D–5120	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 Year Integrated) DEGREE EXAMINATION, MAY 2022.

First Semester

Part I : TAMIL PAPER –I

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

Time : Three hours Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. பாஞ்சாலியின் புகழைக் காக்க கிருஷ்ணன் கொடுத்தது யாது?

2. கோபாலனின் குழலைக் கேட்டப் பசுகள் என்ன செய்தன?

3. நெஞ்சில் குடியிருக்கும்... என்னும் பாடல் இடம்பெற்ற திரைப்படம் எது?

4. 'கண்ணன் என் விளையாட்டுப் பிள்ளை' எனப் பாடியவர்?

5. பிறைநிலவின் புன்னகையைக் கவிதையாகப் பாடிய கவிஞர்?

6. காதலி கண்ணில் மை தீட்டாமைக்கு அப்துல்ரகுமான் கூறும் காரணத்தை எழுதுக.

7. 'மூவேந்தர் காப்பியம்' எனப் பாராட்டப்படும் காப்பியம் எது?

8. மந்திரப் படலம் – விளக்கம் தருக.

9. ‘சீறத்’ என்பதன் பொருள் யாது?

10. வீரமாமுனிவர் இயற்றிய இரண்டு நூல்களைக் குறிப்பிடுக.

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) சூரிய நிறக் கண்ணனைக் கண்ணதாசன் எங்ஙனம் பாராட்டுகிறார்?

(அல்லது)

(ஆ) தொழிலின் சிறப்புகளைப் பட்டுக்கோட்டையார் எங்ஙனம் எடுத்துரைக்கிறார்?

12. (அ) பாரதியார் ‘உலக வழக்கம்’ எனக் குறிப்பிடுவது எதனை? விளக்குக.

(அல்லது)

(ஆ) ‘சர்ப்ப யாகம்’ கவிதையின் கருத்துக்களைச் சுருக்கி எழுதுக.

13. (அ) நோய்க்கு அறிகுறிகளாக நாமக்கல் கவிஞர் எவற்றைக் கூறுகிறார்?

(அல்லது)

(ஆ) மீராவின் கவிதைகள் தரும் கருத்துக்களை எழுதுக.

14. (அ) வாயில் காவலர்க்குத் தன்வரவினைக் கண்ணகி எங்ஙனம் உரைத்தாள்?

(அல்லது)

(ஆ) தசரதனின் அமைச்சர்கள் எங்ஙனம் மகிழ்ந்ததாகக் கம்பர் பாடுகிறார்?

15. (அ) கன்னித்தாயும் சூசையும் ஆயர்களை அழைக்கக் காரணம் யாது? விளக்குக.

(அல்லது)

(ஆ) வீரமாமுனிவரின் தமிழ்ப் பற்றைத் தேம்பாவணி வழி விவரிக்க.

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

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. கண்ணன் செய்யும் குறும்புகளைப் பாரதியார் பாடுமாற்றை விவரிக்க.

17. பாரதிதாசன் உலகிற்குக் காட்டும் வழியை நும் பாடப் பகுதியால் எடுத்துரைக்க.

18. மோசிகீரனாரைக் கவிஞர் ஞானக்கூத்தன் சிறப்பிக்குமாற்றை விளக்குக.

19. பாண்டிமாதேவி கண்ட கனவினால் விளைந்தவைகளை விளக்கி எழுதுக.

20. ஈத்தங்குலை வரவழைத்த படலச் செய்திகளை எடுத்துரைக்க.

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D–5121	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 Year Integrated) DEGREE EXAMINATION, MAY 2022.

First Semester

Part I – COMMUNICATION SKILLS – I

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What are the elements involved in communication process?

2. Write any two importance of communication.

3. How does intonation help for developing the oral communication?

4. Write any two steps that is involved for preparing of speech.

5. What are the types of oral communication?

6. How do the words and phrases play a main role for effective written communication?

7. What are the main points to be kept in mind while writing the official letter?

8. What is considered as 'sentence formation'?

9. How will you prepare Curriculum Vitae effectively for a job?

10. Mention at least two differences between verbal communication and non-verbal communication.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Write a short note on the principle of effective communication.

Or

(b) How does non-verbal communication lead to develop verbal communication in human beings?

12. (a) Bring out the importance of gesture in oral communication.

Or

(b) Is tone and intonation the same thing? Discuss.

13. (a) What are the eight steps of preparing a speech?

Or

(b) What are the challenges encountered by a good speaker? How does he/she rectify it while speaking?

14. (a) State some expressions of non-verbal communication.

Or

(b) Write an application for the post of Post Graduate English Teacher in a school.

15. (a) Write a report for 'Sports Day Celebration' at your college.

Or

(b) What are behavioural – based interview questions?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. What are the seven barriers of effective communication?

17. What is the important parts of speech preparation? Explain.

18. How do you demonstrate written communication skills?

19. Why does 'Outline Layout' play the key role for preparing a paragraph? State some reasons.

20. Differentiate topic-based group discussion with Case-study-based group discussion.

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D–5122	Sub. Code
	12

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 2022.

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 questions.

1. Why does C.V. Raman calls water the elixir of life?
2. Why did Mrs. Packletide decide to hunt down a tiger?
3. How does a tiger become a man eater?
4. How does C.E.M. Joad define civilization?
5. What message is conveyed by J.B.S. Haldane in “Food”?
6. What are the blessings of our civilization?
7. What are the effective treatments for drug addiction?
8. State the reasons why our body requires food.
9. Lord Hardinge supported which movement?
10. How does the author, Carl Sagan, Concludes about human nature?

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) What is the irony in Mrs. Packletide's 'Tiger'?

Or

(b) How does Catharine M. Willson react to the cat?

12. (a) Why does A.G. Gardiner call letter – writing a lost art?

Or

(b) What are the major defects of our civilization according to CEM Joad?

13. (a) Discuss the role played by Gandhi in South Africa.

Or

(b) List out the drug-related health disorders.

14. (a) Rewrite as directed :

(i) He said "I live in the city center" (Change to indirect)

(ii) He said he was going out. (Change to direct)

(iii) Anil said he had finished. (change to indirect)

(iv) She said, "I arrived before you". (Change to indirect)

(v) Helen said, "I am going to call Alan". (Change to indirect)

Or

(b) Fill in with articles :

(i) ———————— Nile is in Egypt, isn't it?

(ii) Where are ———————— boys?

(iii) Do you want ———————— orange?

(iv) How far is ———————— sun away from ———————— earth?

15. (a) Write a precise of the given passage :

Earthquake is the deadly enemy of mankind. Earthquake strikes all without a distinction of nationality or political affiliation The power of a quake is greater than that of any man-made weapon of destruction. An earthquake strikes mankind without a warning. A modern city when struck is reduced to a rubble. A quake strikes plains, seas and mountains causing all round destruction. The quake struck Lisbon in 1755 killing 450; Peru in 1970 killing 50,000 Alaska in 1968 moving it 80 feet into the Pacific ocean. Scientists are trying to find out means to combat earthquakes and they are able to predict atleast where the earth quake will hit so that precaution can be taken to save man and property from destruction. As the number of words in the rough draft is more than required we shall have to reduce it. Further without reducing the ideas.

Or

(b) Dialogue writing :

Sarita is being interviewed for the job of a teacher in a school. Write the dialogues between Sarita and the interviewer.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. What is the theme of the passage 'Mrs. Pack Letide's Tiger"?

17. Illustrate the concept of "The Cat" by Catharine M. Willson.

18. What is the theme of the essay "Our Civilization"?

19. Explain how A.G. Gardiner goes on the show how good letter is written?

20. Describe the bravery of Haria and Narwa.

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D–5202

Sub. Code
11313

DISTANCE EDUCATION

B.Sc. DEGREE EXAMINATION, MAY 2022.

First Semester

Mathematics

CLASSICAL ALGEBRA

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. State D'Alembert's Ratio test.

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

3. If α, β, γ are the roots of $x^3 - 6x^2 + 11x - 21 = 0$. Find then value of $\sum \alpha^2$.

4. Prove that $\log 10 = 3\log 2 + \frac{1}{4} - \frac{1}{2}\left(\frac{1}{4}\right)^2 + \frac{1}{3}\left(\frac{1}{4}\right)^3 - \ldots$.

5. Find the determinant value of $\begin{bmatrix} 2 & 4 & -2 \\ 3 & 2 & -1 \\ 2 & 1 & 3 \end{bmatrix}$.

6. Define Unit matrix.

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

8. If $\alpha, \beta, \gamma, \delta$ are the roots of the equation $x^4 + px^3 + qx^2 + rx + s = 0$, find $\Sigma\frac{1}{\alpha}$.

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

10. Find the eigen values of $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Diminish the roots of $x^4 - x^3 - 10x^2 + 4x + 24 = 0$ by 2.

Or

(b) Test the convergence of $1 + \frac{1.3}{1.4} + \frac{1.3.5}{1.4.7} + \frac{1.3.5.7}{1.4.7.10} + \ldots$

12. (a) Solve the equation $x^5 - x^4 + 8x^2 - 9x - 15 = 0$ if $\sqrt{3}$ and $1 - 2i$ are two of its roots.

Or

(b) Find the positive root of $x^3 - 5x + 3 = 0$.

13. (a) Prove that the sum of the cubes of the roots of $x^3 - 6x^2 + 11x - 6 = 0$ is 36.

Or

(b) Solve the equation $x^3 - 7x^2 + 14x - 8 = 0$ given that its roots are in G.P.

14. (a) Show that

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

Or

(b) Examine the consistency of the equations $x+2y+3z=14$, $3x+y+2z=11$, $2x+3y+z=11$.

15. (a) Find the inverse of $A=\begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$.

Or

(b) Verify Cayley Hamilton theorem for $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. State and prove Leibnitz's test.

17. If α, β, γ are the roots of $ax^3+bx^2+cx+d=0$. Find $\Sigma\alpha^2\beta^2, \Sigma\frac{1}{\alpha^2\beta^2}$.

18. If the sum of the two roots of the equation $x^4+px^3+qx^2+rx+s=0$ equal the sum of the other two, prove that $p^3+8r=4pq$.

19. Find the eigen values and eigen vectors of $\begin{pmatrix} 2 & 2 & 2 \\ 1 & 3 & 2 \\ 2 & 1 & 3 \end{pmatrix}$.

20. Solve the equations, by matrix inversion method $3x + 4y + 5z = 18$, $2x - y + 8z = 13$, $5x - 2y + 7z = 20$.

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D–5203

Sub. Code
11314

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

First Semester

CALCULUS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Prove that $\frac{d^n}{dx^n}(ax+b)^n = n!\,a^n$.

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

3. What is meant by radius of curvature?

4. Verify Euler's theorem for $u = x^3 - 2x^2y + y^3$.

5. Evaluate $\int xe^{x^2}dx$.

6. Evaluate $\int \sin^4 x dx$.

7. Solve : $(1-x)dy - (1+y)dx = 0$.

8. Prove that $\int_a^b f(x)dx = -\int_a^b f(x)dx$.

9. Prove that $\beta(m,n) = \beta l$.

10. Prove that $L\left(e^{-ax}\right) = \frac{1}{s+a}$ if $s + a > 0$.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Find the n[th] differential coefficient of $\frac{1}{(3x-2)(x+3)}$.

Or

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

12. (a) Find the points on the curve $y = x^3 - 3x^2 - 9x + 5$ at which the tangents are parallel to $x-$ axis.

Or

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

13. (a) Evaluate $\int x^3 e^{2x} dx$.

Or

(b) Find the radius of convergence at $\left(\frac{1}{4}, \frac{1}{4}\right)$ for $\sqrt{x} + \sqrt{y} = 1$.

14. (a) Derive reduction formula for $\int x^n e^{ax} dx$.

Or

(b) Prove that $\int_0^{\pi/2} \sqrt{\tan\theta}\, d\theta = \pi/\sqrt{2}$ using Beta and Gamma functions.

15. (a) Derive recurrence formula for $\sqrt{(n+1)} = n\sqrt{(n)}$.

Or

(b) Find the complete integral of $px + qy = pq$ by Charpit's method.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Examine the following functions $x^3 + y^3 - 3axy$ for maxima and minima.

17. Find the envelope of the family of ellipses $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, where the two parameters a and b are connected by the relation $a + b = c$ where c is a constant.

18. Prove that $\int_0^{\pi/2} \log \tan x = 0$.

19. Using the method of variation of parameters solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$.

20. Derive the relation between Beta and Gamma function.

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D–5123

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 2022.

Second Semester

PART I : TAMIL PAPER – II

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

பகுதி அ — ($10 \times 2 = 20$ மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. தேம்பாவணி – குறிப்பு வரைக.
2. 'வான வீதியில்' சிறுகதையின் ஆசிரியர் பெயரைக் குறிப்பிடுக.
3. 'பாசிநிலை' – திணை விளக்கம் தருக.
4. அளபெடை என்றால் என்ன?
5. எண்ணளவை ஆகுபெயர் – விளக்கம் தருக.
6. "எங்கள் வாழ்வும் எங்கள் வளமும் மங்காத தமிழென்று சங்கே முழங்கு" என்றவர்?
7. தமிழில் வெளிவரும் 'வார இதழ்கள்' இரண்டினைக் குறிப்பிடுக.
8. சிம்பொனி இசையமைத்த தமிழர் யார்?
9. பண்பலை வானொலி என்றால் என்ன?
10. 'தாண்டக வேந்தர்' எனப் போற்றப்படும் சைவக் குரவர்?

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) சாந்தி கேட்ட வேத உரையை விளக்கி எழுதுக.

(அல்லது)

(ஆ) ஆயர்கள் குழந்தையைப் போற்றி வணங்கியதை விவரிக்க.

12. (அ) முதல் விமானப் பயணத்தின் அனுபவங்களை நீலபத்மநாபன் எங்ஙனம் விவரித்துள்ளார்?

(அல்லது)

(ஆ) இராமன் புரிந்த கன்னிப்போர் குறித்து இயம்புக.

13. (அ) முதல் எழுத்துக்களின் வகைகளை விளக்கி வரைக.

(அல்லது)

(ஆ) வினாக்கள் எத்தனை வகைப்படும்? அவற்றை விளக்கி வரைக.

14. (அ) புரட்சிக் கவிஞரின் தமிழ்ப்பற்றை நும் பாடப்பகுதியால் விளக்கி வரைக.

(அல்லது)

(ஆ) கவியரசு கண்ணதாசனின் திரைப்பாடல்கள் குறித்துக் கட்டுரைக்க.

15. (அ) திருநாவுக்கரசரின் பக்தித் திறத்தைப் பாராட்டியுரைக்க.

(அல்லது)

(ஆ) மக்கள் வாழ்வியலில் தொலைகாட்சிப் பெறும் முக்கியத்துவத்தை எடுத்துரைக்க.

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

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. ஆயர்கள் குழந்தை ஏசுவைப் போற்றி மகிழ்ந்ததை விளக்கி வரைக.

17. போர்க்களச் செய்தித் தொடர்பைக் கம்பராமாயணம் எடுத்துரைக்குமாற்றை எழுதுக.

18. தமிழின் சொல்லமைப்புச் சிறப்புக்களை நும்பாடப்பகுதியால் விரிந்துரைக்க.

19. தமிழ்க் கவிதைகளும் திரையிசையும் – கட்டுரை வரைக.

20. சைவமும் தமிழும் குறித்துப் பெரியபுராணம் வழிக் கட்டுரைக்க.

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D–5124	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 Years Integrated) DEGREE EXAMINATION,
MAY 2022.

Second Semester

Part I – COMMUNICATION SKILLS – II

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Which stimuli is the best to induce communication skills among the students?

2. Which exercise gives positive responses to the communication skills?

3. Write any two guidelines for effective communication skills.

4. Mention any two uses of stress and tone for improving speaking skills.

5. Define phonetics.

6. What are the language skills that are significant for the students?

7. What is topic sentence in paragraph writing?

8. Write any two important qualities for creative writers.

9. Why do Newsletters play a major role in organization?

10. Why are interviewing skills important?

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Does communication skill tasks act as stimuli and bring the desired responses among the students? Write down the various stimuli and responses of the students during the communication skills activity.

Or

(b) How does code and content facilitate in improving the communication skills?

12. (a) Write a short note on :

(i) Tone

(ii) Stress

(iii) Intonation

(iv) Air-stream mechanism

Or

(b) In what way does IPA help to improve the communication skills? Explain.

13. (a) How do you identify the silent letters in English? Write down the rules to be followed while pronouncing such words.

Or

(b) What are the skills that get developed while involving in the language exercises like reading comprehension, dialogue writing, and proverb expansion writing.

14. (a) What are the types of listening? Explain.

Or

(b) Explain the role of sender, medium and receiver in a communication process.

15. (a) How do you write an effective business proposal in a letter to an organization? Explain.

Or

(b) What are the five stages of an interview?

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. How does mother tongue facilitate the learning of a second language? Discuss.

17. Why is phonetics important for second language learning? Give detailed analysis.

18. Detail the making of a presentation using Power Point Slides.

19. Write in detail about conversation skills and its mode.

20. What is the role of an editor and how do editors add value in the publishing process?

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D–5125	Sub. Code
	22

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 2022.

Second Semester

Part II – ENGLISH PAPER — II

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

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What is the structure of a Shakespearean Sonnet?

2. What is the tone of "Lines composed upon west Minster Bridge"?

3. Define Dramatic monologue.

4. Who is the king mentioned in "Andrea del Sarto"?

5. What does Robert Frost mean by "Worn them really about the same"?

6. Why does the narrator call his friend a "Strange friend"?

7. What is the main theme of Gitanjali?

8. How does shylock describe his demand for a pound of flesh to Bassano and Antonio at first?

9. Which is sweeter than the sands at the full moon in the poem Coramandel Fishers?

10. Define Note-making.

PART B — (5 × 5 = 25 marks)

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

11. (a) Bring out the picture of London in "Lines composed upon west Minster Bridge".

Or

(b) Bring out the final Tone of the poem "Andrea del Sarto".

12. (a) What is the theme of the poem 'The Road not taken'?

Or

(b) Briefly attempt a note on the relationship between the two speakers in "Strange meeting".

13. (a) How does achieve humanization of the divine in his poetry?

Or

(b) Who is the real hero of merchant of Venice?

14. (a) What are the problems faced by the fishermen?

Or

(b) How does The Express offer a sharp contrast to the traditional nature poems?

15. (a) What are the steps in note-making?

Or

(b) Bring out the purposes of a report.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions

16. "Beauty is truth, truth beauty – that's all

Ye know on earth, and all ye need to know" – Discuss how Keats arrives at this conclusion in "Ode one a Grecian Urn".

17. Discuss the dilemma faced by the poet in the poem, "The Road not taken". What is the relevance of that dilemma in real life?

18. Elucidate Tagore's use of imagery in 'Gitanjali' with appropriate examples.

19. Make notes of the following passage:

Reading skills have dominated the English Language learning situation in India. The main reason for this is that opens avenues of knowledge for all disciplines of study by giving access to books and journals. Proficiency in reading contributes to one's intellectual development.

Apart from helping one gain academic excellence, reading introduces many to a world of thought and fancy. It widens their horizon and gives them an edge over others in social and professional settings. Another advantage of reading is that it exposes readers to good style and rich vocabulary, which have a positive impact on communicative competence. For an alert reader, it is a natural way of assimilating language use and usage.

20. Read the following passage and answer the questions give below:

Up to the time of the illness that took away my sight and hearing, I lived with my father and mother in a tiny house. It had one large square room and another smaller one in which the servant slept. The house was completely covered with roses and other climbing plants, the favourite home of birds and bees. The beginning of my life was simple and much the same as every other little life. I came, I saw, I conquered, as the first baby in the family always does. There was the usual amount of talk about a name for me. At last my mother's advice was accepted and I was called Helen. These happy days did not last long. One short spring, musical with the song of birds, one summer rich in fruit and roses, one autumn of red and gold passed by and lift their gifts at the feet of an eager and delighted child. Then in the gloomy month of February 1882, came the illness which closed my eyes and ears and I Sank into a state of unconsciousness. The doctor thought that I could not live, but early one morning I became conscious again. My family celebrated that morning, but no one, Not even the doctor, knew that I would never see or hear again. Then she came - my teacher, Ann Sullivan – and she set my spirit free.

(a) Describe Helen Keller's house.

(b) What is the meaning of 'I came, I saw, I conquered as the first baby in the family always does'?

(c) How does Helen describe the seasons?

(d) How was her sickness felt at home?

(e) What were the consequences of her illness?

D–5204	Sub. Code
	11323

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Second Semester

ANALYTICAL GEOMETRY AND VECTOR CALCULUS

(CBCS 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Show that AB is perpendicular to CD if A is (2, 3, 4) $B(5, 4, -1)$, $C(3, 6, 2)$ and $D(1, 2, 0)$.

2. Define Direction ratios.

3. Find the equation of the plane passing through the points $(1, -2, 3), (3, 1, 2)$ and $(2, 3, -1)$.

4. Find the angle between the planes $2x - y + z = 6$ and $x + y + 2z = 7$.

5. Find the equation of the plane which passes through (2, 1, 3) and which contains $\frac{x}{1} = \frac{y-1}{2} = \frac{z+1}{-2}$.

6. Define right circular cone.

7. Define orthogonal spheres.

8. Find the shortest distance between the lines

$\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$.

9. Write a note on line integral.

10. What is the difference between a solenoidal vector and an irrotational vector?

PART B — (5 × 5 = 25 marks)

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

11. (a) If l, m, n are the direction cosines of a line then prove that $l^2+m^2+n^2=1$.

Or

(b) Find the direction cosines of the lines AB and CD where $A=(1, 2, -4), B=(2, 1, -3)$, $C=(4, 6, -1)$ and $D=(5, 7, 0)$.

12. (a) Find the equation of the plane through (2, 3, –4) and (1, –1, 3) and parallel to the x-axis.

Or

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

13. (a) The circle on the sphere $x^2 + y^2 + z^2 + 6y - 10z + 23 = 0$ has center (1, 2, –2). Find its equation.

Or

(b) Show that the lines $\frac{x-2}{1} = \frac{y-4}{2} = \frac{z-5}{2}$ and $\frac{x-5}{2} = \frac{y-8}{3} = \frac{z-7}{2}$ are coplanar.

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

15. (a) If $f = (ax + 3y + 4z)i + (x - 3y + 3z)j + (3x + 2y - z)k$ is solenoidal, find the value of constant a.

Or

(b) Verify Green's theorem for $f = (x^2 + y^2)i = 2xyj$ and C is the rectangle in the xy-plane bounded by $y = 0$, $y = b$, $x = 0$ and $x = a$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions out of Five.

16. Find the bisector of the acute angle between the planes

$3x + 4y - 5z + 1 = 0$

$5x + 12y - 13z = 0$

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

18. Obtain the equation of the sphere having the circle

$S = x^2 + y^2 + z^2 - 3x + 4y - 2z - 5 = 0$

$\pi = 5x - 2y + 4z + 7 = 0$ as a great circle.

19. Show that the vector

$f(y^2 - z^2 + 3yz - 2x)\,i + (3xz + 2xy)\,j + (3xy - 2xz + 2z)\,k$

is both irrotational and solenoidal.

20. Evaluate $\iint_s (\nabla \times f) \cdot n ds$ where $f = y^2 i + yj - xzk$ and s is the upper half of the sphere

$x^2 + y^2 + z^2 = a^2$ and $z \geq 0$.

D–5205	Sub. Code
	11324

DISTANCE EDUCATION

B.Sc. DEGREE EXAMINATION, MAY 2022.

Second Semester

Mathematics

SEQUENCES AND SERIES

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

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

2. Define sequence and give an example.

3. State comparison test.

4. If $(a_n) \to u$ the prove that $(|a_n|) \to |u|$.

5. Test the convergence of $\sum \frac{(-1)^n \sin n\alpha}{n^3}$

6. State cauchy's general principle of convergence.

7. Define cauchy product of Σa_n and Σb_n.

8. State Kummer's test.

9. State Riemann's theorem.

10. What do you mean by absolute convergent series?

PART B — (5 × 5 = 25 marks)

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

11. (a) Show that the sequence $\left(1+\frac{1}{n}\right)^n$ converges.

Or

(b) Prove that $(n) \to \infty$.

12. (a) Prove that any cauchy sequence is a bounded sequence.

Or

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

13. (a) Show that $\Sigma\frac{1}{4n^2-1}=\frac{1}{2}$.

Or

(b) State and prove Raabe's test.

14. (a) Show that $\sum(-1)^{n+1}\frac{n}{3n-2}$ oscillates.

Or

(b) Show that $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\ldots\ldots$ converges.

15. (a) Write notes on rearrangement of series.

Or

(b) Prove that cauchy product of two convergent series need not converge.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions

16. Prove that any convergent sequence is a bounded sequence. Also discuss the converse.

17. State and prove Cesaro's theorem.

18. Discuss the behaviour of harmonic series $\Sigma \frac{1}{n^p}$.

19. Discuss the converges of the series $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^{\alpha}}$.

20. Given $\Sigma \frac{1}{n^2} = S$, Prove that $1 + \frac{1}{3^2} + \frac{1}{5^2} + ... = \frac{3}{4} S$.

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D–5126	Sub. Code
	31A

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A DEGREE EXAMINATION, MAY 2022.

Third Semester

Part I : TAMIL PAPER — III

(CBCS 2018-19 Academic Year onwards/ 2021 Calendar Year onwards)

Time : Three hours Maximum : 75 marks

பகுதி அ — (10 × 2 = 20 மதிப்பெண்கள்)

அனைத்து வினாக்களுக்கும் விடையளிக்க.

1. முல்லைப்பாட்டு எத்தனை அடிகளால் ஆனது?

2. ஆற்றுப்படை நூல்களைப் பட்டியலிடுக.

3. பரணர் பாடியப் பாடல்களின் எண்ணிக்கையைத் தருக.

4. உடன்போக்கு – விளக்கம் தருக.

5. அகநானூற்று நூலின் எண் பகுப்பு முறையில் திணைகளை எழுதுக.

6. புறப்பாட்டு எனச் சிறப்பிக்கப்படும் சங்க இலக்கியத்தைக் கூறுக.

7. 'உலகப் பொதுமறை' எனப் போற்றப்படும் அற நூல் யாது?

8. நான்மணிக்கடிகை எந்நூல் கருத்துக்களை ஒத்திருக்கின்றது?

9. குந்தவையின் காதலன் பெயரைக் குறிப்பிடுக.

10. 'சுவடுகள்' நாவலின் தலைமை மாந்தர்களின் பெயர்களைச் சுட்டுக.

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) முல்லைப்பாட்டு விவரிக்கும் பாசறை அமைப்புக் குறித்த செய்திகளை எழுதுக.

(அல்லது)

(ஆ) சிவலிங்க ராஜா உரையின் தன்மைகளைத் தொகுத்துரைக்க.

12. (அ) தலைமகன் தன் நெஞ்சிற்குக் கூறுவதாக அமைந்த பாடல்களின் கருத்துக்களை எடுத்துரைக்க.

(அல்லது)

(ஆ) வரைவு நீட்டித்த வழித் தலைமகள் தோழிக்குச் சொல்லியது யாது? விவரிக்க.

13. (அ) வினைமுற்றி மீண்டுவந்த தலைவன் மழையை எங்ஙனம் வாழ்த்தினான்?

(அல்லது)

(ஆ) அகநானூற்றால் அறியவரும் வரலாற்றுச் செய்திகளை எழுதுக.

14. (அ) வள்ளுவர் உரைக்கும் அறிவுடையார் குறித்த செய்திகளை விவரிக்க.

(அல்லது)

(ஆ) யார் யாருக்குத் தூக்கம் வராது? நான்மணிக்கடிகை கூறுமாற்றை எழுதுக.

15. (அ) இராசராசசோழன் நாடகக் கதைக்கோப்பைச் சுருக்கி வரைக.

(அல்லது)

(ஆ) சுவடுகள் நாவலின் கதைமாந்தர் இயல்புகளை விரித்துரைக்க.

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

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. பரணர் பாடல்கள் வழி அறியலாகும் வரலாற்றுச் செய்திகளைத் தொகுத்துரைக்க.

17. பருவம் கண்டு வருந்திய தலைவியின் புலம்பல்களைக் கட்டுரைக்க.

18. சோழன் குளமுற்றுத்துத் துஞ்சிய கிள்ளிவளவனை நப்பசலை புகழுமாற்றை விவரிக்க.

19. வாழ்க்கைத் துணை நலம் என்னும் அதிகாரத்தின் கருத்துக்களைத் தொகுத்துரைக்க.

20. இராசராசச்சோழன் நாடகப் பாத்திரப் படைப்புகள் குறித்து விரிந்துரைக்க.

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D–5127	Sub. Code
	31B

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION,
MAY 2022.

Third Semester

PART – I : HUMAN SKILLS DEVELOPMENT – I

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What are the merits of good habits?

2. What is meant by thinking ahead?

3. Write any two key factors for influencing personality.

4. Why self-concept is important?

5. Mention the types of goal setting skills.

6. Define negotiating skills.

7. Who is called as a leader?

8. What are the different types of conselling?

9. How can you develop human skill relations?

10. What are the causes for anger?

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) What are the features of interpersonal behaviour?

Or

(b) Give some key ideas for developing personality.

12. (a) Write a note on etiquettes in using mobile.

Or

(b) Write some dais etiquettes.

13. (a) What are the different types of decision making skills? Explain briefly.

Or

(b) How can you create ways to develop positive attitudes among others?

14. (a) Why leader is necessary?

Or

(b) When do we need counselling?

15. (a) Write a short note on management of conflicts.

Or

(b) What are the consequences of stress and mention some ways to overcome?

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE of the following.

16. Explain habits, types of merits of good habits.

17. Write a note on the following:

    (a) Self-esteem

    (b) Self-efficacy

18. Write an essay on decision making skills.

19. Write in detail on attitudes and its importance.

20. Explain briefly about stress and its types.

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D–5128	Sub. Code
	32

DISTANCE EDUCATION

COMMON FOR B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2022.

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 questions.

1. What is disgraceful, according to Swami's father in the short story "A Hero"?

2. What is the occupation did the verger take up after resigning from the church?

3. What is the moral of the story " The Proposal"?

4. How does Aunt Emily Character describe in "The boy comes home"?

5. What is the theme of "Progress"?

6. What is the only one fault that Pierre finds with the eel pie?

7. Who is the author of 'Reunion' play?

8. Define noun with an example.

9. Identify the parts of speech for the underlined words.

(a) Health <u>is</u> wealth.

(b) <u>He</u> is very impatient.

10. Give an example for descriptive writing.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) What desperate attempts did Swami make to escape from his father?

Or

(b) How did Matilda manage a new dress and jewellery for the ball?

12. (a) What are the conflicts between Philip and uncle James in "The Boy Comes Home"?

Or

(b) How does Corrie intend to revolutionize warfare?

13. (a) Sketch the character Yassin in 'The Refugee'.

Or

(b) Write a note on the characters Jean and Pierre.

14. (a) Describe redemption and forgiveness are the major themes in "A king of Justice".

Or

(b) Write a short note on the control idea of "Reunion" by W.St. Joh Tayleur.

15. (a) Complete the sentences with adverbs :

(i) I am going to tell you something very important, so please listen ————————.

(ii) Ann! I need your help ————————.

(iii) I am tired this morning. I did not ———————— last night.

(iv) He works ———————— all day.

(v) She sings ———————— enough.

Or

(b) Illustrate noun and its types.

PART C — (3 × 10 = 30 marks)

Answer any THREE of the following.

16. Write an essay on father and son relationship in the story "A Hero".

17. Where is situational irony in the "The Necklace" and how does this convey the author's message?

18. Justify the title of the play, "The Proposal".

19. Write an essay on Partriotic feelings to four friends in "Reunion".

20. Write an essay on "Modern Techniques in mobile – Phone'.

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D–5206

Sub. Code
11333

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION, MAY 2022.

Third Semester

DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Solve $y = (x - a)p - p^2$.

2. Solve $(D^2 + D + 1)^2 y = 0$.

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

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

5. Define orthogonal trajectories.

6. Verify the condition of integrability for $(y + z)dx + dy + dz = 0$.

7. Solve the equation $y'' + 4iy = 0$.

8. Find the complete integral for $z = px + qy + f(p,q)$.

9. Define self orthogonal.

10. Define Brachistochrone problem.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Solve $(x^2 - 4xy - 2y^2)dx + (y^2 - 4xy - 2x^2)dy = 0$.

Or

(b) Solve $xp^2 - 2yp + x = 0$.

12. (a) Solve $y^2 + x^2 \frac{dy}{dx} = xy \frac{dy}{dx}$.

Or

(b) Solve $(D^2 - 5D + 6)\, y = 7e^{2x} + 8$.

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

Or

(b) Solve the equations $\frac{dx}{-y^2 - z^2} = \frac{dy}{xy} = \frac{dz}{xz}$.

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

Or

(b) Solve $xy^2 - y' - 4x^3 y = 8x^3 \sin x^2$ by changing the independent variable x to z.

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

Or

(b) Find the orthogonal trajectories of the family of circles $x^2 + y^2 = a^2$.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Solve $(5+2x)^2 \frac{d^2y}{dx^2} - 6(5+2x)\frac{dy}{dx} + 8y = 6x$.

17. Using the method of variation of Parameters, solve $(D^2 + 1)y = x$.

18. Verify the condition of integrability of

$(2xz - yz)dx + (2yz - zx)dy -$

$(x^2 - zx + y^2)dz = 0$ and solve.

19. Find the complete integral for $z = px + qy + p^2 + q^2$ by using Charpits methods.

20. Solve :

(a) $4(1 + z^3) = 9z^4 pq$. (5)

(b) $z = px + qy + \sqrt{1 + p^2 + q^2}$. (5)

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D–5207

Sub. Code
11334

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Third Semester

MECHANICS

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

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

Answer ALL the questions.

1. State polygon of forces.

2. What is force polygon?

3. Forces acting at a point are represented in magnitude and direciton by $\overline{AB}, 2\overline{BC}, 2\overline{CD}, \overline{DA}$ where $ABCD$ is a square. Show that the forces are in equilibrium.

4. Define like a unlike parallel forces.

5. Define a friction.

6. Define a uniform catenary.

7. What is meant by the time of flight of a projectile?

8. Define impulse of force.

9. Write the pedal equation of central orbit.

10. Define centre of forces.

SECTION B — ($5 \times 5 = 25$ marks)

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

11. (a) If the resultant R of two forces P and Q inclined to one another at any given angle makes an angle ϕ with the direction of P, show that the resultant of forces $(P+R)$ and Q acting at the same angle will make an angle $\frac{\phi}{2}$ with the direction of $P+R$.

Or

(b) State and prove Lami's theorem.

12. (a) Obtain the resultant of two like parallel forces acting on a rigid body.

Or

(b) Derive the conditions of equilibrium of three coplanar parallel forces.

13. (a) A uniform chain of length 'l' is to be suspended from two points in the same horizontal line so that either terminal tension is 'n' times that at the lowest point. Show that the span must be $\frac{1}{\sqrt{n^2-1}} \log\left[n+\sqrt{n^2-1}\right]$.

Or

(b) Derive the range on an inclined plane.

14. (a) Explain the oblique impact of two smooth spheres.

Or

(b) A ball is thrown from a point on a smooth horizontal ground with a speed V at an angle α to the horizon. If 'e' be the coefficient of restitution, show that the total time for which the ball rebounds on the ground is $\frac{2V\sin\alpha}{g(1-e)}$ and the horizontal distance travelled by it is $\frac{V^2\sin 2\alpha}{g(1-e)}$.

15. (a) Derive the differential equation of a central orbit in polar coordinates.

Or

(b) Derive the (p,r) equation of Ellipse pole at focus.

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

Answer any THREE of the following questions.

16. The resultant of two forces P, Q acting at a certain angle is X and that of P, R acting at the same angle is also X. The resultant of Q, R again acting at the same angle is Y. Prove that $P = \left(X^2 + QR\right)^{\frac{1}{2}} = \frac{QR(Q+R)}{Q^2 + R^2 - Y^2}$.

17. E is the middle point of the side CD of a square $ABCD$. Forces 16, 20, $4\sqrt{5}$ and $12\sqrt{2}$ kg. Wt. act along AB, AD, EA and CA in the directions indicated by the order of the letters. Show that they are in equilibrium.

18. State and prove Varigon's theorem.

19. A particle falls from a height h upon a fixed horizontal plane. If e be the coefficient of restitution, show that the whole distance described before the particle has finished rebounding is $h\left(\frac{1+e^2}{1-e^2}\right)$. Show also that the whole time taken is $\frac{1+e}{1-e}\sqrt{\frac{2h}{g}}$.

20. Derive the general solution of the simple hormonic motion equation.

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D–5129

Sub. Code
41A

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION,
MAY 2022.

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. யாப்பின் உறுப்புகளைக் குறிப்பிடுக.

2. அசை எத்தனை வகைப்படும்?

3. திணை - குறிப்பு வரைக.

4. வரைவு கடாதல் பற்றி விளக்குக.

5. ஆநிரை கவர்தல் எப்புறத்திணைக்குரியது?

6. 'தற்குறிப்பேற்றம்' என்ற அணியின் முக்கியத்துவம் யாது?

7. தொல்காப்பிய அதிகாரப் பகுப்புக் குறித்து எழுதுக.

8. 'மணநூல்' எனப்படும் காப்பியம்?

9. பாண்டியன் பரிசு காப்பிய ஆசிரியர் யார்?

10. கண்ணதாசனின் இயற்பெயரைக் குறிப்பிடுக.

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

பின்வரும் வினாக்களுக்கு ஒரு பக்க அளவில் விடை தருக.

11. (அ) அடி எத்தனை வகைப்படும்? சான்றுகளுடன் விளக்குக.

(அல்லது)

(ஆ) புதுக்கவிதையில் குறியீடு பெறுமிடத்தைச் சுட்டி வரைக.

12. (அ) ஊடல் பொருளுக்குரிய அகத்திணை யாது? கருப்பொருட்களுடன் விவரிக்க.

(அல்லது)

(ஆ) சங்க கால வீரத்தைப் புறப்பொருள் இலக்கணம் கொண்டு விரித்துரைக்க.

13. (அ) 'மையோ மாமலையோ மறிகடலோ' – இதில் பயின்று வரும் அணியை விளக்குக.

(அல்லது)

(ஆ) நிறுத்தற்குறிகளில் 'காற்புள்ளி' வருமிடங்களைச் சான்றுகளுடன் எழுதுக.

14. (அ) பத்துப்பாட்டு நூல்களைப் பாடு பொருள் அடிப்படையில் பகுத்துக் கூறுக.

(அல்லது)

(ஆ) நாலடியார் நூல் எழுந்த வரலாற்றை எடுத்துரைக்க.

15. (அ) பெரிய புராணத்தின் தனித்துவத்தை நும் பாடப் பகுதியால் நிறுவுக.

(அல்லது)

(ஆ) பாண்டியன் பரிசு காப்பியத்தின் கதைக் களத்தைச் சுருக்கி வரைக.

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

பின்வரும் வினாக்களில் மூன்றனுக்குக் கட்டுரை வடிவில் விடை தருக.

16. அகவற்பாவின் இலக்கணத்தைக் கூறி வகைகளைப் பட்டியலிடுக.

17. அன்பின் ஐந்திணைகள் குறித்த செய்திகளைத் தொகுத்துரைக்க.

18. உவமை அணியின் இலக்கணத்தைச் சான்றுகள் காட்டி விவரிக்க.

19. மதுரைக் காஞ்சி நூல் வழிச் சங்க கால வரலாற்றை எடுத்துரைக்க.

20. பாரதியாரின் நாட்டுப்பற்றைப் 'பாஞ்சாலி சபதம்' வழி விரிந்துரைக்க.

D–5130	Sub. Code
	41B

DISTANCE EDUCATION

COMMON FOR B.A/B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2022.

Fourth Semester

Part I – HUMAN SKILLS DEVELOPMENT – II

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Give four roles of a counsellor.

2. What are the three managerial skills?

3. Define technical skills.

4. What are the types of presentation?

5. Give two examples for multitasking skills.

6. What are the roles of a leader?

7. What skills are needed to work as an individual?

8. Write about the importance of problem solving skills?

9. Give two methods to improve your problem solving skills.

10. What is cooperative learning skills?

PART B — (5 × 5 = 25 marks)

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

11. (a) Elaborate the importance of counselling.

Or

(b) Define managerial skills with examples.

12. (a) Write about the importance of conceptual skills.

Or

(b) Illustrate the tools in technical skills.

13. (a) How do you improve your grasping power?

Or

(b) Write a note on qualities of a good leader?

14. (a) What are some important skills for community organizers?

Or

(b) How are skills in human connection relevant at all management level?

15. (a) Where do you use problem solving skills?

Or

(b) Define social responsibilities.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE of the following

16. Write an essay on the importance and techniques of counselling.

17. List out the types of communication skills.

18. How to analyse a candidate in an interview?

19. Elaborate cooperative learning skills.

20. What are problem solving skills and how are they important?

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D–5131	Sub. Code
	42

DISTANCE EDUCATION

Common for B.A./B.Sc./B.C.A. DEGREE EXAMINATION, MAY 2022.

Fourth Semester

PART II – ENGLISH PAPER – IV

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. How old was Schatz? What disease was he suffering from?

2. What is the dream of klaus?

3. What have Pickering and Higgins written respectively?

4. Write about Shankar's qualities as a student.

5. How much money did shylock give to Bassanio?

6. What disturbed the peace of Verona?

7. When did martin Luther king Jr. deliver his famous speech "I have a Dream"?

8. Put in the correct tag question:

   (a) She's from a small town in china.

   (b) Julie is not an accountant?

9. Expand the below given proverb.

"Make hay while the sun shines"

10. Give some expressions of apology.

PART B — (5 × 5 = 25 marks)

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

11. (a) Sketch the character of sahib.

Or

(b) Analyse the short story 'Little Girls wiser than men".

12. (a) Discuss the transformation of Eliza in Pygmalion.

Or

(b) Describe the personalities of Swami's friends?

13. (a) How does Bassanio win the right to marry Portia?

Or

(b) Examine the role of Escalus.

14. (a) Why was Martin Luther king Jr. awarded the 1964 Nobel peace prize?

Or

(b) Describe the second meeting of Toynbee and Nehru.

15. (a) Add appropriate question tags to the following sentences.

(i) She speaks English well

(ii) He has left

(iii) You will have some tea

(iv) I need not stay long

(v) She loves dancing

(vi) You are not joining the Strike

(vii) He broke the glass

(viii) He is not late

(ix) He used to play cricket when he was young

(x) Let's take some rest

Or

(b) Elaborate the use of Apology, request and thanking in a conversation.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Analyse the story 'Two old Men'.

17. Write about Eliza's transformation.

18. What is the reason that the play was named, 'The winter's Tale'?

19. Write about Martin Luther King Jr. as given by R.N. Roy.

20. What is the significance of Toynbee's meetings with Nehru?

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D–5208

Sub. Code
11343

DISTANCE EDUCATION

B.Sc. DEGREE EXAMINATION, MAY 2022.

Fourth Semester

Mathematics

ANALYSIS

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define countable set.
2. Give an example discrete metric.
3. Prove that composition of two continuous functions is continuous.
4. Is Q is open in R? Justify your answer.
5. Define Homeomorphism.
6. State Daurboux's theorem on derivatives.
7. Prove that any compact metric spaces is totally bounded.
8. Is constant function Riemann integrable?
9. Let A be a totally bounded subset of R. Prove that $\overline{A}$ is compact.
10. Define uniform convergence with example.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) If d_1, d_2 are metric in M. Prove that $d_1 + d_2$ is also a metric is M.

Or

(b) Prove that a subset of a countable set is countable.

12. (a) Let (M, d) be a metric space. A be any subset of M. Prove that $\overline{A} + A \cup D(A)$.

Or

(b) Prove that in any metric space, every closed ball is a closed set.

13. (a) Prove that A metric space M is connected iff there does not exist a continuous function f from M onto the discrete metric space $\{0,1\}$.

Or

(b) Prove that the function $f : R \to R$ defined by $f(x) = \sin x$ is uniformly continuous on R.

14. (a) For any partition P of $[a,b]$, show that $m[f; p](b-a) \le L[f; p] \le U[f; p] \le M[f; p](b-a)$.

Or

(b) State and prove Baire's category theorem.

15. (a) Prove that the closure of a totally bounded set is totally bounded.

Or

(b) State and prove intermediate value theorem.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. State and prove Holder's inequality.

17. Let (M_1, d_1) and (M_2, d_2) be two metric spaces. Prove that $f : M_1 \to M_2$ is continuous if any only if $f^{-1}(G)$ is open in M_1 whenever G is open in M_2.

18. State and prove Cantor's intersection theorem.

19. State and prove Piccards theorem.

20. (a) State and prove fundamental theorem of calculus.

    (b) Show that continuous image of a compact metric space is compact.

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D–5209	Sub. Code
	11344

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Fourth Semester

STATISTICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. The heights of 10 students in cm's chosen at random are given by 164, 159, 162, 168, 170, 168, 171, 154, 169, 165 calculate A.M.

2. Find the HM of the four numbers 2, 4, 6, 27.

3. Find the mean and range of 20, 22, 27, 30, 40, 48, 45, 32, 31, 35.

4. Define Kurtosis and its types.

5. Prove that the Correlation Coefficient is the geometric mean between the regression coefficients.

6. Prove that

   (a) $E = 1 + \Delta$

   (b) $E = (1 - \nabla)^{-1}$

7. Define Paasche's Index number and Bowley's Index number.

8. State the normal equation for fitting the second degree parabola.

9. State Lagranges formula for interpolation.

10. Explain Cyclical variation in time series.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Find the Geometric Mean and Harmonic Mean of the following distribution.

X:	1	2	3	4	5
f:	2	4	3	2	1

Or

(b) The four parts of a distribution are as follows

	Frequency	Mean
Part 1	50	61
Part 2	100	70
Part 3	120	80
Part 4	30	83

Find the mean of the entire distribution.

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

X :	0	5	10	15	20	25
Y :	12	15	17	22	24	30

Or

(b) Prove that the Correlation Co-efficient is independent of change of origin and scale.

13. (a) Prove that the angle between the two regression lines is given by $\theta = tan^{-1}\left(\left(\frac{r^2-1}{r}\right)\left(\frac{\sigma_x \sigma_y}{\sigma_x^2+\sigma_y^2}\right)\right)$

Or

(b) Estimate the missing term in the following table.

X:	0	1	2	3	4
U_x	1	3	9	-	81

14. (a) Find $U_{0.5}$ using Newton's interpolation formula.

X :	0	1	2	3	4	5
U_x :	1	4	9	16	25	36

Or

(b) Using Lagrange's Interpolation formula to find U_3

X:	0	1	2	5
U_x :	2	3	12	14

15. (a) Find the greatest and least value of (ABC), where (A) = 50, (C) = 80, (B) = 60, (AB) = 35, (AC) = 45 and (BC) = 42.

Or

(b) Explain Ideal Index Number.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find

(a) Mean

(b) Range

(c) Standard deviation

(d) Coefficient of variation for the following marks of 10 students 20, 22, 27, 30, 40, 48, 45, 32, 31, 35

17. Fit a second degree parabola

X:	0	1	2	3	4
Y:	1	1.8	1.3	2.5	2.3

18. Three judges assign the ranks to 8 entries in a beauty contest.

Judge X :	1	2	4	3	7	6	5	8
Judge Y :	3	2	1	5	4	7	6	8
Judge Z :	1	2	3	4	5	7	8	6

Which pair of judges has the nearest approach to common taste in beauty?

19. Population was recorded as follows in a village.

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

Estimate the population for the year 1945 and 1985.

20. Calculate (a) Laspeyers (b) Paaches (c) Fishers (d) Bowley's index Number

Commodities	Base Year 1990		Current Year 1992	
	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

D–5210	Sub. Code
	11351

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION, MAY 2022.

Fifth Semester

MODERN ALGEBRA

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Prove that $A\Delta B = B\Delta A$ for any two sets A and B.

2. Define Cartesian product of two sets A and B with an example.

3. State Lagrange's theorem.

4. Let G be a group such that $a^2 = e$ for all $a \in G$. Prove that G is abelian.

5. Define prime ideal.

6. Show that the center H of a group G is a normal subgroup of G.

7. If R is a ring such that $a^2 = a$ for all $a \in x$, prove that $a + a = 0$.

8. Let R is a ring with identify. Prove that $S = \{n - 1 / n \in z\}$ is a subring of R.

9. Define orthogonal set.

10. Show that $\dim V = \dim w + \dim w^{\perp}$.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Show that $f : R \to (0, 1)$ defined by $f(x) = \frac{1}{2}\left[1 + \frac{x}{1+|x|}\right]$ is a bijection.

Or

(b) If ρ and σ are equivalence relations defined on a set S, prove that $\rho \cap \sigma$ is an equivalence relation.

12. (a) Show that if a group G has exactly one subgroup of given order, then H is a normal subgroup of G.

Or

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

13. (a) Let R be any commutative ring with identity. Let P be an ideal of R. Prove that P is a prime ideal if and only if $R \mid P$ is an integral domain.

Or

(b) Prove that a ring R has no zero-divisors cancellation law is valid in R.

14. (a) Let R be a commutative ring with identify. Then prove that R is a field iff R has no proper ideals.

Or

(b) Prove that any polynomial ring $F[x]$ over a field F is an Euclidean domain where are define $d(f(x)) = \deg f(x)$.

15. (a) Let W_1 and W_2 be subspaces of a finite dimensional inner product space. Show that $(W_1 + W_2)^{\perp} = W_1^{\perp} \cap W_2^{\perp}$.

Or

(b) State and prove Schwartz's inequality.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Let G be a group and H be a subgroup of G. Then prove that

(a) $a \in H \Rightarrow GH = H$

(b) $aH = bH \Rightarrow a^{-1}b \in H$

(c) $a \in bH \Rightarrow a^{-1} \in Hb^{-1}$

(d) $a \in bH \Rightarrow aH = bH$.

17. State and prove Fermat's theorem.

18. Let R be a commutative ring with identity. Prove that an ideal M of R is maximal iff R/M is a field.

19. Let V be a finite dimensional vector space over a field F. Let A and B be subspaces of V, prove that $\dim(A + B) = \dim A + \dim B - \dim(A \cap B)$.

20. Show that every finite dimensional inner product space has an orthonormal basis.

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D–5211	Sub. Code
	11352

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Fifth Semester

OPERATIONS RESEARCH

(CBCS 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is decision theory?

2. Define basic feasible solution.

3. Define artificial variable.

4. State the complementary slackness theorem.

5. Explain the non-degenerate basic feasible solution.

6. State the Johnson's rule.

7. Explain maximin and minimax principal.

8. Define saddle point.

9. State the principle of dominance.

10. What is a dummy activity?

PART B — (5 × 5 = 25 marks)

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

11. (a) Explain the procedure for solving LPP by Graphical method.

Or

(b) Describe briefly the Big M method for LPP by giving examples.

12. (a) Write the dual of the following LPP.

Min $Z = 2x_2 + 5x_3$

Subject to $x_1 + x_2 \geq 2$;

$2x_1 + x_2 + 6x_3 \leq 6$;

$x_1 - x_2 + 3x_3 = 4$;

$x_1, x_2, x_3 \geq 0$

Or

(b) Explain Gomory's cutting plane method for pure Integer programming problem.

13. (a) Explain North west corner rule with suitable example.

Or

(b) Determine an initial basic feasible solution for the following TP using the least cost method (LCM).

	D_1	D_2	D_3	D_4	Supply
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Demand	6	10	15	4	35

14. (a) Explain modified distribution method.

Or

(b) Write the steps of Johnson's rule.

15. (a) Solve the following payoff matrix. Also determine the optimal strategies and value of the game.

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

Or

(b) Write the significance of network analysis.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Use simplex method to solve the following LPP.

Maximize $Z = 3x_1 + 2x_2$

Subject to $x_1 + x_2 \leq 4;$

$x_1 - x_2 \leq 2;$

$x_1, x_2 \geq 0$

17. Use two phase simplex method to solve :

Maximize $Z = 5x_1 - 4x_2 + 3x_3$

Subject to $2x_1 + x_2 - 6x_3 = 20;$

$6x_1 + 5x_2 + 10x_3 \leq 76;$

$8x_1 - 3x_2 + 6x_3 \leq 50;$

$x_1, x_2, x_3 \geq 0$

18. Find the optimum integer solution to the following IPP.

Maximize $Z = x_1 + x_2$

Subject to $3x_1 + 2x_2 \leq 5;$

$x_2 \leq 2;$

$x_1, x_2 \geq 0$ and are integers.

19. Find the initial solution to the following TP using VAM.

		Destination				
		D_1	D_2	D_3	D_4	Supply
Factory	F_1	3	3	4	1	100
	F_2	4	2	4	2	125
	F_3	1	5	3	2	75
Demand		120	80	75	25	300

20. Draw a network arrow diagram for the following information concerning some project and also find the critical path for the network.

Activity	Predecessor Activity or Activities
A	None
B	A
C	A
D	B, C
E	C
F	D
G	E
H	F, G

D–5212	Sub. Code
	11353

DISTANCE EDUCATION

B.Sc.(Mathematics) DEGREE EXAMINATION, MAY 2022.

Fifth Semester

NUMERICAL ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. When does an error arise in function interpolation?

2. State the Gauss – Seidal iteration method.

3. Define the Newton's interpolations.

4. Define the Everett's formula.

5. Write the Gauss's forward difference formula.

6. What is forward interpolations in numerical differentiation?

7. Define the Weddle's rule.

8. What is a predictor formula?

9. Analyse the modified Euler's method.

10. Define the Adam's Predictor – Corrector method.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Use Cramer's rule to solve the following system.

$$\begin{bmatrix} 2 & -3 & 1 \\ 3 & 1 & -1 \\ 1 & -1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$$

Or

(b) With the help of appropriate interpolation formula, find from the following data the weight of a baby at the age of one year and of ten years.

Age = x	3	5	7	9
Weight = $y(kg)$	5	8	12	17

12. (a) Using Lagrange's formula, find the value of $f(0)$ from the table given below.

x	–1	–2	2	4
$f(x)$	–1	–9	11	69

Or

(b) Using Bessel's formula obtain y_{26}. Given that $y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3544$ and $y_{32} = 3992$.

13. (a) Using the following table of values, find a polynomial representation of $f'(x)$ and then compute $f'(0.5)$.

x	0	1	2	3
$f(x)$	1	3	15	40

Or

(b) Find $\Delta^n \sin x$ by taking $h = 1$.

14. (a) Compute the approximate value of $\int_0^2 x^4 dx$ by taking four sub-intervals and compare it with the exact value.

Or

(b) Using Euler's method, compute $y(0.1)$ and $y(0.2)$ for the initial value problem $y''+y=0$, $y(0)=0$, $y'(0)=1$.

15. (a) Compute the solution of the following initial value problem by Euler's method, for $x=0.1$ correct to four decimal places, taking $h=0.02$, $\frac{dy}{dx}=\frac{y-x}{y+x}$, $y(0)=1$.

Or

(b) Illustrate the multiple methods. Give appropriate example.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Find the real root lying between 1 and 2 of the equation x^3-3x+1 upto 3 places of decimals by using regula falsi method.

17. Solve the following system by Gauss – Seidel iteration method.

$$20x_1+2x_2+x_3=30$$
$$x_1-40x_2+3x_3=-75$$
$$2x_1-x_2+10x_2=30$$

Give the solution correct upto three significant figures.

18. Use Stirling's formula to evaluate $f(1.22)$ given,

x	1.0	1.1	1.2	1.3	1.4
$f(x)$	0.841	0.891	0.932	0.963	0.985

19. Compute the solution of the following initial value problem for $x = 0.2$ using Taylor series solution method of order 4. $\frac{d^2y}{dx^2} = y + x\frac{dy}{dx}, y(0) = 1,\ y'(0) = 0$.

20. Use Runge – Kutta method of fourth order to find $y(0.1)$ given that $\frac{dy}{dx} = \frac{1}{x+y},\ y(0) = 1.$

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D–5213	Sub. Code
	11354

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Fifth Semester

TRANSFORM TECHNIQUES

(CBCS 2018 – 19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Find $L(\sin at)$.

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

3. If $L(f(t)) = F(s)$, prove that $L\{f(at)\} = \frac{1}{a}F\left(s/a\right)$.

4. Define odd function with example.

5. Interpret the half range Fourier series.

6. Find Fourier transform of $f(x)$, if $f(x) = \begin{cases} 1, & |x| < a \\ 1, & |x| > a \end{cases}$

7. State Fourier integral theorem.

8. State the convolution theorem.

9. Define the linear property of Z-transform.

10. Find $z^{-1}\left(\frac{1}{z-2}\right)$ when $|z|<2$.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Evaluate $L(f(t))$, where $f(t)=\begin{cases}0, & 0<t<1\\ t, & 1<t<2\\ 0, & t>2\end{cases}$.

Or

(b) Find Laplace transform of the periodic function $f(t)=\begin{cases}1, & 0\le t\le 2\\ 0, & 2\le t\le 4\end{cases}$.

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

Or

(b) Expand $f(x)=x^3$ in $(-\pi,\pi)$ as Fourier series.

13. (a) Find the Fourier sine series for $f(x) = x^2$ in $(0, \pi)$.

Or

(b) Prove that the Fourier transform of $f(x) = e^{-\frac{x^2}{2}}$ is $e^{-p^2/2}$.

14. (a) Find Fourier transform of $f(x) = \begin{cases} 1 \text{ for } |x| < a \\ 0 \text{ for } |x| > a \end{cases}$.

Or

(b) Evaluate $z[\sin \alpha k], k \geq 0$.

15. (a) Find $z^{-1}\left[\frac{4z}{z-a}\right]$ (i) $|z| < a$ (ii) $|z| \geq a$.

Or

(b) Find $z^{-1}\left\{\frac{z(z^2 - z + 2)}{(z-1)^2(z+1)}\right\}$ by using Residue theorem.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Using Laplace transform, solve $(D^2 + 2D + 5)y = e^{-x} \sin x$ where $y(0) = y'(0) = 1$.

17. Obtain the Fourier series for $f(x) = e^{2x}$ in $(0, 2\pi)$.

18. Represent the following function by a half range Fourier series $f(t)=\begin{cases} t & , \quad 0<t\le \pi/2 \\ \pi/2 & , \quad \pi/2<t\le \pi \end{cases}$

19. Find the Fourier sine and cosine transform of x^{n-1} hence deduce that $\frac{1}{\sqrt{x}}$ is self reciprocal under both the transform. Also find $F\left\{\frac{1}{\sqrt{|x|}}\right\}$.

20. Solve : $y_{k+2}+6y_{k+1}+9y_k=2^k$ given $y(0)=y(1)=0$.

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D–5214	Sub. Code
	11361

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Sixth Semester

DISCRETE MATHEMATICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

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

Answer ALL questions.

1. Define Atomic statement and give an example.

2. Expand PDNF and PCNF.

3. What do you mean by bounded lattice?

4. Define Hamming distance.

5. Define connected graph with example.

6. What is Chromatic number?

7. Give any two examples for tree graph.

8. How do you find the spanning tree on a graph?

9. Define Cutset.

10. What do you mean by Hamiltonian graph?

SECTION B — ($5 \times 5 = 25$ marks)

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

11. (a) Determine the truth table of the formula $P \to (Q \to R)$.

Or

(b) Obtain the PDNF for $\neg P \vee Q$.

12. (a) Let $(L, \leq)$ be a lattice. For any $a, b \in L$ the following are equivalent.

(i) $a \leq b$

(ii) $a \vee b = b$

(iii) $a \wedge b = a$.

Or

(b) State and prove DeMorgan's law for Boolean Algebra.

13. (a) State the properties of distance function δ.

Or

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

14. (a) Prove that in any graph the number of vertices of odd degree is even.

Or

(b) Write a note on chromatic polynomial.

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

Or

(b) Prove that every cutset in a connected graph G must contain atleast one edge of every spanning tree of G.

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

Answer any THREE questions.

16. Prove that $(P \to (Q \to R)) \Rightarrow (P \to Q) \to (P \to R)$.

17. If L and M are lattices then prove that $(L \times M, \vee, \wedge)$ is a lattice.

18. Let G be an undirected graph, then prove that G is bipartite if and only if it contains no odd cycle.

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

20. Prove that a given connected graph G is eulerian if and only if all the vertices of G are of even degree.

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D–5215

Sub. Code
11362

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Sixth Semester

FUZZY ALGEBRA

(CBCS – 2018-19 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

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

Answer ALL questions.

1. Define Membership function.

2. What do you mean by Strong α-cut?

3. Define complement of a fuzzy set and give an example.

4. What is Fuzzy number?

5. How will you define inverse of a Fuzzy relation?

6. Define Fuzzy equivalence relation.

7. Define the measure of Fuzziness.

8. What do you mean by U-Uncertainty?

9. State the three types of entropy.

10. Define measure of confusion.

SECTION B — ($5 \times 5 = 25$ marks)

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

11. (a) Prove that a fuzzy set A on $\mathbb{R}$ is convex iff $A(\lambda x_1 + (1-\lambda) x_2) \geq \min[A(x_1), A(x_2)]$.

Or

(b) If C is a continuous fuzzy complement then prove that C has a unique equilibrium.

12. (a) Define Support and height of a fuzzy set.

Or

(b) Verify the following properties for $A = [a_1, a_2]$ $B = [b_1, b_2]$ $O = [0, 0]$ $I = [1, 1]$.

(i) $A + B = B + A$

(ii) $A \cdot B = B \cdot A$

(iii) $A = O + A = A + O$

(iv) $I \cdot A = A \cdot I = 1$.

13. (a) Explain about Fuzzy ordering relation in detail.

Or

(b) Find the transitive closure of the fuzzy relation

$$R = \begin{bmatrix} .7 & .5 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & .4 & 0 & 0 \\ 0 & 0 & .8 & 0 \end{bmatrix}$$

14. (a) Describe in detail the types of Uncertainty.

Or

(b) Write a note on Hartley function.

15. (a) Write the principle of maximum uncertainty and minimum uncertainty.

Or

(b) Explain about the Measures of Dissonance.

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

Answer any THREE questions.

16. State and prove the first decomposition theorem.

17. State and prove the second characteristics theorem of fuzzy complement.

18. Prove that the Standard fuzzy intersection is the only idempotent t-norm.

19. Prove that every possibility measure on a finite power set is a probability measure iff $m(\{x\}) = Bel(\{x\})$ and $m(A) = 0$ for all subsets of X.

20. Explain the measures of non specificity.

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D–5216

Sub. Code
11363

DISTANCE EDUCATION

B.Sc. DEGREE EXAMINATION, MAY 2022.

Sixth Semester

Mathematics

COMPLEX ANALYSIS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Define complex conjugation.

2. Find radius of convergence for $\sum_{n=1}^{\infty} \frac{z^n}{n^2}$

3. Write any four elementary transformations.

4. Define Cross Ratio.

5. Prove that $\int_c \frac{dz}{z-a} = 2\pi i$ where C is the circle with centre a and radius r.

6. State maximum modulus theorem.

7. Find a zero for $f(z) = \sin z$

8. Define singularity of a function.

9. What is simple Pole?

10. Evaluate $\int_c \frac{dz}{2z+3}$ where C is $|z| = 2$.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Verify C.R. equations for $f(z) = e^x (\cos y + i \sin y)$.

Or

(b) Prove that the real and imaginary parts of an analytic function are harmonic functions.

12. (a) Write notes on Milne-Thompson method.

Or

(b) Find the radius of convergence for $\sum_{n=0}^{\infty} \frac{x^n}{n!}$.

13. (a) Prove that any bilinear transformation preserves cross ratio.

Or

(b) Prove that any bilinear transformation having ∞ as the only fixed point is a translation.

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

Or

(b) Evaluate using cauchy's integral formula $\frac{1}{2\pi i}\int_c \frac{z^2+5}{z-3} dz$ where C is $|z|=4$.

15. (a) Expand $\cos z$ into a Taylor's series about the point $z=\frac{\pi}{2}$.

Or

(b) Find the Laurent's series expansion of $f(z)=z^2e^{1/2}$ about $z=0$.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Prove that $u=2x-x^3+3xy^2$ is harmonic and find its harmonic conjugate. Also find the corresponding analytic function.

17. (a) Prove that the functions $f(z)$ and $\overline{f(z)}$ are simultaneously analytic.

(b) If $f(z)$ and $\overline{f(z)}$ are analytic in a region show that $f(z)$ is constant in that region.

18. Let f be a function which is analytic at all points inside and on a simple closed curve c. Then $\int_c f(z)\,dz=0$.

19. State and prove Cauchy's Residue theorem.

20. Evaluate $\int_0^{2\pi} \frac{d\theta}{5+4\sin\theta}$.

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D–5217	Sub. Code
	11364

DISTANCE EDUCATION

B.Sc. (Mathematics) DEGREE EXAMINATION, MAY 2022.

Sixth Semester

COMBINATORICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Define stirling numbers of the second kind.

2. In how many ways can a total 16 be obtained by rolling 4 dice once?

3. Define exponential generating function.

4. Define conjugate ordering.

5. Define multinomial number.

6. Define the permanent of a matrix A.

7. Define G-equivalent of two functions.

8. Define cycle index of the group of permutation.

9. Define primitive period.

10. Define polya – substitution.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Prove that the number of distributions of n distinct objects into m distinct boxes with the object in each box.

Or

(b) Prove that the number of subjections of the n-set into the m-set A is $m! s_n^m$.

12. (a) If $D_1, D_2, ... D_k$ form a partition of D, and S is the set $S = \{\phi \in R^D /$ for each $i = 1, 2, ... K, \phi(d) =$ constant for all $d \in D_i\}$, then prove that $\sum_{\phi \in S} W(\phi) = \prod_{i=1}^{K} \sum_{r \in R} W(r)^{|D_i|}$.

Or

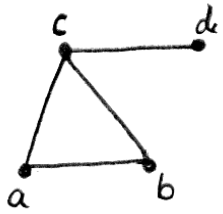
(b) Find the co-efficient of x^5 in $(a + bx + cx^2)^9$.

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

Or

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

14. (a) Find the chromatic polynomial of the following graph.



Or

(b) Explain "The manage problem".

15. (a) Prove that the number of circular necklace patterns with n-beads and atmost c colours in $\frac{1}{n}\sum_{d/n}\phi\left(\frac{n}{d}\right)c^d$, where ϕ is Eulers functions.

Or

(b) Prove that $Z(G[H]) = Z(G)[Z(H)]$.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Let n be a positive integer. Prove that the ordinary enumerator

(a) for the partitions of n is $F(t) = \frac{1}{(1-t)(1-t^2)(1-t^3).....}$

(b) for the partitions of n into precisely m parts is $\frac{t^m}{(1-t)(1-t^2)...(1-t^m)}$.

17. State and prove Burnside's lemma.

18. State and prove Polya's enumeration theorem.

19. State and prove the generalized inclusion and exclusion principle.

20. (a) Prove that $\Phi(t) = \sum_{j=0}^{N} W(j)(t-1)^j$. (5)

(b) Explain the term permutation group. (5)

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