, where E_m is the identity permutation on m symbols.

Or

- (b) Let n be a positive integer. Prove that the ordinary enumerator for the partitions of n is

$$F(t) = \frac{1}{(1-t)(1-t^2)(1-t^3)\cdots}$$

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. State and prove the Generalised inclusion and exclusion principle.
17. State and prove Burnside's Lemma.
18. State and prove Polya's enumeration theorem.
19. (a) Prove that $\xi(t) = \sum_{j=0}^N w(j)(t-1)^j$. (5)
- (b) What is permutation group? Explain. (5)
20. Define G-equivalent. Prove that G-equivalent is an equivalence relation on the set R^D of all functions from D to R .