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L – 3833

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, August 2021

Career Related First Degree Programme under CBCSS

Mathematics

Complementary Course I for Physics and Computer Applications

**MM 1131.6 : MATHEMATICS I CALCULUS, INFINITE SERIES AND VECTOR
ALGEBRA**

(2019 Admission)

Time : 3 Hours

Max. Marks : 80

PART – I

All the first ten questions are compulsory. They carry 1 mark each.

1. State product rule of differentiation for 3 functions.
2. Write the formula for radius of curvature of $y=f(x)$.
3. State Rolle's Theorem.
4. Write the formula for total area in polar coordinates between two angles ϕ_1 and ϕ_2 .
5. Write the formula for volume V enclosed by rotating the curve $y=f(x)$ about the x -axis between $x=a$ and $x=b$.

P.T.O.

6. Find the sum of all integers between 1 and 1000.
7. What is an arithmetico-geometric series?
8. State comparison test for convergence.
9. Define scalar triple product.
10. Write the position vector of a general point on the line joining A and C with position vectors a and c .

PART – II

Answer **any eight** questions from among the questions 11 to 22. These questions carry **2 marks** each.

11. Differentiate $f(x) = (3 + x^2)^2$.
12. Find $\frac{dy}{dx}$ if $x^3 - 3xy + y^3 = 2$.
13. Find the third derivative of $x^3 \sin x$.
14. Evaluate $\int x \sin x dx$.
15. Evaluate $\int_0^{\infty} \frac{x}{(x^2 + a^2)^2} dx$.
16. Find the mean value m of the function $f(x) = x^2$ between the limits $x = 2$ and $x = 4$.
17. Evaluate the sum $\sum_{n=1}^N \frac{1}{n(n+1)}$.

18. Test for convergence the series $\sum_{n=1}^{\infty} \frac{1}{(n!)^2}$.
19. Is the series $1 + \frac{1}{2} + \frac{1}{3} + \dots$ convergent? Why?
20. A point P divides a line segment AB in the ratio $x : y$. If the position vectors of the points A and B are a and b respectively, find the position vector of the point P.
21. Prove that for any three vectors a, b and c , $a \times (b \times c) + b \times (c \times a) + c \times (a \times b) = 0$.
22. Find the area of the parallelogram with sides $a = i + 2j + 3k$ and $b = 4i + 5j + 6k$.

PART - III

Answer any six questions from among the questions 23 to 31. These questions carry 4 marks each.

23. Find positions and number of stationary points of $f(x) = 2x^3 - 3x^2 - 36x + 2$.
24. What semi-quantitative results can be deduced by applying Rolle's Theorem to the following functions?
- (a) $\sin x$
- (b) $x^2 - 3x + 2$.
25. Show that the value of the integral $\int_0^1 \frac{1}{(1+x^2+x^3)^{1/2}} dx$ lies between 0.810 and 0.882.
26. Find the length of the curve $y = x^{2/3}$ from $x=0$ to $x=2$.
27. Sum the series $S = 1 + \frac{2}{2} + \frac{3}{2^2} + \frac{4}{2^3} + \dots$

28. Determine the range of values of x for which the power series $P(x)=1+2x+4x^2+8x^3+\dots$ converges.
29. Find the angle between the vectors $\bar{a}=i+2j+3k$ and $\bar{b}=2i+3j+4k$.
30. Find the volume of the parallelepiped with sides $a=i+2j+3k$, $b=4i+5j+6k$ and $c=7i+8j+10k$.
31. Find the direction of the line of intersection of two planes $x+3y-z=0$ and $2x-2y+4z=0$.

PART – IV

Answer any two questions from among the questions 32 to 35. These questions carry 15 marks each.

32. (a) State and prove Mean Value Theorem.
- (b) Using Mean Value Theorem, determine the inequality satisfied by $\ln x$ and $\sin x$ for suitable ranges of the real variable x .
33. Using integration by parts, find a relation between I_n and I_{n-1} where $I_n = \int_0^1 (1-x^3)^n dx$ and n is any positive integer. Hence evaluate $I_2 = \int_0^1 (1-x^3)^2 dx$.
34. Expand $f(x)=\sin x$ as a Maclaurin series about $x=0$.
35. (a) Four non-coplanar points A,B,C,D are positioned such that the line AD is perpendicular to BC and BD is perpendicular to AC. Show that CD is perpendicular to AB.
- (b) Find the distance from the point P with coordinates (1,2,3) to the plane that contains the points A, B and C having coordinates (0, 1, 0), (2, 3, 1) and (5, 7, 2).

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L – 3928

Reg. No. :

Name :

First Semester B.Sc./B.C.A. Degree Examination, August 2021

Career Related First Degree Programme Under CBCSS

Computer Science/Computer Applications/Physics with Computer Applications

Foundation/Vocational Course

CS 1121/CP 1121/PC 1171 : COMPUTER FUNDAMENTALS AND ORGANIZATION

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions. Each question carries 1 mark.

1. What is CMOS?
2. What is port?
3. What is ROM?
4. What is virtual memory?
5. What is USB?
6. What is instruction register?
7. What is OP CODE?

P.T.O.

8. What is ISR?
9. What is HLDA?
10. What is a bus?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. Each question carries **2** marks.

11. Write short notes on ASCII.
12. What is BIOS?
13. What is the use of expansion cards?
14. What is RAM? Explain its types.
15. What are the operations in cache memory?
16. Write short notes on memory representation.
17. Explain instruction format with an example.
18. What are the data transfer instructions?
19. What is parallel processing?
20. Write short notes on interrupt priority.
21. What is hit ratio?
22. What are the types of optical disks?
23. Write short notes on ribbon cables.
24. Why we need an external hard disk?
25. What are the advantages of hardwired control unit?
26. Write short notes on programmed I/O.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. **Each** question carries **4** marks.

27. Explain the characteristics of computer.
28. Explain the following :
 - (a) SMPS
 - (b) Motherboard.
29. Discuss Von Neumann model briefly.
30. What is memory hierarchy? Explain its characteristics.
31. Write notes on CPU registers.
32. Explain micro programmed control unit.
33. Explain fetch cycle with an example.
34. Explain types of interrupts.
35. Explain asynchronous data transfer.
36. What is accumulator? Explain its characteristics.
37. With a figure, explain interrupt cycle.
38. What are the advantages of magnetic disk?

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. **Each** question carries **15** marks.

39. Explain various input and output devices in detail.
40. Discuss types of secondary storage devices and its characteristics.

41. Briefly explain CISC and RISC architectures.
42. Explain working of DMA controller and transfer modes in detail.
43. Explain the following :
 - (a) Primary memory
 - (b) Instruction format and cycles.
44. Explain any four hardware located inside the computer.

(2 × 15 = 30 Marks)

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L – 3718

Reg. No. :

Name :

First Semester B.A./B.Sc. Degree Examination, August 2021

Career Related First Degree Programme Under CBCSS

Language Course : Additional Language I

Hindi

HN 1111.3 — POETRY AND MASS MEDIA

(2017-2019 Admission)

Time : 3 Hours

Max. Marks : 80

- I. एक या दो वाक्यों में उत्तर लिखिए।
1. कबीरदास की वाणी के संग्रह का नाम लिखिए।
2. सूरदास की भाषा कौन सी है?
3. तुलसीदास के किन्हीं चार रचनाओं के नाम लिखिए।
4. कामायनी किसकी रचना है?
5. निराला के प्रसिद्ध शोकगीत का नाम लिखिए।
6. पंतजी को किस रचना के लिए ज्ञानपीठ पुरस्कार मिला?
7. मधुशाला किसकी रचना है?
8. भारत का पहला समाचार पत्र कौन-सा है?

P.T.O.

9. कंप्यूटर का आविष्कार किसने किया?
10. सूचना प्रौद्योगिकी का अंग्रेजी शब्द क्या है?

(10 × 1 = 10 Marks)

II. किन्हीं आठ प्रश्नों के लघु उत्तर करीब 50 शब्दों में लिखिए।

11. कबीर के मत में गुरु का महत्व क्या है?
12. यशोदा से कृष्ण की शिकायत क्या है?
13. तुलसीदास की राय में संत और आम के पेड़ कैसे महत्वपूर्ण होते हैं?
14. 'स्नेह निझर बह गया' कविता का भाव क्या है?
15. 'सुख दुख' कविता का सन्देश क्या है?
16. 'मधुशाला' में चर्चित विषय क्या है?
17. 'नदी और साबुन' में अभिव्यक्त समस्या क्या है?
18. ई-मेल क्या है?
19. संगणक से क्या लाभ है?
20. ई-रीडिंग क्या है?
21. किन्हीं दो मुद्रण संचार माध्यम के नाम लिखिए।
22. समाचार पत्र से क्या-क्या लाभ हैं?

(8 × 2 = 16 Marks)

III. किन्हीं छः प्रश्नों के उत्तर करीब 120 शब्दों में लिखिए।

23. कबीर की वाणी के महत्व पर प्रकाश डालिए।
24. पठित पद के आधार पर गोपिकाओं के विरह वर्णन पर टिप्पणी लिखिए।

25. 'आवत ही हरषे नहीं, नेमन नहीं सनेह।

तुलसी तहाँ न जाइए, कंचन बरसे मेह॥ - भावार्थ लिखिए।

26. 'धोखा दे जाते हैं पुराने निशान

खोजता है ताकना पीपल का पेड़' - ये किस कविता की पंक्तियाँ हैं? संदर्भ क्या है?

27. 'भारत देश' कविता में अभिव्यक्त भाव क्या है?

28. जीवन के सुखदुख के बारे में पंत ने अपनी कविता में क्या कहा है?

29. नव इलक्टोनिक माध्यम के बारे में लिखिए।

30. परंपरागत सूचना माध्यम पर प्रकाश डालिए।

31. 'जानकारी आज ऊंगली की नोक पर है'। इस कथन पर विचार कीजिए।

(6 × 4 = 24 Marks)

IV. किन्हीं दो प्रश्नों के उत्तर करीब 250 शब्दों में लिखिए।

32. तुलसीदास के पठित दोहों का संक्षिप्त परिचय दीजिए।

33. 'नदी और साबुन' कविता का सारांश लिखकर उसका सन्देश व्यक्त कीजिए।

34. 'मधुशाला' कविता की विशेषताएँ लिखिए।

35. आधुनिक काल में सूचना माध्यम की आवश्यकता लिखकर विभिन्न प्रकार के आधुनिक सूचना माध्यम के बारे में लिखिए।

(2 × 15 = 30 Marks)

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L – 3832

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, August 2021

Career Related First Degree Programme Under CBCSS

Complementary Course for Physics and Computer Applications

**MM 1131.6 : MATHEMATICS I – COMPLEX NUMBERS, DIFFERENTIATION
AND THEORY OF EQUATIONS**

(2013, 2015-2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer all questions. Each question carries 1 mark.

1. Express $2 + i$ in the form $r(\cos \theta + i \sin \theta)$
2. State De Moivre's theorem.
3. Find the natural domain of $\frac{1}{(2x + 1)(x - 2)}$.
4. Use implicit differentiation to obtain the derivative of $y = \sin^{-1} x$.
5. State Rolle's theorem.
6. State L' Hospital's rule for finding the limits of indeterminate forms.
7. Find the horizontal asymptote of the function $f(x) = \frac{7x + 10}{x}$.
8. Change the signs of the roots of the equation $x^7 + 4x^5 + x^3 - 2x^2 + 7x + 3 = 0$.

P.T.O.

9. Form a rational cubic equation which shall have for roots $1, 1 + i$.
10. State the Descartes' rule of signs.

SECTION – II

Answer any eight questions from among the question 11 to 22. These questions carry 2 marks each.

11. Simplify : $\frac{(\cos 3\theta + i \sin 3\theta)^5 (\cos \theta - i \sin \theta)^3}{(\cos 5\theta + i \sin 5\theta)^7 (\cos 2\theta - i \sin 2\theta)^5}$.
12. Find all the values of $(1)^{\frac{1}{4}}$.
13. Find the slope of the curve $y = 2x^2 + 1$ at the point $(1, 3)$ and use it to find the equation of the tangent at $(1, 3)$.
14. A spherical balloon is being inflated.
- (a) Find a general formula for the instantaneous rate of change of the volume V with respect to the radius r , given that $V = \frac{4}{3} \pi r^3$.
- (b) Find the rate of change of V with respect to r at the instant when the radius $r = 5$.
15. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ if $y = x^2 \tan x$.
16. Determine whether the series $\sum_{k=1}^{\infty} \frac{1}{k(k+1)} = \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \frac{1}{4.5} + \dots$ converges or diverges. If it converges find the sum of the series.
17. Define Maclaurin series for a function $f(x)$ and find the Maclaurin series for $f(x) = e^x$.
18. If $z = e^{3x} \cos 7y$ find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$.

19. Find the Jacobian $\frac{\partial(x, y)}{\partial(u, v)}$ if $x = \sin u + \cos v$ and $y = -\cos u + \sin v$.
20. Solve the equation $x^3 - 3x^2 - 6x + 8 = 0$ given that sum of two of its roots is 2.
21. If α, β, γ are the roots of the equation $x^3 + px^2 + qx + r = 0$, find the equation whose roots are $\beta + \gamma, \gamma + \alpha, \alpha + \beta$.
22. Show that $12x^7 - x^4 + 10x^3 - 28 = 0$ has at least four imaginary roots.

SECTION - III

Answer any six questions from among the question 23 to 31. These questions carry 4 marks each.

23. Express $\cos^4 \theta \sin^3 \theta$ in terms of the sines of multiples of θ .
24. Separate $\sin^{-1}(\cos \theta + i \sin \theta)$ in to real and imaginary parts, $0 < \theta < \frac{\pi}{2}$.
25. Find the absolute maximum and absolute minimum values of $f(x) = x - \tan x$ in $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$.
26. Locate all the relative extrema and saddle points of $f(x, y) = 4xy - x^4 - y^4$.
27. The position function of a particle moving along a coordinate line is given by $s = -3t + 2$. Analyze the motion of the particle for $t \geq 0$ by finding the velocity and acceleration and give a schematic picture of the motion.
28. Define a power series in x . What are the convergence set, interval of convergence, and radius of convergence of a power series? Find the interval of convergence and radius of convergence of the power series $1 + (x - 2) + (x - 2)^2 + \dots + (x - 2)^k + \dots$
29. Use the method of Lagrangian multipliers to find the points on the circle $x^2 + y^2 = 45$ that are closets to and farthest from $(1, 2)$.

30. If α, β, γ are the roots of the equation $x^3 + px^2 + qx + r = 0$ find the values of $\Sigma \alpha^2, \Sigma \alpha^3, \Sigma \alpha^2 \beta$ and $\Sigma \alpha^2 \beta^2$.
31. Solve the reciprocal equation $6x^6 + 11x^4 - 33x^3 - 33x^2 + 11x + 6 = 0$.

SECTION – IV

Answer any two questions from among the question 32 to 35. These questions carry 15 marks each.

32. (a) Express $\frac{\sin 6\theta}{\sin \theta}$ as a polynomial in $\cos \theta$.
- (b) If $\sin(x + iy) = A + iB$ prove that
- $$\frac{A^2}{\cosh^2 y} + \frac{B^2}{\sinh^2 y} = 1 \text{ and } \frac{A^2}{\sin^2 x} - \frac{B^2}{\cos^2 y} = 1.$$
33. (a) A point moves along the intersection of the plane $y = 3$ and the surface $z = \sqrt{29 - x^2 - y^2}$. At what rate is z changing with respect to x when the point is at $(4, 3, 2)$?
- (b) State Euler's theorem for homogeneous functions and verify the theorem for the function $f(x, y) = x^3 - 2x^2y + 3xy^2 + y^3$.
34. (a) Show that the function $z = x^2 - y^2 + 2xy$ satisfies Laplace's equation
- $$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0.$$
- (b) Given $z = x^2 - y \tan x$, $x = \frac{u}{v}$, $y = u^2 v^2$. Use chain rule to find $\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$.
- (c) Verify that $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$ for the function $z = ax^2 + 2hxy + by^2$.
35. (a) Solve using Cardon's method the equation $x^3 - 27x + 54 = 0$.
- (b) Solve using Ferrari's method, the equation $x^4 - 10x^3 - 35x^2 - 50x + 24 = 0$.

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L – 3719

Reg. No. :

Name :

First Semester B.A./B.Sc. Degree Examination, August 2021

Career Related First Degree Programme Under CBCSS

Hindi

Language Course : Additional Language

HN 1111.3 — HINDI GADYA SAHITYA

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

I. 1 से 10 तक के प्रश्नों के उत्तर एक शब्द या एक वाक्य में लिखिए।

1. 'चंपक' किस विधा की रचना है?
2. प्रेमचंद उर्दू में किस नाम से लिखते थे?
3. 'शंकर' किस कहानी का पात्र है?
4. त्रिशंकु का क्या काम था?
5. चंपक को आश्रय देनेवाला कवि का नाम लिखिए।
6. सुशीला टाक भौरे जी की आत्मकथा का नाम लिखिए।
7. 'समाज सेवा' किसकी रचना है?
8. मनुष्य कैसा प्राणी है?

P.T.O.

9. 'त्रिशंकु बेचारा' किस विधा की रचना है?

10. 'मंगर' का रचनाकार कौन है?

(10 × 1 = 10 Marks)

II. निम्नलिखित में से किन्हीं आठ प्रश्नों के उत्तर करीब 50 शब्दों में लिखिए।

11. वृद्ध चंपक की सेवा क्यों करना चाहता है?

12. शंकर ने किससे सवा सेर गेहूँ उधार लिया? क्यों?

13. त्रिशंकु कौन है? उसकी सबसे बड़ी अभिलाषा क्या थी?

14. सुशीला जी की सास का अंतिम संस्कार कहाँ पर हुआ? क्यों?

15. सेवा का क्या अर्थ है?

16. मंगर का परिचय दीजिए।

17. सुशीला जी के लिए किराये का मकान मिलना क्यों मुश्किल था?

18. विश्वामित्र त्रिशंकु मास्टर से क्यों खुश हुए?

19. चंपक कैसे घायल हो गया?

20. शंकर को बीस वर्ष तक गुलामी क्यों करनी पड़ी?

21. किराये का मकान मिलने के लिए सुशीला जी को क्या-क्या शर्तें माननी पड़ीं?

22. किशोर कौन है? चंपक से उनका क्या संबंध है?

23. समाज के भीतर समता का भाव रहना क्यों आवश्यक है?

24. इंद्रजी के अनुसार सिविल लाइन्स में किस प्रकार का व्यक्ति रह सकता है?

25. विप्र ने शंकर को क्या चेतावनी दी?
26. मंगर आधी रोटी बैलों को क्यों खिलाते थे?

(8 × 2 = 16 Marks)

III. किन्हीं छः प्रश्नों के उत्तर करीब 120 शब्दों में लिखिए।

27. शंकर किसान से मज़दूर कैसे बना?
28. 'चंपक' एकांकी का सारांश लिखिए।
29. बुढापे में मंगर की हालत कैसी थी?
30. भास्कर पाण्डे ब्राह्मण न होते हुए भी सरनेम पाण्डे क्यों रख लिया?
31. समाजसेवा का मतलब क्या है?
32. 'चंपक' कहानी के किशोर की भूमिका पर प्रकाश डालिए।
33. त्रिशंकु को क्यों धर्मशाला में रहना पडा?
34. मंगर की चरित्रगत विशेषताओं पर प्रकाश डालिए।
35. 'सवा सेर गेहूँ' कहानी का सारांश लिखिए।
36. 'हम उस मोहल्ले में उन जातिवादी लोगों के बीच नहीं रहेंगे'। सुशीला जी को ऐसा निर्णय क्यों लेना पडा?
37. मनुष्य कैसा प्राणी है? उनकी बुद्धि की खासियत क्या है?
38. त्रिशंकु मास्टर का परिचय दीजिए।

(6 × 4 = 24 Marks)

IV. किन्हीं दो प्रश्नों के उत्तर करीब 250 शब्दों में लिखिए।

39. 'समाजसेवा' नामक निबंध का आशय लिखिए।
40. 'त्रिशंकु बेचारा' का व्यंग्य समझाइए।

-
41. 'शिकंजे का दर्द' में चित्रित जाति-व्यवस्था पर विचार कीजिए।
 42. 'चंपक' में मानवीय संवेदना पर प्रकाश डालिए।
 43. 'सवा सेर गेहूँ के लिए जिंदगी भर पैरों में गुलामी की बेड़ियाँ'। समीक्षा कीजिए।
 44. 'मंगर' रेखाचित्र का सारांश लिखिए।

(2 × 15 = 30 Marks)

Reg. No. :

Name :

First Semester B.A./B.Sc./B.Com. Degree Examination, August 2021

First Degree Programme under CBCSS

Language Course – I – English

EN 1111.1/EN 1111.2/EN 1111.3 : LANGUAGE SKILLS

**(Common for B.A./B.Sc. (EN 1111.1), B.Com (EN 1111.2) & Career Related
(EN 1111.3)**

(2019 Admission)

Time : 3 Hours

Max. Marks : 80

1. Answer **all** questions, each in a word or sentence.
1. _____ is a type of communication when people exchange urgent information without using words.
2. The study of production, transmission and reception of speech sounds in human beings is called _____.
3. [\] is used to mark _____.
4. If the voice moves from lower to higher pitch within a single syllable it is called _____.
5. A word with more than two syllables is called _____.
6. The rise and fall in pitch or utterance bound pitch is referred to as _____.

7. _____ is a unit of sound.
8. English is said to be _____ since the letters do not correspond to the sound.
9. Diphthongs are _____ in number.
10. _____ are sounds during the production of which air escapes through the mouth freely and continuously without any audible friction.

(10 × 1 = 10 Marks)

II. Answer **any eight**, each in a short paragraph not exceeding **50** words.

11. What is verbal communication?
12. What is noise?
13. *Skimming*
14. Name any two barriers to effective communication.
15. State any two rules of telephone etiquette.
16. What are the skills required by an Anchor?
17. What is plagiarism?
18. Explain macro skills and micro skills involved in learning a language.
19. Differentiate between close reading and interactive reading.
20. What is the difference between interpersonal and intrapersonal communication?
21. Discuss the different types of editing.
22. Write a note on pitch and intonation.

(8 × 2 = 16 Marks)

III. Answer **any six**, each in a paragraph not exceeding **100** words.

23. Imagine that you are attending an interview and complete the following conversation.

You : May I come in, sir?

Interviewer : _____

You : _____

Interviewer : Good Morning. Be seated please.

You : _____

Interviewer : Can you tell me something about yourself?

You : _____

24. Prepare a speech on the hazards of cutting down trees / deforestation.

25. Prepare minutes of a meeting conducted by the Film Club in your college. You are the Secretary of the Club and the meeting is related to online screening of a motivational film.

26. Write a script for the anchor who is hosting a cooking competition.

27. Edit the passage given below

The greatest contribution to mathematics and by extension to all branches of science was the concept of Zero-given to the world by aryabhatta, an Indian intellectual. The concept was first burrowed by the Arabs and from them through the Phoenicians, it reached the western world. Therefore the intellectual property right to Zero legally, morelly and historically belongs to India and Indians.

28. Write a blog on a place of historical importance in your state.

29. Explain the rules of netiquette to your friend.

30. How would you introduce yourself during an interview?

31. Write a script for a podcast on Pandemic and Online Teaching.

(6 × 4 = 24 Marks)

IV. Answer **any two** each in about **300** words.

32. Write a paragraph on **any two** of the following

(a) Importance of Value Education

(b) Your dream job

(c) Joint Family System.

33. Write a telephone conversation between you and your dentist. It can be about an appointment.

34. Prepare a cover letter and CV for the post of Office Assistant in a renowned educational institution in response to an advertisement that appeared in a daily.

35. Write a speech to be delivered on World Aids Day.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, August 2021.

Career Related First Degree Programme under CBCSS

MATHEMATICS

Complementary Course I for Physics & Computer applications

MM 1131.6: MATHEMATICS – I CALCULUS, INFINITE SERIES AND VECTOR ALGEBRA

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions :

1. State the Rolle's theorem.
2. What is the relationship between curvature and radius of curvature?
3. Define the stationary point of inflection.
4. Evaluate: $\int \ln x \, dx$.
5. State the formula to find the length of a curve in polar coordinates.
6. Define the Gamma function $\Gamma(n)$. What is the value of $\Gamma(\frac{1}{2})$?
7. Sum the infinite series: $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots$
8. Using ratio test prove that the series $\sum_{n=1}^{\infty} \frac{2^n}{n!}$ converges.

9. Write the equation of the plane that containing the points A, B and C whose position vectors are a, b and c.
10. If $a = b + \lambda c$, then show that $a \times c = b \times c$.

(10 × 1 = 10 Marks)

SECTION – B

Answer any eight questions

11. Find the derivative of f with respect to x if $f(t) = 2at$, where $x = at^2$.
12. Evaluate $f'(x)$ if $f(x) = x^3 \sin x$.
13. Verify the mean value theorem for the function $f(x) = x^2$.
14. Compute the 200th derivative of $\sin x$.
15. Evaluate $\int x^3 e^{-x^2} dx$.
16. Evaluate the integral $\int_0^2 (2-x)^{-4} dx$.
17. Obtain the mean value of the function $f(x) = x^3$ between the limits $x = 1$ and $x = 2$.
18. Estimate: $\int_0^{\infty} x e^{-x} dx$.
19. Verify whether the series $\sum_{n=1}^{\infty} \frac{4n^2 - n - 3}{n^3 + 2n}$ converges.
20. Sum the series: $\sum_{n=1}^N (n+1)(n+3)$.
21. State the Ratio comparison test.
22. Test for convergence the harmonic series $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} \dots$ using the integral test.
23. Find the area of the parallelogram with sides $a = i + 2j + 3k$ and $b = 4i + 5j + 6k$.
24. Find the angle between the vectors $A = -2i + j - 2k$ and $B = 2i - 2j$.

25. Write any two properties of the scalar product of vectors.
 26. Show that $[abc] = [bca]$

(8 × 2 = 16 Marks)

SECTION – C

Answer any six questions.

27. Compute the magnitude of the radius of curvature at the point (x, y) on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
 28. Find the derivative with respect to x of $f(x) = x^2$ from first principles.
 29. Find $\frac{dy}{dx}$ if $y = a^x$.
 30. Evaluate $\int e^{ax} \sin bx \, dx$.
 31. Find the surface area of a cone formed by rotating about the x -axis and the line $y = 2x$ between $x = 0$ and $x = h$.
 32. Compute the total length of the asteroid $x^{2/3} + y^{2/3} = a^{2/3}$.

33. Evaluate the sum: $\sum_{n=1}^N \frac{1}{n(n+1)}$

34. Sum the series using integration $S = 1 + \frac{2}{2} + \frac{3}{2^2} + \frac{4}{2^3} + \dots$

35. Test for convergence $\sum_{n=3}^{\infty} \frac{\sqrt{2n^2 - 5n + 1}}{4n^3 - 7n^2 + 2}$

36. A line is given by $r = a + \lambda b$, where $a = i + 2j + 3k$ and $b = 4i + 5j + 6k$.
 37. Four non-coplanar points A, B, C, D are positioned such that line AD is perpendicular to BC and BD is perpendicular to AC. Show that CD is perpendicular to AB.
 38. For any three vectors a, b and c , prove that $a \times (b \times c) + b \times (c \times a) + c \times (a \times b) = 0$

(6 × 4 = 24 Marks)

SECTION - D

Answer any two questions.

39. Find the positions and natures of the stationary points of the function $f(x) = 2x^3 - 3x^2 - 36x + 2$.
40. What semi - quantitative results can be deduced by applying Rolle's theorem to the following functions $f(x)$ with a and C chosen so that $f(a) = f(c) = 0$?
- (a) $\cos x$
- (b) $x^2 + 7x + 3$
- (c) $2x^3 - 9x^2 - 24x + k$.
41. Find a reduction formula for the integration $I_n = \int (1 - x^3)^n dx$.
42. Show that the value of the integral $I = \int_0^1 \frac{1}{(1 + x^2 + x^3)^2} dx$ lies between 0.810 and 0.882.
43. Sum the series: $S(x) = \frac{x^4}{3(0!)} + \frac{x^5}{4(1!)} + \frac{x^6}{5(2!)} + \dots$
44. Find the distance from the point P with coordinates $(1,2,3)$ to the plane that contains the points A, B and C having coordinates $(0,1,0), (2,3,1)$ and $(5,7,2)$ and hence show that the point $(1,2,3)$ is in the opposite side of the plane from the origin.

(2 × 15 = 30 Marks)

(Pages : 4)

L – 3830

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, August 2021

Career Related First Degree Programme under CBCSS

Physics and Computer Applications

Foundation Course-I

**PC 1121– MECHANICS, THERMODYNAMICS AND PROPERTIES OF
MATTER**

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions in one or two sentences. Each question carries 1 mark.

1. Define moment of inertia.
2. What is the design consideration used to increase the moment of inertia of a flywheel?
3. How does an isochoric process be different from isobaric process?
4. Why does the entropy be considered as thermal inertia?
5. The adiabatic curves on the PV diagram are called isoentropics. Why?
6. Give the Clausius inequality condition.
7. What are the advantages of I section girders?
8. State the law of efflux.

P.T.O.

9. What is the main purpose of Quincke's method?
10. Mention the use of Lee's disc method in heat experiment.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions, not exceeding a paragraph. Each question carries **2** marks.

11. What is radius of gyration? What is its significance?
12. Compare mass and moment of inertia.
13. What are the factors on which the kinetic energy of a rotating body depends?
14. Distinguish between homogeneous system and heterogeneous system with example.
15. Explain the requirements to be satisfied by a system to be in thermodynamic equilibrium.
16. State Carnot's theorem.
17. Explain the TS diagram of Carnot's cycle.
18. Distinguish between irreversible and reversible processes.
19. Mathematically prove the impossibility of temperatures below absolute zero.
20. Distinguish between axis of bending and neutral axis.
21. Distinguish between uniform and non-uniform bending.
22. What are the drawbacks of the determination of the surface tension of water by capillary rise method?
23. How can you identify streamline flow from turbulent flow?

24. Explain the dependence of surface tension on temperature.
25. State Wiedemann- Franz law. Where is it valid?
26. What makes conduction different from radiation?

(8 × 2 = 16 Marks)

SECTION – C

Answer any six questions. Each question carries 4 marks.

27. What is the angular momentum and rotating kinetic energy of a particle of angular velocity 60 s^{-1} , if the angular momentum vector coincides with the axis of rotation and its moment of inertia about the axis is 0.01 kgm^2 .
28. Determine the moment of inertia of a uniform rod of length l and mass m about an axis through the centre and perpendicular to its length. Hence determine the moment of inertia of a rod of mass 2 kg and length 50 cm about an axis through one end and perpendicular to its length.
29. A steel wire of 1 mm radius is bent to form a circle of 10 cm radius. Find the bending moment and the maximum stress if the Young's modulus of steel is 200 Gpa .
30. A cylindrical rod of mass 2kg , 10 cm radius and 1 m length is rotated about an axis through the centre and perpendicular to the axis of symmetry. The axis of rotation is then changed to one end of the rod. What will be the ratio of the moments of inertia?
31. A Carnot's refrigerator has the coefficient of performance 2. If the heat absorbed from the lower temperature is 200J , find the heat rejected at the higher temperature and efficiency of the refrigerator.
32. Show that for the same compression ratio the efficiency of an Otto engine is more than a Diesel engine.
33. Determine the elevation produced in the middle of a rectangular bar of breadth 2.5 cm and thickness 2.5 mm loaded uniformly with 250 gm weights at a distance of 10 cm from the knife edges. The length of the bar between the knife edges is 50 cm . The Young's modulus of the material of the bar is 10^{10} Pa .
34. Find the work done in stretching a wire of 1 mm^2 cross section and 1 m long through 0.1 mm if the material of the wire has the Young's modulus $=0.2 \text{ TPa}$.

35. Show that the excess pressure inside a liquid drop is $2T/r$ where T is the surface tension and r the radius of the drop.
36. What amount of energy will be liberated if 1000 droplets of Water each 10^{-8} m in radius coalesce to form a single drop? The surface tension of water is 70 mNm^{-1} .
37. The diameters of water main where a venturimeter is connected to it are 20 cm and 12 cm. What is the rate of water flow if the water levels in the 2 piezometer tubes differ by 6cm?
38. Two closely spaced concentric spheres, which act as black body radiators are maintained at ice point and steam point. The space between the spheres is evacuated. Calculate the net rate of energy transfer between the two spheres. Given Stefan's constant $= 5.67 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}$.

(6 × 4 = 24 Marks)

SECTION – D

Answer any two questions. Each question carries 15 marks:

39. State and explain the theorems on moment of inertia Hence use them to derive the MI of a solid sphere about
 - (a) Its diameter and
 - (b) A tangent
40. Discuss the laws of thermodynamics.
41. What is Carnot's cycle? Derive the Clapeyron's latent heat equation using Carnot's cycle. Discuss its two applications.
42. With detailed theory explain static torsion experiment.
43. State Bernoulli's theorem and derive Bernoulli's equation Explain Euler's equation and an application of Bernoulli's theorem.
44. Discuss the experimental determination of the thermal conductivity of rubber and solar temperature with necessary theory.

(2 × 15 = 30 Marks)

(Pages : 3)

L – 3927

Reg. No. :

Name :

First Semester B.Sc./B.C.A. Degree Examination, August 2021

Career Related First Degree Programme Under CBCSS

Computer Science/Computer Applications/Physics with Computer Applications

Foundation/Vocational Course

CS 1121/CP 1121/PC 1171 — COMPUTER FUNDAMENTALS AND ORGANIZATION

(2018 – 2019 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Very Short Answer Type)

(One word to maximum one sentence, Answer all questions).

1. Expand SMPS.
2. What is Mother Board?
3. Define Volatile Memory.
4. What is a Register?
5. Define Hit Ratio.
6. Expand RISC.

P.T.O.

7. What is an instruction?
8. Define SISD stream.
9. Define Interrupt.
10. Define Peripheral Device.

(10 × 1 = 10 Marks)

SECTION – B

(Short Answer)

(Not to exceed one paragraph, answer any eight questions. Each question carries 2 marks).

11. Write about video Card.
12. Discuss the role of a computer port.
13. Write about Pointing Devices.
14. Write a note on various types of ROM.
15. What is meant by locality of reference?
16. Write a note on memory stick.
17. What is one address instruction format? Explain.
18. Explain MOV and LEA instructions.
19. Write a note on Hardwired Control Unit.
20. Explain handshaking.
21. Write about priority interrupt.
22. Write a note on Programmed I/O.

(8 × 2 = 16 Marks)

SECTION – C

(Short Essay)

(Not to exceed **120** words, answer **any six** questions. **Each** question carries **4** marks).

23. Write a note on Characteristics of Computer.
24. Explain about ASCII.
25. Differentiate RAM and ROM.
26. Explain about CPU Registers.
27. Write a note on Cache Memory.
28. Write a note on CISC architecture.
29. Explain about Microprogram.
30. Write about isolated versus memory mapped I/O.
31. Write about asynchronous serial communication.

(6 × 4 = 24 Marks)

SECTION – D

(Long Essay)

(Answer **any two** questions. **Each** question carries **15** marks).

32. Explain Types of Output Devices.
33. Write a detailed note on secondary storage devices.
34. Explain in detail about Microprogrammed Control Unit.
35. Write about DMA.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

First Semester B.A./B.Sc./B.Com. Degree Examination, August 2021

First Degree Programme under CBCSS

LANGUAGE COURSE — I – English

EN 1111.1/EN 1111.2/EN 1111.3 – LANGUAGE SKILLS

**(Common for B.A./B.Sc. (EN 1111.1) B.Com. (EN 1111.2) &
Career Related (EN 1111.3)**

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

- I. Answer **all** questions, each in a word or sentence.
1. _____ are sounds during the production of which air escapes through the mouth freely and continuously without any audible friction.
2. The study of production, transmission and reception of speech sounds in human beings is called _____
3. The rise and fall in pitch or utterance bound pitch is referred to as _____
4. If the voice moves from lower to higher pitch within a single syllable it is called _____
5. _____ is a unit of sound.
6. English is said to be _____ since the letters do not correspond to the sound.
7. A word with more than two syllables is called _____

8. Diphthongs are _____ in number.
9. [\] is used to mark _____
10. _____ is a type of communication when people exchange urgent information without using words.

(10 × 1 = 10 Marks)

II. Answer **any eight**, each in a short paragraph not exceeding **50** words.

11. What is verbal communication?
12. What is noise?
13. Skimming.
14. Name any two barriers to effective communication.
15. State any two rules of telephone etiquette.
16. What are the skills required by an Anchor?
17. What are the factors to be considered to master the skill of public speaking?
18. What is plagiarism?
19. Explain macro skills and micro skills involved in learning a language.
20. Differentiate between close reading and interactive reading.
21. Mention any two ways to follow Netiquette.
22. What are some barriers to reading?
23. What is the difference between interpersonal and intrapersonal communication?
24. Is listening skill important while conducting an interview?
25. Discuss the different types of editing.
26. Write a note on pitch and intonation.

(8 × 2 = 16 Marks)

III. Answer **any six**, each in a paragraph not exceeding **100** words.

27. Imagine that you are attending an interview and complete the following conversation.

You : May I come in, sir?

Interviewer : _____

You: _____

Interviewer: Good Morning. Be seated please.

You: _____

Interviewer: Can you tell me something about yourself?

You: _____

28. Prepare a speech on the hazards of cutting down trees/ deforestation.

29. Prepare minutes of a meeting conducted by the Film Club in your college. You are the Secretary of the Club and the meeting is related to online screening of a motivational film.

30. Write a script for the anchor who is hosting a cooking competition.

31. Write an email to a well- known sports personality inviting him/her to inaugurate Annual Sports Day in your college.

32. You have been asked to write a report on the lockdown situation in your locality.

33. Edit the passage given below

The greatest contribution to mathematics and by extension to all branches of science was the concept of Zero — given to the world by aryabhatta, an Indian intellectual. The concept was first burrowed by the Arabs and from them through the Phoenicians, it reached the western world. Therefore the intellectual property right to Zero legally, morelly and historically belongs to India and Indians.

34. Write a script for a podcast on the Pandemic and Online education.
35. Write a blog on a place of historical importance in your state.
36. Explain the rules of netiquette to your friend.
37. Write a paragraph on the increasing crimes in India.
38. How would you introduce yourself during an interview?

(6 × 4 = 24 Marks)

IV. Answer **any two** each in about **300** words.

39. Write a paragraph on any two of the following :

(a) Importance of Value Education

(b) Your dream job

(c) Joint Family System

40. Write a telephone conversation between you and your dentist. It can be about an appointment.
41. Write a letter to the Municipal Chairman complaining about the indiscriminate dumping of waste in your locality.
42. Prepare a cover letter and CV for the post of Office Assistant in a renowned educational institution in response to an advertisement that appeared in a daily.
43. Write a letter to your friend describing your experience on the first day of college.
44. Write a speech to be delivered on World Aids Day.

(2 × 15 = 30 Marks)