

Reg. No. :

Name :

First Semester B.A./B.Sc. Degree Examination, November 2019

First Degree Programme Under CBCSS

Foundation Course I

EN 1121 & CG 1121.3 : WRITINGS ON CONTEMPORARY ISSUES

(Common for B.A./B.Sc. English & Communicative English)

(2019 Admission)

Time : 3 Hours

Max. Marks : 80

PART A

I. Answer **ALL** questions, each in a word or a sentence :

1. What is dopamine?
2. What does the Section 64 of NDPS act state?
3. What is UTM?
4. Define AI?
5. When was the term secularism first used?
6. What is MSD and RSI?
7. When did the General Assembly adopt the Universal Declaration of Human rights?

P.T.O.

8. What does Adam Smith state about infanticide?
9. How did ageing in India increased exponentially?
10. Expand and define GNP. **(10 × 1 = 10 Marks)**

PART B

II. Attempt any **EIGHT** questions in not more than **50** words :

11. Explain the different causes for drug abuse, state in the prescribed essay.
12. Describe Alan Turing's contribution to artificial intelligence.
13. How does drug abuse affects the brain of the user?
14. What were the suggestions the author received regarding the steps to cure her disease?
15. Elucidate the different aspects of civil law.
16. Why is the author sceptical regarding the use of smart phone?
17. Explain the different economic and cultural rights.
18. Discuss the method of formulating the ratio of girls to boys in India.
19. What is Amartya Sen's views about the female-male ratio in different parts of India?
20. Explain the significance of infrastructure in old age care.
21. What does the author state about 'boy-preference'?
22. What was the effect of globalization on China? **(8 × 2 = 16 Marks)**

PART C

- III. Attempt any **SIX** questions in around 100 words :
23. Describe Turing Test and its relevance in the context of artificial intelligence.
 24. Discuss the different exercise that the author did to cure her rotator cuff tear.
 25. Describe the formation of the Universal Declaration of Human Rights.
 26. Discuss the transition of total fertility rate in Bangladesh.
 27. Explain the impact of female education in women empowerment.
 28. Discuss the initiatives of China and South Korea in women empowerment.
 29. What are the economic factors that influence geriatric care in India?
 30. Give a brief overview about the impact of privatisation.
 31. What is the effect of globalization on health care? **(6 × 4 = 24 Marks)**

PART D

- IV. Attempt any **TWO** questions in not less than 300 words :
32. Give an overview of Samudranil Mukherjee's views on drug abuse.
 33. Discuss the concept of artificial intelligence as put forth by Gareth Southwell.
 34. Describe the evolution of written norms in human rights.
 35. Critically examine P. Sainath's views about globalization. **(2 × 15 = 30 Marks)**

(Pages : 6)

H – 1995

Reg. No. :

Name :

First Semester B.A./B.Sc./B.Com. Degree Examination, November 2019

First Degree Programme Under CBCSS

Language Course – I

EN 1111.1, EN 1111.2 & EN 1111.3 : LISTENING, SPEAKING AND READING

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

(2016 Admission to 2018 Admission)

Time : 3 Hours

Max. Marks : 80

1. Answer **all** questions, each in a **word** or sentence.
1. Write the IPA symbol for the last sound in the word Singing.
2. "The sun rises in the east". What intonation would be associated with this statement?
3. Given here is an incorrect transcription of the word Engineering. Correct the mistake and rewrite. / endʒɪni:ɪŋ/
4. Using the IPA symbols, provide an example for a long vowel.
5. Give at least three different spellings for the long vowel /i: /
6. Transcribe the word Author.
7. Give an expression that is commonly used while greeting a guest.
8. You bumped into someone while walking on the road. How would you apologise?
9. What is a blog?
10. Who is Mrs. Shorrocks?

(10 × 1 = 10 Marks)

P.T.O.

- II. Answer any **eight**, each in a short paragraph not exceeding **50** words.
11. Transcribe the following words : Creative, Tumbler, Laminate, Printed.
 12. Write a short note on e-mails.
 13. Create a short exchange between a librarian and a student at the library.
 14. Indicate the type of reading technique you'd employ while reading :
 - (a) Telephone Directory,
 - (b) Railway Time Table,
 - (c) Newspaper Report,
 - (d) Tabular Data
 15. Identify the diphthongs in the following words : Loan, Bound, Manure, Coin.
 16. List some techniques and practices to improve one's vocabulary.
 17. What is intonation?
 18. How did Jean and Pierre trick Marion and Gaultier?
 19. How did Lady Muriel and Lady Grace react when the queen stopped them from accompanying her?
 20. How does the spat between his daughters lead to Abel Merryweather discovering the truth?
 21. If you were looking for a particular train in a train time table, would you be skimming or scanning a page? How are the two processes different?
 22. Bring out the irony in the title of the play "The Dear Departed".

(8 × 2 = 16 Marks)

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

23. You are at a reputed garment store in the city. You have come to return some dresses that you've purchased previously because you are unhappy with them. Frame a dialogue between you and the customer service personnel.

24. How important are images and graphics in texts?

25. You are looking for hostel accommodation. Complete the dialogue between you and the hostel warden based on the dialogue cues.

You	Hostel Warden
Enters the room, introduces	Greets and welcomes you
States purpose of visit, enquires about hostel facilities, type of room etc	Responds, gives details about the facilities and rooms
Asks about timings and rules	Gives details
Asks about hostel fees	Provides details
Thanks the warden	Asks to fill registration form before leaving.

26. You are Mayank and you've just missed a train. Complete the conversation with the station master :

Station master : Good afternoon. How can I help you?

Mayank : _____

Station master : Oh! Where were you going?

Mayank : _____

Station manager : Ah yes. That train left just a few minutes ago.

Mayank : _____

Station master : Let's see. The next train leaves at 17:15 from platform 2.

Mayank : _____

Station master : No, there are no trains before that.

Mayank : _____

Station master : No, you will have to take a new ticket. Your previous one was for a passenger train. This is an express train.

Mayank : _____

Station master : That will be Rs. 48.

Mayank : _____

Station master : Platform number 2. You can take the stairs to the left of this counter.

Mayank : _____

Station master : Safe journey.

27. It is a holiday and you and your friend want to go for a movie. Construct a dialogue in which both of you discuss and decide on which movie to watch and why.

28. Read the poem and answer the questions below :

Sundays too my father got up early
and put his clothes on in the blueblack cold,
then with cracked hands that ached
from labor in the weekday weather made
banked fires blaze. No one ever thanked him.

I'd wake and hear the cold splintering, breaking.
When the rooms were warm, he'd call,
and slowly I would rise and dress,
fearing the chronic angers of that house,

Speaking indifferently to him,
who had driven out the cold
and polished my good shoes as well.

What did I know, what did I know
of love's austere and lonely offices?

- (a) What colour does the poet use to describe the cold?
- (b) What days did the father get up to make the fire?
- (c) Were the father's actions were appreciated? How can you tell?
- (d) Provide an appropriate title for the poem.

29. Darton's expedition was a doomed expedition. Comment.

30. Write a short note on the different varieties of English.

31. Read the passage and answer the questions that follow :

Do you remember when you were twelve years old? It was a confusing time for me. When I was twelve, I had a very embarrassing situation. I went to the family barber, Mr. Willard, and he cut my hair very short. All my friends had long hair back then. That was the style. Mr. Willard didn't care much for style. I didn't want to be different, and I looked like a plucked chicken. I even missed a few days of school because of my embarrassment. My sister was amused. She told me not to be disappointed. After all, she said, the hair will grow back. Still, to me, it was very upsetting.

I learned a valuable lesson from this situation. Today, when I go to the barber, I always say exactly how I want my hair. I advise you to do the same. Speak to the barber before you sit down in that revolving chair. Explain exactly what you want. Watch carefully in the mirror as the barber cuts your hair. Don't be frightened to speak up. Barbers want their customers to be happy. They welcome your instructions.

I was probably too sensitive about my hair then. Now, at my age, I am just proud of the hair that I have. By the way, Mr. Willard no longer cuts my hair: He's retired. His daughter Wilhelmina, a hairstylist, runs the shop. She not only cuts my hair, but she I so styles the hair of my wife and children. No more plucked chickens.

- (a) What happened to the writer when he was twelve?
- (b) How is the writer different now?
- (c) Why did the narrator miss a few days of school?
- (d) The phrase plucked chicken implies?

(6 × 4 = 24 Marks)

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

32. Create conversations based on the prompts given :

- (a) You and your friend are planning to go out for dinner. Decide on where you want to go, giving reasons for choosing a particular restaurant.
- (b) At the restaurant, choose items from the menu that both of you would like to order.
- (c) Give your order to the waiter. The waiter will give his/her suggestions, based on which you will alter your choice of food.

33. Attempt the appreciation of the story "Under Fire".

34. The Organs of speech.

35. Transcribe the following words: speaker, coffee, cassette, climate, roller coaster, plantation, minority, hardbound, cellular, contrary, sty, leather, lather, pizza, application.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

First Semester B.A. / B.Sc. Degree Examination, November 2019

First Degree Programme Under CBCSS

English Language

Foundation Course I

EN 1121 : WRITINGS ON CONTEMPORARY ISSUES

(2016 – 2018 Admission)

Time : 3 Hours

Max. Marks : 80

I. Answer **all** questions, each in a word or a sentence.

1. What is NHRC?

2. What does the speaker mean when he says that "My mother bore me in the southern wild"?

3. What is ICCPR?

4. What did Nani do?

5. What is the significance of Patna conference resolution?

6. Who appears before the author in her dream like state in "The Goddess of Revenge."?

7. Define the terms globalisation and localisation.

P.T.O.

8. What does the term freedom imply for the thirsty people?
9. What is alcohol withdrawal delirium?
10. What are stimulants?

(10 × 1 = 10 Marks)

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

11. Explain the association between economic disparity and human rights.
12. What is the theme of the poem "The Little Black Boy"?
13. Discuss the case of Roop Kanwar.
14. Examine the author's depiction of society in the story "The Goddess of Revenge."
15. How does the author describe the grandmother's reaction on hearing the name Nani?
16. Explain the effects of globalisation on India?
17. Describe author's views on the policy changes in the context of localisation.
18. Explain the symbolism in the act of stitching as depicted the poem "Freedom."
19. What are the basic patterns in the usage of psycho-active substances?
20. Discuss the association between alcohol and different mental health problems.
21. Why does the cup in the hand of the poet rattles like drum?
22. The tailor's idea of freedom.

(8 × 2 = 16 Marks)

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

23. Explain the impact of globalisation on human rights.
24. Examine the poet's depiction of Nani.
25. Discuss the association between poverty and human dignity.
26. Explain author's views on "the varying forms of violence confronted by different sections of women."
27. What are the views of Joseph E Stiglitz about pro-globalization policies?
28. What are the different treatment methods in alcoholism?
29. Examine the images and symbols used by Jeet Thayil to depict the life of an alcoholic.
30. Discuss the atrocities encountered by the underprivileged women.
31. Write a short note on the etiology of adolescent substance abuse?

(6 × 4 = 24 Marks)

IV. Answer **any two** of the following in not less than **300** words.

32. Examine Gail Omvedt's analysis of violence against women.
33. Examine the major themes portrayed in the poem "Nani."
34. Describe the process of localisation as discussed by Helena Norberg-Hodge.
35. Discuss N.R. Madhava Menon's views on human rights and dignity.

(2 × 15 = 30 Marks)

(Pages : 4)

H – 2096

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, November 2019

First Degree Programme Under CBCSS

Complementary Course for Mathematics

ST 1131.1 : DESCRIPTIVE STATISTICS

(2018 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions : Each question carries 1 mark

1. What is nominal scale.
2. Define primary data?
3. What is percentage bar diagram?
4. Name any two sources of secondary data.
5. What do you mean by random sampling?
6. What is scatter plot?
7. Define coefficient of variation

P.T.O.

8. Define Skewness
9. What is the relationship between correlation coefficient and regression coefficient?
10. What is the expression of Spearman's rank correlation coefficient?

(10 × 1 = 10 Marks)

SECTION – B.

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

11. Distinguish between questionnaire and schedule?
12. What is time series graphs? When false base line is used in line graphs?
13. What is sampling survey? What are the advantage of sampling over census?
14. Distinguish between SRSWOR and SRSWR.
15. What is sampling error? How it is different from non-sampling error?
16. Define Harmonic mean (HM) Give a situation where HM is used.
17. What is coefficient of variation? When it is used?
18. Distinguish between raw moments and central moments.
19. What is pie chart? When it is used?
20. List out any four non-random sampling methods.
21. Define Mean Deviation? What are its merits?
22. Define Pearson's and Bowleys measures of skewness

(8 × 2 = 16 Marks)

SECTION – C

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

23. Write a short note on scales of measurement with examples.

24. Explain any two methods of collecting primary data?

25. Construct histogram for following data

Class	0–10	11–20	21–30	31–40	41–50	51–60
Frequency	7	13	22	10	7	4

26. Show that sum of squares of the deviations of observations is minimum, when it is taken from arithmetic mean.

27. Find the missing value, x for the following data, if its mean of distribution is 10.20

Observation	5	8	x	12	13	15
Frequency	9	9	11	8	4	9

28. Find Harmonic Mean of 2, 4, 6, 8.

29. For positive numbers, show that $AM \geq GM \geq HM$

30. Write a short note on curve fitting

31. Derive the expression for angle between two regression lines.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Explain any three methods of sampling. State merits and demerits of each method.
33. (a) Explain different measures of central values like arithmetic mean, median and mode
- (b) Compare quartile deviation and standard deviation. List out merits and demerits of each measures.
34. Following table shows the price of a particular commodity in Thiruvananthapuram and Kozhikode for six months

Thiruvananthapuram	50	60	55	62	58	57
Kozhikode	48	52	50	46	64	58

Compare the consistency in prices of two cities.

35. (a) Derive Spearman's rank correlation?
- (b) Height and weight of ten students of a college is given below use Karl Pearson's method to check whether height and weight are correlated.

Height (in cm)	140	130	152	148	150	160	162	140	150	148
Weight (in cm)	40	38	45	42	42	55	50	46	48	45

(2 × 15 = 30 Marks)

(Pages : 3)

H-2011

Reg. No. :

Name :

First Semester B.A./B.Sc. Degree Examination, November 2019

First Degree Programme under CBCSS

Hindi (Additional Language I)

HN 1111.1 : PROSE AND ONE ACT PLAYS

(2018 Admission onwards)

Time : 3 Hours

Max. Marks : 80

1. प्रत्येक परश्न का उत्तर एक या दो वाक्य में लिखिए :

1. 'पंच परमेश्वर' किसकी रचना है?
2. भीष्म साहनी की आत्मकथा का नाम क्या है?
3. 1924 में गांधी जी ने किस आंदोलन का नेतृत्व किया था?
4. जगदीश चन्द्र माथुर के संस्मरण किन पुस्तकों में संग्रहीत है?
5. हरिशंकर परसाई के कहानी संग्रहों के नाम बतलाइए।
6. 'आधे अधूरे' किसका नाटक है?
7. 'भुक्ति मार्ग' किसका काव्य संग्रह है?
8. 'बहू की विदा' एकांकी में कौन कौन से पात्र हैं?
9. गोदान किसका उपन्यास है?
10. भीष्म साहनी के नाटकों के नाम लिखिए।

(10 × 1 = 10 Marks)

P.T.O.

II. किन्हीं आठ प्रश्नों के उत्तर लगभग 50 शब्दों में लिखिए :

11. डॉ चड्ढा ने मरीज़ को देखने से क्यों इंकार कर दिया?
12. श्रीमान ने किस शर्त पर हेतु को जाने दिया?
13. बीड़ी पीने की बुरी आदत की शुरुआत गांधीजी में कैसे हुई?
14. पी.डी. टंडन के व्यक्तित्व की विशेषताओं को बतलाइए।
15. मरकर नरक पहुंचने पर भी लेखक को दुख क्यों नहीं हुआ?
16. राधा भाभी क्या दिखावटी व्यवहार करती हैं?
17. 'यही कि मेरे पिता अंधे क्यों हुए' वाक्यांश की व्याख्या कीजिए।
18. कमला के चरित्र की विशेषताओं को स्पष्ट कीजिए।
19. भगत किस प्रकार के व्यक्ति थे?
20. अधिकारी वर्ग की तरह अध्यापक का ओहदा ऊंचा करने के लिए झा साहब ने क्या व्यवस्था की?
21. हेतु जब घर जाने की इच्छा प्रकट कर रहा था तब घर का वातावरण कैसा था?
22. पांडवों ने अंत में दुर्योधन को कैसे पराजित किया?

(8 × 2 = 16 Marks)

III. किन्हीं छे प्रश्नों के उत्तर लगभग 100 शब्दों में लिखिए।

23. डॉ चड्ढा का चरित्र की क्या विशेषताएँ थीं?
24. हेतु का चरित्र चित्रण कीजिए।
25. किस घटना से गांधी जी को शुद्ध अहिंसा का पाठ मिला?
26. डॉ झा की विशिष्टताओं को स्पष्ट कीजिए।
27. 'अंडे के छिलके' एकांकी के विभिन्न पात्र किस प्रकार दोहरी जिंदगी जी रहे हैं?

28. 'महाभारत की एक सांझ' में अभिव्यक्त दुर्योधन के चरित्र पर प्रकाश डालिए।

29. जीवनलाल समाज के कैसे लोगों का प्रतिनिधित्व करता है?

30. लेखक को नरक से बोलने की आवश्यकता क्यों पड़ी ?

31. भगत के मानसिक द्वंद को प्रेमचन्द ने किस प्रकार चित्रित किया है?

(6 × 4 = 24 Marks)

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

32. मानवता के श्रेष्ठ आदर्शों की स्थापना प्रेमचंद की कहानियों में हुई है मंत्र कहानी के आधार पर सिद्ध कीजिए।

33. 'चोरी और प्रायश्चित्त' पाठ की समीक्षा कीजिए।

34. 'मैं नरक से बोल रहा हूँ' पाठ के आधार पर हरिशंकर परसाई जी की व्यंग्य कला पर प्रकाश डालिए।

35. 'शिष्टाचार' कहानी का सारांश लिखिए।

(2 × 15 = 30 Marks)

Reg. No. :

Name :

First Semester B.A./B.Sc. Degree Examination, November 2019

First Degree Programme under CBCSS

Malayalam Language

Language Course II – Additional Language I

ML 1111.1 : മലയാള കവിത

(2018 admission onwards)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. ജരിതയുടെ ഭർത്താവ് ആര്?
2. 'ഗ്രാമവൃക്ഷത്തിലെ കുയിൽ' ആരുടെ രചനയാണ്?
3. 'ആരോമൽച്ചേകവരകം പിടിച്ചിട്ടും' അരമുഴംപോലും പിൻവാങ്ങാത്തതെന്ത്?
4. ആദ്യത്തെ കർഷകരാജാവായി ശോഭിച്ചതാര്?
5. 'ഗോപികാദണ്ഡകം' എന്ന രചന ഏതു കവിതയോടുള്ള പ്രതികരണമാണ്?
6. ഒക്ടേവിയോ പാസിന്റെ 'സൺസ്റ്റോൺ' എന്ന കൃതി 'സൂര്യശില' എന്ന പേരിൽ വിവർത്തനം ചെയ്തതാര്?
7. ഇക്കുറി ആതിരയെ ഒരുമിച്ചു കൈകൾകോർത്ത് എതിരേല്ക്കണമെന്നു പറയാൻ കാരണമെന്ത്?

8. 'അമ്പലമണി' രചിച്ചതാര്?
9. ഉണ്ണിയാർച്ച പിറന്ന വീടേത്?
10. 'ശക്തിയുടെ കവി' എന്ന വിശേഷണം നേടിയതാര്?

(10 × 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. "എങ്ങാനും പൊയ്ക്കാൾകമ്മേ! നീകൂടെ മരിക്കേണ്ടോ" - ഇങ്ങനെ പറയാൻ കാരണമെന്ത്?
12. "ഭീതിവേണ്ട, തരികതെനിക്കു നീ" - പറഞ്ഞതാര്? സൂചിതമെന്ത്?
13. മനസിനിയുടെ ചികുരഭരം വിലസിയത് എപ്രകാരമാണ്? കല്പനയുടെ ഭംഗി പരിശോധിക്കുക.
14. "സങ്കടം കാൺകിലും കാണാതെ പോകയോ
മംഗലേ നീയൊരു മങ്കയല്ലേ?" - പറഞ്ഞതാര്? കാരണമെന്ത്?
15. "ഒന്നിണ്ടു കേൾക്കണം അച്ഛനോട്" - ഉണ്ണിയാർച്ച ചോദിക്കുന്നതെന്ത്?
16. വൃദ്ധന്റെ പ്രണയം ചാഞ്ഞു പെയ്യുന്ന മഴപോലെയൊന്നു പറയുന്നതെന്തുകൊണ്ട്?
17. "മർദ്ദനമേറ്റു വലഞ്ഞൊരൻ ദൃഢ-
മസ്തകമിപ്പൊഴുമുയരുന്നൂ." - ആരുടെ? എന്തുകൊണ്ട്?
18. "അവിടെ നീ പോകേണ്ട, തവരുടെ മാർഗ്ഗമെന്നറിയൂ" - എവിടെ? സൂചിതമെന്ത്?
19. "എത്ര കൊഴുത്ത ചവർപ്പു കുടിച്ചു വറ്റിച്ചു നാം
ഇത്തിരി ശാന്തിതൻ ശർക്കര നൂണയുവാൻ" - സൂചിതമെന്ത്?
20. "ആരന്ധകാരത്തെ സൃഷ്ടിച്ചവൻ, ദയാ-
വാരാശിയദ്ദേഹം വാഴ്ത്തപ്പെട്ടോൻ" - ഇങ്ങനെ സ്തുതിക്കാൻ കാരണമെന്ത്?
21. "അതിരുണ്ടവർതൻ ക്ഷമയ്ക്കും" - ആരുടെ? സൂചിതമെന്ത്?
22. പാടത്തു കതിരിനു കനം വീഴുന്നതിനൊപ്പം കോമന്റെ വീട്ടിലുയർന്ന ആശകൾ ഏവ?

(8 × 2 = 16 Marks)

(Pages : 3)

H – 2097

maths

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, November 2019

First Degree Programme Under CBCSS

Complementary Course for Mathematics

PY 1131.1 : MECHANICS AND PROPERTIES OF MATTER

(2018 Admission onwards)

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. Write an expression for moment of inertia of a circular disc.
3. Define periodic motion.
4. What is energy density of a wave?
5. Define Hook's law.
6. Define Poisson's ratio. What is the theoretical limit of poisons ratio.
7. What is meant by cohesive force?
8. Why mercury won't wet a glass surface while water wet the surface?
9. What do you meant by viscous force?
10. Define coefficient of viscosity.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

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

11. State and explain parallel axis theorem.
12. Obtain an expression for the moment of inertia of a disc about any diameter.
13. What is torsional oscillation? Obtain an expression for the period of oscillation of torsion pendulum?
14. Distinguish between transverse and longitudinal waves.
15. Derive an expression for potential energy of a particle executing SHM.
16. Explain Young's modulus, bulk modulus and rigidity modulus of elasticity.
17. Obtain an expression for twisting couple per unit twist of a wire?
18. What is meant by bending moment?
19. Distinguish between streamline and turbulent flow of a liquid.
20. How temperature affect surface tension?
21. How will you determine the value of "g" using compound pendulum?
22. Obtain an expression for Poiseuille's formula.

(8 × 2 = 16 Marks)

SECTION – C

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

23. Calculate the moment of inertia of a disc of mass 1.2 Kg and radius 8cm about (a) its diameter (b) an axis parallel to a diameter and tangential to the disc.
24. A progressive harmonic wave travelling in a string is given by $y = 5 \sin 2\pi \left(\frac{x}{100} - \frac{t}{0.02} \right)$ with length expressed in cm and time in second. Find the wavelength, amplitude, frequency and velocity of wave.

25. A particle moving with simple harmonic motion has a period 0.001s and amplitude 0.5cm. Find the acceleration, when it is 0.2cm apart from its mean position and its maximum velocity.
26. Calculate the force required to stretch a 2cm diameter steel rod by 0.01 percentage. Young's modulus of steel is $2 \times 10^{11} \text{ N/m}^2$.
27. A rod of rectangular cross section having breadth 2cm and thickness 1cm is bent in the form of an arc of radius 10m. If the young's modulus is 10^{11} N/m^2 , find the stress and strain on convex surface and bending moment.
28. A soap bubble is spherical in shape and has a diameter of 10cm. If the surface tension of the surface separating soap solution and air is $40 \times 10^{-3} \text{ N/m}$. What is the excess pressure of the air in the bubble over the atmospheric pressure?
29. A capillary tube 10^{-3} m diameter and 0.2m in length is fitted horizontally to a vessel kept full of alcohol of density $0.8 \times 10^{-3} \text{ kg/m}^3$. The capillary tube is 0.3m below from the surface of the alcohol in the vessel. Calculate the volume of the alcohol flows in 5 minute.
30. An air bubble of radius 1cm is allowed to rise through a long cylindrical column of viscous liquid and travel at a steady rate of 0.21cm/s. If the density of the liquid is 1470 kg/m^3 , find the viscosity of the liquid. Neglect the density of the air.
31. Calculate the radius of gyration of a disc of mass 1.2 Kg and radius 8cm about (a) its diameter (b) an axis parallel to a diameter and tangential to the disc.

(6 × 4 = 24 Marks)

SECTION – D

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

32. What is the difference between simple pendulum and compound pendulum? Obtain an expression for the period of oscillation of a compound pendulum.
33. Define a cantilever. Obtain an expression for the depression of a beam supported at its ends and loaded in the middle.
34. Discuss Jaeger's method for determining the surface tension of given liquid.
35. Derive an expression for the moment of inertia of a fly wheel.

(2 × 15 = 30 Marks)

(Pages : 4)

H – 2095

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, November 2019

First Degree Programme under CBCSS

Mathematics

Core course

MM 1141 : METHODS OF MATHEMATICS

(2018 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

(All the questions are compulsory. Each question carries 1 mark.)

1. Define local linear approximation of f at x_0 .
2. Define percentage error in measurement.
3. Give the differential formula for quotient rule of differentiation.
4. Define inflection points of a curve.
5. How can you interpret the sign of acceleration?
6. Give the formula for average value of a function.
7. What is the volume of a solid bounded by $x = a$ and $x = b$ having a cross sectional area, $A(x)$

P.T.O.

8. Give the formula for work done by a variable force F in moving an object over $[a, b]$
9. Define Hyperbolic sine and cosine functions
10. Evaluate $\int_0^{\infty} \frac{dx}{x^3}$

(10 × 1 = 10 Marks)

SECTION – II

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

11. Suppose that x and y are differentiable functions of t and are related by the equation $y = x^3$ find $\frac{dy}{dt}$ at time $t = 1$ if $x = 2$ and $\frac{dx}{dt} = 4$ at time $t = 1$.
12. State L'Hospital's Rule for form $0/0$.
13. Find the intervals on which $f(x) = x^3$ is increasing and the intervals on which it is decreasing.
14. Evaluate $\lim_{x \rightarrow \infty} \frac{x^{-4}}{\sin(\frac{1}{x})}$.
15. State a sufficient condition for $f(x)$ to be concave up or concave down.
16. State Mean value theorem for $f(x)$.
17. Find the average value of the function $f(x) = \sqrt{x}$ over the interval $[1, 4]$.
18. State the formula for Volume by Washer method.
19. A triangular lamina with vertices $(0, 0)$, $(0, 1)$ and $(1, 0)$ has density $\delta = 3$. Find its total mass.
20. The face of a dam is a vertical rectangle of height 100ft and width 200 ft. Find the total fluid force exerted on the face when the water surface is level with the top of the dam.

21. Prove that $\cosh^2 x - \sinh^2 x = 1$.

22. Evaluate $\int_0^{\infty} \frac{dx}{1+x^2}$.

(8 × 2 = 16 Marks)

SECTION – III

(Answer any six questions. Each question carries 4 marks)

23. Suppose that the side of a square is measured with a ruler to be 10 inches with a measurement error of at most $\pm \frac{1}{32}$ in. Estimate the error in the computed area of the square.

24. Define critical points and find all critical points of $f(x) = 3x^{\frac{5}{3}} - 15x^{\frac{2}{3}}$.

25. Find the relative extrema of $f(x) = 3x^5 - 5x^3$.

26. Find the absolute maximum and minimum values of the function $f(x) = 2x^3 - 15x^2 + 36x$ on the interval $[1,5]$, and determine where these values occur.

27. An open box is to be made from a 16-inch by 30-inch piece of cardboard by cutting out squares of equal size from the four corners and bending up the sides. What size should the squares be to obtain a box with the largest volume?

28. Suppose that a particle moves along a coordinate line so that its velocity at time t is $v(t) = 2 + \cos t$. Find the average velocity of the particle during the time interval $0 \leq t \leq \pi$.

29. Find the arc length of the curve $y = x^{\frac{3}{2}}$ from $(1,1)$ to $(2, \sqrt{2})$ by integrating with respect to x .

30. Use cylindrical shells to find the volume of the solid generated when the region R under $y = x^2$ over the interval $[0,2]$ is revolved about the line $y = -1$.

31. Evaluate $\int_0^{\infty} (1-x)e^{-x} dx$.

(6 × 4 = 24 Marks)

SECTION – IV

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

32. (a) Suppose that liquid is to be cleared of sediment by allowing it to drain through a conical filter that is 16cm high and has a radius of 4cm at the top. Suppose also that the liquid is forced out of the cone at a constant rate of $2\text{cm}^3/\text{min}$. Find a formula that expresses the rate at which the depth of the liquid is changing in terms of the depth.
- (b) Find a point on the curve $y = x^2$ that is closest to the point (18,0).
33. (a) Evaluate $\lim_{x \rightarrow 0} (1 + \sin x)^{\frac{1}{x}}$. using L'Hospital's Rule.
- (b) Find the radius and height of the right circular cylinder of largest volume that can be inscribed in a right circular cone with radius 6 inches and height 10 inches.
34. (a) A coin is released from rest near the top of a building at a point that is 1250 ft above the ground. Assuming that the free-fall model applies and $g = 32\text{ft}/\text{s}^2$ how long does it take for the coin to hit the ground, and what is its speed at the time of impact?
- (b) Derive the formula for the volume of a right pyramid whose altitude is h and whose base is a square with sides of length a .
35. (a) Find the centroid of the region R enclosed between the curves $y = x^2$ and $y = x + 6$.
- (b) Prove that $\sin^{-1} x = \ln|x + \sqrt{x^2 + 1}|$ and $\tanh^{-1} x = \frac{1}{2} \ln\left(\frac{1+x}{1-x}\right)$.

(2 × 15 = 30 Marks)