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Reg. No. : .....

Name : .....

Third Semester B.A./B.Sc. Degree Examination, January 2023

First Degree Programme under CBCSS

Language Course VII – Additional Language III – Malayalam

ML 1311.1 : ദൃശ്യകലാസാഹിത്യം

(2019-2020 Admission)

Time : 3 Hours Max. Marks : 80

PART A

ഒരു വാക്കിലോ ഒറ്റ വാചകത്തിലോ ഉത്തരമെഴുതുക.

1. കാന്താരതാരകം ഏത് കൃതിയുടെ വ്യാഖ്യാനമാണ്?

2. ഒബെസിക്കിൾ തീവ്സ് ഏത് ചലച്ചിത്ര പ്രസ്ഥാനത്തെ അടയാളപ്പെടുത്തുന്ന സിനിമയാണ്.

3. 'പെരുമ്പറ' ആരുടെ കൃതിയാണ്?

4. ജി. ശങ്കരപ്പിള്ള രചിച്ച രണ്ട് നാടകങ്ങളുടെ പേരെഴുതുക.

5. ശകുന്തളയ്ക്ക് പ്രിയമുള്ള രണ്ട് സഖിമാർ ആരെല്ലാമായിരുന്നു?

6. കുഞ്ചൻ നമ്പ്യാർ എഴുതിയ ഒരു ഓട്ടൻതുള്ളൽ കൃതിയുടെ പേരെഴുതുക.

7. അതിദുഃഖകാരണമിന്നാരാമ സഞ്ചരണം - ആർക്കാണ് ആരാമ സഞ്ചരണം ദുഃഖമായി മാറിയത്?

P.T.O.

8. 'രാവുണ്ണി' ഏത് സാഹിത്യ വിഭാഗത്തിൽപ്പെടുന്ന കൃതിയാണ്?

9. മിന്നൽക്കൊടിയിറങ്ങി മന്നിലേ വരികയോ? - ആരുടെ വരവിനെക്കുറിച്ചാണ് സൂചന?

10. ഗുരുകടാക്ഷ പരമഭാഗ്യമുള്ളവ-
നൊരു ദുരാധി വരികയില്ല മന്നവാ - ആർക്കാണ് ഗുരുകടാക്ഷ പരമഭാഗ്യമുള്ളതായി പറയുന്നത് ?

(10 × 1 = 10 Marks)

PART B

ഒരു ഖണ്ഡികയിൽ ഏതെങ്കിലും **എട്ടു** ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. 'നിന്റെ കുഞ്ഞോമന നമ്പ്യാരോടു ചെന്നുപറ രാവുണ്ണി തോറ്റിട്ടില്ലെന്ന് - രാവുണ്ണി ഇങ്ങനെ പറയാനിടയായ സാഹചര്യമെന്ത്?

12. "ബന്ധനം ചെയ്യേണ്ട നീ മാം
ബന്ധുവത്രെ തവ ഞാൻ" - ആരുടെ വാക്കുകൾ? സന്ദർഭമേത്?

13. ദുർവ്വാസാവ് മഹർഷി ശകുന്തളയെ ശപിക്കാനിടയായ സാഹചര്യമെന്ത്?

14. ഓട്ടൻതുള്ളലിനെ പരിചയപ്പെടുത്തുക.

15. അന്റോണിയോ റിക്കി മോഷ്ടാവായ സാഹചര്യം വിശദീകരിക്കുക.

16. ഓട്ടൻ ദുര്യോധനനോടു പറഞ്ഞ കൗന്തേയ വിശേഷങ്ങൾ എന്തെല്ലാമായിരുന്നു?

17. വിഷ്ണു രമയ്ക്ക് നിശയ്ക്ക് ശശാങ്ക
നുമക്കു ഹരൻ; നളനോർക്കിൽ നിനക്കും - ആരെക്കുറിച്ചാണ് സൂചിതം?

18. എ.ആർ. രാജരാജവർമ്മ - കുറിപ്പെഴുതുക.

19. ഇനിയൊരടി നടന്നാൽ കിട്ടുമേ കൈക്കലെന്നും
പ്രതിപദമപി തോന്നുമാറു മന്ദം നടന്നു - ആര്? എപ്പോൾ?

20. ''ആ വിളക്കും മാഞ്ഞു. നവഖലീ! നവഖലീ! സബർമതി ദൂരെയാണ്. ദൂരെ. വളരെ ദൂരെ'' - ശാന്തി ഏത് സന്ദർഭത്തിലാണ് ഇങ്ങനെ പറയുന്നത്?

21. കൗന്തേയന്മാരുടെ വിശേഷങ്ങളറിഞ്ഞ് അസ്വസ്ഥനായ ദുര്യോധനനെ കർണ്ണൻ സമാധാനിപ്പിച്ചത് എവ്വിധമായിരുന്നു?

22. ഭർതൃഗൃഹത്തിലേക്ക് യാത്രയാകുന്ന ശകുന്തളയെ താപസിമാർ അനുഗ്രഹിച്ചതെങ്ങനെ?

23. നല്ലതു നല്ലതിനോടു ചേരേണം തവ
വല്ലഭനപരൻ തുല്യൻ നഹി നൂനം - വ്യാഖ്യാനിക്കുക.

24. ഏകാങ്കനാടകങ്ങളുടെ പ്രത്യേകതകൾ വിവരിക്കുക.

25. ''വേണ്ട, ഒടിഞ്ഞത് ഒടിഞ്ഞതായിരിക്കട്ടെ. ഏച്ചുകെട്ടിയാൽ മുഴച്ചിരിക്കും'' - സന്ദർഭം വിവരിക്കുക.

26. 'രാവുണ്ണി' എന്ന നാടകത്തിലെ രാവുണ്ണി എന്ന കഥാപാത്രത്തെ പരിചയപ്പെടുത്തുക.

(8 × 2 = 16 Marks)

PART C

ഒരു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും **ആറ്** ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

27. നളചരിതം ആട്ടക്കഥയുടെ സവിശേഷതകൾ എന്തെല്ലാം?

28. ഇറ്റാലിയൻ നിയോറിയലിസ്റ്റിക് സിനിമയുടെ മുദ്രകൾ ബൈസിക്കിൾ തീവ്സിൽ പ്രതിഫലിക്കുന്നതെങ്ങനെയെന്ന് വിവരിക്കുക.

29. ഒരു തികഞ്ഞ ഗാന്ധിശിഷ്യനാണ് വേണു - ചർച്ച ചെയ്യുക.

30. ചൂഷിതരാകുന്ന അടിസ്ഥാനവർഗ്ഗം അറിയാതെ ചൂഷിതരാവുകയും കടത്തിനടിമപ്പെടുകയും ചെയ്യുന്ന അവസ്ഥയാണ് രാവുണ്ണിയിൽ അവതരിക്കപ്പെടുന്നത് - പരിശോധിക്കുക.

31. കഥകളി വേഷങ്ങളെക്കുറിച്ചും അവതരണത്തെക്കുറിച്ചും കുറിപ്പെഴുതുക.

32. ''അർണ്ണവം തന്നിലല്ലോ നിമ്നഗ ചേർന്നു ഞായം
അന്യഥാ വരുത്തുവാൻ കുന്നു മുതിർന്നീടുമോ?'' - സൂചിതം വിശദീകരിക്കുക.

33. ദാരിദ്ര്യവും നിസ്സഹായതയും മനുഷ്യരെ ചെന്നെത്തിക്കുന്ന സംഘർഷങ്ങൾ ബൈസിക്കിൾ തീവ്സിനെ അടിസ്ഥാനമാക്കി വിശദീകരിക്കുക.

34. മനുഷ്യനും പ്രകൃതിയും തമ്മിൽ ഗാഢമായി ലയിച്ചു ചേരുന്ന ദൃശ്യങ്ങൾ മലയാളശാകുന്തളം നാലാമങ്കത്തിൽ ഏ.ആർ. അടയാളപ്പെടുത്തുന്നുണ്ട്. - പ്രസ്താവന പരിശോധിക്കുക.

35. ജി. ശങ്കരപ്പിള്ളയുടെ നാടകങ്ങൾ - കുറിപ്പെഴുതുക.

36. രാവുണ്ണി എന്ന നാടകത്തെ അടിസ്ഥാനമാക്കി പി.എം. താജിന്റെ നാടകങ്ങളുടെ സവിശേഷതകൾ വിവരിക്കുക.

37. അച്ഛനും മകനും തമ്മിലുള്ള അനിതരസാധാരണമായ ഹൃദയബന്ധത്തിന്റെ ആഖ്യാനമായി ബൈസിക്കിൾ തീവ്സ് മാറുന്നുണ്ട് - പരിശോധിക്കുക.

38. നമ്പ്യാർക്കൃത്തികളുടെ സവിശേഷതകളെ ഘോഷയാത്ര മുൻനിർത്തി വിശദീകരിക്കുക.

(6 × 4 = 24 Marks)

PART D

ഏതെങ്കിലും **രണ്ട്** ചോദ്യത്തിന് **മൂന്നു** പുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക.

39. രണ്ടാം ലോകമഹായുദ്ധം തകർത്തു കളഞ്ഞ യൂറോപ്യൻ ജീവിതത്തിന്റെ അടയാളങ്ങൾ ബൈസിക്കിൾ തീവ്സിനെ അടിസ്ഥാനപ്പെടുത്തി വിശകലനം ചെയ്യുക.

40. മലയാളത്തിലെ ഏറ്റവും വലിയ ജനകീയകവി എന്ന ബഹുമതി നമ്പ്യാർക്കുള്ളതാണ് - പ്രസ്താവനയുടെ സാധുത പരിശോധിക്കുക.

41. ആട്ടക്കഥാ സാഹിത്യത്തിലെ ഉത്തമ കൃതിയാണ് നളചരിതം - അപഗ്രഥിക്കുക.

42. മലയാള നാടക ചരിത്രത്തിൽ ശ്രദ്ധേയമായ സംഭാവനകൾ നൽകിയ നാടകപ്രവർത്തകനാണ് ജി. ശങ്കരപ്പിള്ള - ചർച്ച ചെയ്യുക.

43. മലയാള ശാകുന്തളം നാലാമങ്കത്തിന് ഒരാസ്വാദനക്കുറിപ്പ് തയ്യാറാക്കുക.

44. മലയാളത്തിലെ കരുത്തുറ്റ രാഷ്ട്രീയ നാടകങ്ങളിലൊന്നാണ് പി.എം. താജിന്റെ രാവുണ്ണി - ചർച്ച ചെയ്യുക.

(2 × 15 = 30 Marks)

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Reg. No. : .....

Name : .....

Third Semester B.A./B.Sc. Degree Examination, January 2023

First Degree Programme Under CBCSS

Language Course – English

EN 1311.1/EN 1311.3 : ENGLISH FOR CAREER

(Common for B.A./B.Sc. & Career Related Group 2(a))

(2019 Admission Onwards)

Time : 3 Hours Max. Marks : 80

I. Answer **all** the following questions. Follow the instructions given in the brackets wherever needed.

1. The correct spelling of the word 'biscut' is ————————.

2. The word that is the antonym of "callous" is ————————

3. Give a synonym for the word 'deceptive'.

4. What is ———————— (breed) in the bone will not wear out of the flesh. (Use the correct tense form of the verb in brackets)

5. The adjective form of reluctance is ————————.

6. The child, thinking all was safe, ———————— (attempt) to cross the road. (Use the correct tense form of the verb in brackets)

7. The word 'intricate' is synonym for ————————.

8. I'm having some trouble work out the solution to this equation.

(Underline the error)

9. Mr. Pritchard has been to Scotland recently, ——————?
(Complete the sentence with a question tag)

10. They've ——————— the meeting. (Use the appropriate phrasal verb)

(a) Called out

(b) Called in

(c) Called by

(d) Called off **(10 × 1 = 10 Marks)**

II. Answer **any eight** of the following questions.

11. Provide one-word substitutes for any **two** of the phrases :

(a) A number of fish swimming together

(b) Easily set on fire

(c) In a timely manner

(d) Protected against diseases

12. Give the antonyms of **two** of the following words :

(a) genuine

(b) coarse

(c) boisterous

13. Make sentences of your own with any **two** of the following phrasal verbs :

(a) clamp down on

(b) fall through

(c) make up

(d) stick up for

14. Choose the correct option from those given in the brackets :

(a) The four men ———— towards us. (is walking/are walking).

(b) The old woman ———— clothes for a living. (makes/make)

15. Fill in the blanks using a collective noun from those given below :

(pack, deck, herd, chest, team)

(a) He hid this secret diary in a ———— of drawers in his room.

(b) I spotted a ———— of wolves at the sanctuary.

16. Use the correct tense of the verb in the bracket :

(a) We ———— (has live) here for ten years.

(b) I ———— (receive) his letter a week ago.

17. Fill in the blanks using the suitable degrée of the adjective given in the brackets :

(a) Lead is ———— than other metals. (heavy)

(b) The tiger is the ———— of all animals. (fierce)

Correct the errors in the words given in italics.

18. (a) It is *recommendable* that you charge the mobile phone before first use.

(b) Kindly note our address for all *farther* communication.

19. (a) She *vested* all her time in chatting and did not find the time to complete her work.

(b) In case of a land dispute, the officials will determine how the property is to be *dividend.*

20. Fill in the blanks with suitable words from those given in brackets :

(obtain, assimilate, perennial, develop)

It is your duty to train and ———— your mind and acquire knowledge, as much knowledge as you possibly can ———— Knowledge is like a deep well, fed by ———— springs, and your Mind is the little bucket that you drop into it : you will get as much as you can ————.

21. Choose the correct option from the brackets :

(a) Eight dollars ———— the price of a ticket. (is/are)

(b) I ———— be honoured to attend the function. (shall/would)

22. Fill in the blanks with the appropriate word from the brackets :

(before, quite, never, well, once)

(a) These mangoes are ———— ripe.

(b) He ———— met me in Cairo.

23. Use the correct tense of the verb in the brackets :

(a) The tempest ———— the ship ashore. (blow)

(b) ———— over the fence, the thief escaped. (jump)

Read the paragraph and answer the question given below :

24. The National Institute of Oceanography (NIO) in Goa developed a real-time reporting and Internet accessible coastal sea-level monitoring system which has been operational since 2005. The gauge uses a cellular modem to put on the Internet real-time sea-level data. By using a cellular phone network, coastal sea-level changes are continuously updated on to a web-server. The sea-level gauge website can be made available to television channels to broadcast real-time visualisation of the coastal sea level, particularly during oceanic hazards such as storm surges or a tsunami. A network of such gauges along the coast and the islands that lie on either side of the mainland would provide data to disaster management agencies to disseminate warnings to coastal communities and beach tourism centres.

(a) What is the function of the NIO's gauge?

(b) Comment on an additional benefit of such gauges.

25. A sanctuary may be defined as a place where Man is passive and the rest of Nature active. Till quite recently Nature had her own sanctuaries, where man either did not go at all or only as a tool-using animal in comparatively small numbers. But now, in this machinery age, there is no place left where man cannot go with overwhelming forces at his command. He can strangle to death all the nobler wild life in the world today. Tomorrow he certainly will have done so, unless he exercises due foresight and self-control in the meantime.

(a) What predictions do the author make regarding the fate of sanctuaries?

(b) Identify the word in the passage which means the following : the ability to predict what will happen or be needed in the future?

26. The first and most important rule of Legitimate or popular government, that is to say, of government whose object is the good of the people, is therefore, as I have observed, to follow in everything the general will. But to follow this will it is necessary to know it, and above all to distinguish it from the particular will, beginning with one's self: this distinction is always very difficult to make, and only the most sublime virtue can afford sufficient illumination for it, As, in order to will, it is necessary to be free, a difficulty no less great than the former arises – that of preserving at once the public liberty and the authority of government.

(a) How does the author describe a legitimate or popular government?

(b) What is the one virtue that is necessary for the people to be in a position to make known their will?

(8 × 2 = 16 Marks)

III. Answer **any six** of the following questions.

27. Fill in the blanks with the correct option :

(a) He had asked you to ———— your answers, hadn't he? (mail him/mail to him)

(b) The manager ———— all the claims of the employee and dismissed him. (reputed, refuted)

(c) ———— prices cause hardship to the poor. (Escalating/Exciting)

(d) I like Ashley a lot, she's a very ———— person. (denying/dynamic)

28. Fill in the blanks with suitable phrases from those given in the brackets :
(ran out, tear up, put up, set up, wore off, pass out, cut back, let in, go out)

(a) My doctor wants me to ———— on sweets.

(b) We ———— of shampoo so I had to wash my hair with soap.

(c) The effects of the sedative ———— after a few hours.

(d) I cannot ———— with his attitude.

29. Correct the errors in any **four** of the following sentences :

(a) Either my mother or my father are coming to the meeting.

(b) George and Tamara doesn't want to see that movie.

(c) Your pants is at the cleaner's.

(d) One of my sisters are going on,a trip to France.

(e) There was fifteen candies in that bag.

30. Correct the error in the section in italics in any **four** of the following sentences :

(a) *How a beautiful* bride she made!

(b) *What does he* think he is!

(c) *So big eyes* you have!

(d) *Wow*, that hurts!

(e) That soup was *how delicious*!

31. Fill in the blanks with suitable pronouns :

(a) My grandparents live in Berlin. We visit ———— often.

(b) I really like watching old shows ———— are some of the best things on TV.

(c) I'm always talking to ————.

(d) I don't recognize the song ———— is playing.

32. Correct the error in the words in italics :

(a) My knife is *sharp* than yours.

(b) Truth is *strange* than fiction.

(c) He is the *idler* boy in the class.

(d) Bangladesh has the *large* tea garden in the world.

33. Fill in the blanks with suitable words from those given in brackets :

(ailments, strength, suffer, harmony, tension, recover, tackles, outlined)

Yoga is a series of physical exercises that use the body and mind to create ———— and health within yourself. Yoga allows you to gain ————, calmness, and flexibility while relieving stress and ———— from your body. About 2000 years ago in India, a wise man, Pantanjali, ———— the system for Yoga. In his writings, he explains how Yoga ———— both physical and emotional ———— Yoga can not only help you ———— from a physical condition but it also can help those of us who ———— from anxiety or depression.

34. Fill in the blanks with the suitable conjunction :

(a) He ran away ———— he was afraid.

(b) You can have an ice cream ———— a brownie sundae.

(c) Our hoard is little, ———— our hearts are great.

(d) He is ———— foolish, ———— stubborn.

35. Rewrite the sentences replacing the italicised words with the appropriate word from the brackets :

(cosmopolitan, a cartographer, a recluse, an octogenarian, a polyglot, an atheist, an optimist, an immigrant)

(a) It is not easy being *a foreigner who comes to settle* in the USA.

(b) My grandpa is *eighty years old.*

(c) I took up Spanish to become *someone who speaks more than one language.*

(d) We need a person who *makes maps or charts to decode these cryptic maps.*

Read the passage and answer the questions given below :

36. The Indian Army is the land-based branch and the largest component of the Indian Armed Forces. The President of India is the Supreme Commander of the Indian Army, and it is commanded by the Chief of Army Staff (COAS), who is a four-star general. Two officers have been conferred with the rank of field marshal, a five-star rank, which is a ceremonial position of great honour. The Indian Army originated from the armies of the East India Company, which eventually became the British Indian Army, and the armies of the princely states, which finally became the national army after independence. The units and regiments of the Indian Army have diverse histories and have participated in a number of battles and campaigns across the world, earning a large number of battle and theatre honours before and after Independence.

(a) Identify a word from the passage that means 'a part or element of a larger whole'.

(b) Use the word 'ceremonial' in a sentence of your own.

(c) Who commands the Indian Army?

(d) Trace the origin of the Indian Army.

37. The trend toward commodification of high-brow art took an ominous, if predictable, turn in the 1980s during the Japanese "bubble economy." At a time when Japanese share prices more than doubled, individual tycoons and industrial giants alike invested record amounts in some of the West's greatest masterpieces. Ryoei Saito, for example, purchased van Gogh's *Portrait of Dr. Gachet* for a record-breaking $82.5 million. The work, then on loan to the Metropolitan Museum of Modern Art, suddenly vanished from the public domain. A representative of the Van Gogh museum, conceding that he had no legal redress, made an ethical appeal to Mr. Saito, asserting, "a work of art remains the possession of the world at large."

(a) Identify a word from the passage that means 'dark' or 'menacing.'

(b) What did Mr. Saito purchase and at what cost?

(c) Use the word 'masterpiece' in a sentence of your own.

(d) What was the request made to Mr. Saito by the representative of the Van Gogh museum?

38. Surveillance has increased manifold since the 9/11 terror attacks on the World Trade Centre in the U.S. This increase in surveillance today shapes the relationship between the state and the individual. The state keeps an eye on its citizens, thereby positing each and even citizen as a potential wrong-doer. For instance, the proliferation of the CCTV cameras in streets, restaurants and in every imaginable public space. In fact, the camera need not even be functional in order to make the citizens behave themselves – its mere presence is enough to scare the citizens into submission. Such is the power of the mere potential of surveillance.

(a) Identify a word from the brackets that means 'surveillance'.

(scrutiny, intelligence, attack, suspicion)

(b) Give the antonym of 'proliferation.'

(c) Which event resulted in the increase in surveillance?

(d) What power does the process of surveillance possess?

(6 × 4 = 24 Marks)

IV. Answer **any two** of the following questions, choosing **one** each from any **two** Group.

GROUP – A

39. Read the following passage and answer the questions given below :

In 1970 geologists Kenneth J. Hsu and William B.F. Ryan were collecting research data while aboard the oceanographic research vessel *Glomar Challenger*. An objective of this particular cruise was to investigate the floor of the Mediterranean and to resolve questions about its geologic history. One question was related to evidence that the invertebrate fauna (animals without spines) of the Mediterranean had changed abruptly about 6 million years ago. Most of the older organisms were nearly wiped out, although a few hardy species survived. A few managed to migrate into the Atlantic. Somewhat later, the migrants returned, bringing new species with them. Why did the near extinction and migrations occur? Another task for the Glomar Challenger's scientists was to try to determine the origin of the domelike masses buried deep beneath the Mediterranean seafloor.

With questions such as these clearly before them, the scientists aboard the *Glomar Challenger* proceeded to the Mediterranean to search for the answers, On August 23, 1970, they recovered a sample.

The investigators theorized that about 20 million years ago, the Mediterranean was a broad seaway linked to the Atlantic by two narrow straits, Crustal movements closed the straits, and the landlocked Mediterranean began to evaporate. Increasing salinity caused by the evaporation resulted in the extermination of scores of invertebrate species. Only a few organisms especially tolerant of very salty conditions remained. Later, under the weight of overlying sediments, this salt flowed plastically upward to form salt domes. The Mediterranean was a vast desert 3,000 meters deep. Then, about 5.5 million years ago came the deluge. As a result of crustal adjustments and faulting, the Strait of Gibraltar, where the Mediterranean now connects to the Atlantic, opened, and water cascaded spectacularly back into the Mediterranean. As the basin was refilled, normal marine organisms returned. The salt and gypsum, the faunal changes, and the unusual gravel provided abundant evidence that the Mediterranean was once a desert.

1. ———— is the word used in the passage for 'look into'.

2. The word ———— in the passage is related to 'the scientific study of oceans'.

3. ———— is a word from the passage that is an antonym of 'gradually'.

4. The phrase ———— in the passage means 'to obliterate'.

5. Use the word 'spectacular' in a sentence of your own.

6. The synonym for 'cascade' is

   (a) steps (b) pour rapidly into

   (c) glitter (d) transform

7. ———— is a word from the passage that is an antonym of 'scarce'.

8. Identify the statement which is true.

   (a) The Mediterranean has undergone no change for millennia

   (b) The Mediterranean is an ocean

   (c) The Mediterranean transformed into a desert for a period of time

   (d) None of these

9. What was the objective of the research by geologists Hsu and Ryan?

10. Mention one of the major questions related to the above objective.

11. According to theorists, what was the Mediterranean like 20 million years ago?

12. How did the Mediterranean become landlocked?

13. What impact did this have ecologically?

14. What is the Strait of Gibraltar?

15. Suggest a suitable title for the passage.

OR

40. Answer **all** the following questions :

Fill in the blanks with suitable articles, prepositions, conjunctions, adverbs or adjectives.

1. John answered the question ————————.

2. We played a ———————— tough match yesterday.

3. He is ———————— talking about visiting his ancestral home.

4. She passed the exam ————————.

5. She walked ———————— down the road.

6. I'm ———————— little excited because it's ———————— Friday. There are ———————— lot of good shows on TV today ———————— one I usually watch is at 3:30.

7. Please get me a bag of ———————— apples.

8. The dinner party went ————————.

9. ———————— spring arrives, we have to be prepared for more snow.

10. This salad is ———————— delicious ———————— healthy.

Rewrite as directed :

11. He will finish the work in a fortnight. (Use passive voice)

12. He said to me, "I don't believe you." (Change to indirect speech).

13. I wish I were young again. (Write an exclamatory sentence)

14. He requested him to wait there till he returned. (Change to direct speech).

15. Why was such a letter written by your brother? (Use active voice)

OR

41. Read the passage and answer the questions given below :

Paleontologists have argued for a long time that the demise of the dinosaurs was caused by climatic alterations associated with slow changes in the positions of continents and seas resulting from plate tectonics. Off and on throughout the Cretaceous (the last period of the Mesozoic era, during which dinosaurs flourished), large shallow seas covered extensive areas of the continents. Data from diverse sources, including geochemical evidence preserved in seafloor sediments, indicate that the Late Cretaceous climate was milder than today's. The days were not too hot, nor the nights too cold. The summers were not too warm, nor the winters too frigid. The shallow seas on the continents probably buffered the temperature of the nearby air, keeping it relatively constant.

At the end of the Cretaceous, the geological record shows that these seaways retreated from the continents back into the major ocean basins. No one knows why. Over a period of about 100,000 years, while the seas pulled back, climates around the world became dramatically more extreme: warmer days, cooler nights; hotter summers, colder winters. Perhaps dinosaurs could not tolerate these extreme temperature changes and became extinct.

Dissatisfaction with conventional explanations for dinosaur extinctions led to a surprising observation that, in turn, has suggested a new hypothesis. Scientists hypothesized that a single large asteroid, about 10 to 15 kilometers across, collided with Earth, and the resulting fallout created the boundary clay. Their calculations show that the impact kicked up a dust cloud that cut off sunlight for several months, inhibiting photosynthesis in plants; decreased surface temperatures on continents to below freezing ; caused extreme episodes of acid rain; and significantly raised long-term global temperatures through the greenhouse effect. This disruption of the food chain and climate would have eradicated the dinosaurs and other organisms in less than fifty years.

1. The synonym for 'flourish' is
   (a) thrive (b) shake
   (c) impress (d) address

2. The word ———————— in the passage relates to the chemical composition of the earth and its rocks and minerals.

3. Find the word in the passage that is the antonym of 'hot'.

4. The word 'buffer' in the passage is closest in meaning to
   (a) erupt (b) shower
   (c) shield (d) none of the above

5. Use the word 'evidence' in a sentence of your own.

6. Identify a word from the passage that means 'consequence or result of something.'
   (a) fallout (b) dismal
   (c) experience (d) none of the above

7. Use the word 'eradicate' in a sentence of your own.

8. Identify the statement which is true
   (a) The climate during the late Cretaceous was harsh.
   (b) The climate during the late Cretaceous was cold.
   (c) The climate during the late Cretaceous was mild.
   (d) None of these.

9. What reasons did paleontologists associate with the demise of the dinosaurs?

10. Define Cretaceous.

11. What conditions contributed to the moderate temperature of the Cretaceous?

12. What happened once the sea pulled back?

13. Explain the new hypothesis regarding the extinction of the dinosaurs.

14. What was the immediate result of the asteroid's collision with earth?

15. Suggest a suitable title for the passage.

GROUP B

42. Spot the error in the underlined sections in the following sentences. If there is no error, the answer is 'd'.

1. Owing to his ill health (a), he will not be able to (b) give this examination (c). No Error (d).

2. He prostrated himself (a) before his master (b) upon his return from London (c).
No error (d)

3. He lent me some money (a) on the condition that I should (b)
return before November (c). No Error (d).

4. Ravi was approached (a) the money lender and requested him (b)
to lend him some money (c). No Error (d).

5. Currently, (a) working from home (b) have become common scenario (c). No error (d)

6. "Pull it out by its plug, not by the cord," said dad. No error.
a b c d

7. Either the captain or someone from his crew is responsible for this mistake.
a b c
No error.
d

8. She reimbursed back the money which I had spent during
a b
our journey to Jaipur. No error.
c d

9. Either Lisa or Karen will always volunteer their valuable time
a b
to serve on our board. No error
c d

10. When she entered the room, she found the child
a b
sleeping peacefully. No error.
c d

11. "They had went to the lake without me", Jack complained. No error.
a b c d

12. Do you think they will except our plan without an argument? No error
a b c d

13. The conversation with her mother had a profound affect on her. No error
a b c d

14. Any of these pictures is not worth seeing. No error.
a b c d

15. Symptoms of this illness includes fever, vomiting and diarrhoea. No error.
a b c d

OR

43. Read the passage and answer the questions given below.

The Alaska pipeline starts at the frozen edge of the Arctic Ocean. It stretches southward across the largest and northernmost state in the United States, ending at a remote ice-free seaport village nearly 800 miles from where it begins. It is massive in size and extremely complicated top operate.

The steel pipe crosses windswept plains and endless miles of delicate tundra that tops the frozen ground. It weaves through crooked canyons, climbs sheer mountains, plunges over rocky crags, makes its way through thick forests, and passes over or under hundreds of rivers and streams. A little more than half of the pipeline is elevated above the ground. The remainder is buried anywhere from 3 to 12 feet, depending largely upon the type of terrain and the properties of the soil.

One of the largest in the world, the pipeline cost approximately $8 billion and is by far the biggest and most expensive construction project ever undertaken by private industry. In fact, no single business could raise that much money, so eight major oil companies formed a consortium in order to share the costs. Each company controlled oil rights to particular shares of land in the oil fields and paid into the pipeline-construction fund according to the size of its holdings. Today, despite enormous problems of climate, supply shortages, equipment breakdowns, labour disagreements, treacherous terrain, a certain amount of mismanagement, and even theft, the Alaska pipeline has been completed and is operating.

1. The word 'remote' in the passage is closest in meaning to

   (a) electronic device (b) unrelated

   (c) sizeable (d) far away from civilisation

2. The phrase 'windswept plains' in the passage is closest in meaning to

   (a) unsheltered land (b) bayou

   (c) plateau (d) mountain

3. Find the word in the passage which is the antonym of 'molten'.

4. Use the word 'complicated' in a sentence of your own.

5. The phrase 'plunges over' in the passage means

   (a) climb up (b) stream by

   (c) falls over (d) flow across

6. ———— is a word in the passage which means 'bent' or 'twisted.'

7. The word 'consortium' in the passage means

   (a) an association (b) a condition

   (c) a result (d) none of the above

8. Use the word 'treacherous' in a sentence of your own.

9. Identify the statement which is true with regard to the Alaska pipeline

   (a) One company holds the rights to it.

   (b) Several governments together hold the rights.

   (c) A consortium of eight oil companies holds the rights.

   (d) None of these.

10. What is the Alaska pipeline?

11. Describe the terrain on which the pipeline is built.

12. A consortium was formed for the construction and operation of the pipeline. Why?

13. How is it significant in terms of size and cost?

14. What were the challenges, excluding the cost, faced while constructing the pipeline?

15. Suggest a suitable title for the passage.

OR

44. Answer **all** of the following questions. Fill in the blanks with suitable articles, prepositions, conjunctions, adverbs or adjectives.

1. They travelled ———— the river.

2. My brother loves animals. He just brought a puppy ———— a kitten home with him.

3. We could cook dinner ————, we could buy some takeaway food.

4. Marie was born in 1867 ———— Warsaw, Poland ———— an early age, she displayed a brilliant mind. Her great exuberance ———— learning prompted her to continue ———— her studies after high school.

5. Jennifer does not like to swim, ———— does she enjoy cycling.

6. His two favourite sports are football ———— tennis.

7. He is ———— intelligent, ———— very funny.

8. The treasure lies ———— the box.

9. The cat is sleeping ———— the bed.

10. ———— I wake up early.

Rewrite as directed :

11. Of his birth many tales are told. (Write in active voice)

12. Only the brave deserves the praise. (Change into negative)

13. "Please sit down", said the headmaster. (Change into indirect speech)

14. They proclaimed him king. (Write in passive voice).

15. His father told him that he was ashamed of him. (Change into direct speech)

(2 × 15 = 30 Marks)

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Reg. No. : .....

Name : .....

Third Semester B.A./B.Sc. Degree Examination, January 2023

First Degree Programme under CBCSS

Language Course – Additional Language – Hindi

HN 1311.1 – HINDI NATAK, VYAKARAN TATHA ANUVAD

(2020 Admission onwards)

Time : 3 Hours Max. Marks : 80

I. एक या दो वाक्यों में उत्तर लिखिए।

1. सकुबाई के पति का नाम क्या है और वह क्या काम करता था?

2. बाबा और वासंती सकुबाई और माँ के साथ बंबई क्यों नहीं गए?

3. सकुबाई के मेम साब और साब के बीच झगड़ा होने की क्या वजह थी?

4. शहनाज़ के पति की मृत्यु कैसे हुई?

5. पुलिस ने सकुबाई की माँ को पुलिस थाना ले जाने का निर्देश क्यों दिया?

6. अन्वय से क्या तात्पर्य है?

7. वर्ण की परिभाषा देकर उसके भेदों के नाम लिखिए।

8. अपादान कारक का चिह्न क्या है?

9. शुद्ध कीजिए - 'यह आदमी को किसने बुलाया'?

10. स्वर संधि का उदाहरण लिखिए।

(10 × 1 = 10 Marks)

P.T.O.

II. **किन्हीं आठ प्रश्नों के लघु उत्तर (करीब 50 शब्दों में) लिखिए:-**

11. छोटे मामा के दुर्व्यवहार पर सकुबाई की माँ की प्रतिक्रिया क्या थी?

12. सुमन का परिचय दीजिए।

13. 'सकुबाई' नाटक में लड़के और लड़की के भेदभाव की समस्या पर कैसे प्रकाश डाला गया है?

14. ''गरीब के बीमार होने से अच्छा है उसका मर जाना'' - सकुबाई ऐसा क्यों सोचती है?

15. हुसैन मामा कौन है? उसने सकुबाई के परिवार की मदद कैसे की?

16. साइली अपनी कविता के माध्यम से कौन सा संदेश सामने रखती है?

17. 'सकुबाई' नाटक की भाषा-शैली पर विचार कीजिए।

18. सकुबाई के पति का बंबई छोड़कर गाँव जाने के पीछे क्या कारण था?

19. समुच्चयबोधक अव्यय से क्या तात्पर्य है? सोदाहरण समझाईए।

20. नामधातु क्रिया और अनुकरणात्मक क्रिया पर प्रकाश डालिए।

21. वाच्य बदलिए -

    (a) रमा गीत गाती है।

    (b) मैं बोल नहीं सकता।

22. वर्तमानकाल किसे कहते है? उसके भेद क्या-क्या हैं?

23. उपसर्ग और प्रत्यय पर प्रकाश डालिए।

24. समास की परिभाषा देकर उसके भेदों का संक्षिप्त परिचय दीजिए।

25. वाक्य रचना में पदक्रम से संबंधित क्या-क्या नियम हैं?

26. अर्थ के आधार पर वाक्य के कितने भेद हैं? वे क्या-क्या हैं? सोदाहरण लिखिए।

(8 × 2 = 16 Marks)

III. **किन्हीं छः प्रश्नों के उत्तर (करीब 120 शब्दों में) लिखिए:–**

27. सकुबाई के परिवार का वर्णन कीजिए।

28. सकुबाई को मेमसाब के घर में रोज़ क्या-क्या काम करना पड़ता है?

29. वासंती की मृत्यु के बारे में सकुबाई की क्या-क्या यादें रही हैं?

30. ''हम लोग दिन रात मेहनत करते हैं। मेहनत करते-करते बूढ़े हो जाते हैं.... और मर जाते हैं। न कोई हमें पूछता है न याद करता'' – सप्रसंग व्याख्या कीजिए।

31. शहनाज़ के बारे में सकुबाई की क्या राय रही है? वह उसका आदर सम्मान क्यों करती है?

32. पूजा की अंगूठी कैसे गायब हुई और वह कैसे वापस मिली?

33. 'ने' प्रत्यय के प्रयोग से संबंधित नियम लिखिए।

34. खंड़वाक्य के भेद-उपभेद पर सविस्तार प्रकाश डालिए।

35. सर्वनाम की परिभाषा लिखकर उसके विभिन्न भेदों का परिचय दीजिए।

36. हिंदी में अप्राणिवाचक शब्दों के लिंग निर्णय से संबंधित क्या-क्या नियम हैं?

37. संज्ञा की परिभाषा लिखकर उसके मुख्य भेदों पर प्रकाश डालिए।

38. अर्थ की दृष्टि से सहायक क्रियाओं के कितने भेद हैं? प्रत्येक का परिचय दीजिए।

(6 × 4 = 24 Marks)

IV. **किन्हीं दो प्रश्नों के उत्तर (करीब 250 शब्दों में) लिखिए:–**

39. सकुबाई के माध्यम से नाटककार ने नौकरानियों के जीवन यथार्थ को सामने रखा है। समर्थन कीजिए।

40. सकुबाई नाटक में अभिव्यक्त विभिन्न समस्याओं की चर्चा कीजिए।

41. विशेषण की परिभाषा लिखते हुए उसके भेदों पर प्रकाश डालिए।

42. विभिन्न आधारों पर शब्दों के वर्गीकरण को समझाइए।

43. हिन्दी में अनुवाद कीजिए।

Scholars of ancient History are of opinion that India had trade relations with foreign countries even before Christ. According to some scholars, the renowned Sanskrit poet Kalidasa flourished one hundred years before Christ. From the evidence of his world famous drama 'Abhijnanashakunthala', we come to know that India imported silk from China. Our export trade in those old days was fetching enormous wealth of gold and silver. It is why India was known to the foreigners as 'a bird of gold' exporting cotton cloths to countries like Persia, Arabia and Egypt. When the English people came here, they found that our people could prepare the finest linen in the world.

44. सकूबाई का चरित्र चित्रण कीजिए।

(2 × 15 = 30 Marks)

(Pages : 4) **P – 3907**

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2023

First Degree Programme under CBCSS

Mathematics

Complementary Course for Statistics

MM 1331.4 — MATHEMATICS – III – FOURIER SERIES, NUMERICAL METHODS AND ODE

(2021 Admission)

Time : 3 Hours Max. Marks : 80

PART – A

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

1. Evaluate $\int_{\alpha}^{\alpha+2\pi} \cos nx \, dx$.
2. Define the Fourier Transform of $f(x)$.
3. Write the formula for approximation to the root in the Method of false position.
4. Find two points a and b such that $f(a) - f(b) < 0$ where $f(x) = x^3 - x - 1$.
5. Write Newton-Raphson formula.
6. Define the Wronskian of two functions $u(x, y)$ and $v(x, y)$.
7. What is the standard form for Legendres linear equation?
8. Find the degree of the differential equation $\frac{d^2f}{dx^2} + 2x\frac{df}{dx} + f^2 = \sin^3 x$.
9. Write the general form of Clairaut's equation.
10. What is meant by quadrature?

(10 × 1 = 10 Marks)

P.T.O.

PART – B

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

11. Evaluate $(D^2 - D)y$ where $y = ae^{-2x} + be^{x}$.

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

13. Find the first four approximations to the root of $x^3 - 4x - 9 = 0$ between 2 and 3 using bisection method.

14. Solve $\frac{d^2x}{dt^2} + 6\frac{dx}{dt} + 9x = 0$.

15. Solve $10yy' + 3x = 0$.

16. Write the general form of Bernoulli's equation.

17. Show that the equation $(1 + 4xy + 2y^2)dx + (1 + 4xy + 2x^2)dy = 0$ is exact.

18. Define an odd function- Give an example.

19. What is meant by the orthogonal trajectory of a family of curves?

20. Show that the functions $\sin 2x$ and $\cos 2x$ are independent solutions of $y'' + 4y = 0$.

21. What is interpolation?

22. Evaluate $\Delta \tan^{-1} x$.

23. State Newton's forward interpolation formula.

24. Define Trapezium rule for Numerical Intergration.

25. Write the Lagrange's interpolation formula for unequal intervals.

26. What is Simpson's rule for Numerical intergration?

(8 × 2 = 16 Marks)

PART – C

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

27. Find a Fourier series to represent $f(x)$ in the interval $(-\pi, +\pi)$, where $f(x) = \begin{cases} -k & \text{if } -\pi < x < 0 \\ k & \text{if } 0 < x < +\pi \end{cases}$ and $f(x+\pi) = f(x)$.

28. Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to 2 decimal places.

29. Apply Gauss Elimination method to solve $x + 4y - z = -5$, $x + y - 6z = -12$ and $3x - y - z = 4$.

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

31. Solve $\frac{d^2y}{dx^2}x^2 - \frac{dy}{dx}x + y = \log x$.

32. Verify that $(y\cos x + 2x e^y) + (\sin x + x^2 e^y - 1)y' = 0$ is exact and find its solution.

33. Solve $\left(xy^2 - e^{\frac{1}{x^3}}\right)dx - x^2 y\, dy = 0$.

34. Find the orthogonal trajectory of the family of curves $r = a(1 - a\cos\theta)$.

35. Find the missing item in the table :

X :	2	3	4	5	6
Y :	45.0	49.2	54.1	–	67.4

36. A curve passes through the points (0,18), (1,10), (3, –18) and (6, 90). Find the slope of the curve at $x = 2$.

37. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Weddle's rule.

38. Explain Taylor Sales method for solving ordinary differential equations.

(6 × 4 = 24 Marks)

PART – D

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

39. (a) Find the real root of $x \log_{10} x = 1.2$ correct to five decimal places, using Newton's iterative method.

(b) If y_x is a polynomial for which the fifth difference is constant and $y_1 + y_7 = -7845$, $y_2 + y_6 = 686$, $y_3 + y_5 = 1088$, find y_4.

40. (a) Use the method of variation of parameters to solve $y'' - y' - 2y = 4x^2$.

(b) Use the method of undetermined coefficients to solve $y'' - 4y' + 4y = x^3 e^{2x} + xe^{2x}$.

41. (a) Explain the method for solving Cauchy's homogeneous linear equations.

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

42. Solve, by Jacobi's iteration method, the equations $20x + 4y - 2z = 17$, $3x + 20y - z = -18$, and $2x - 3y + 20z = 25$.

43. From the following table, estimate the number of students who obtained marks between 40 and 45 :

Marks :	30 - 40	40 – 50	50 - 60	60 – 70	70 – 80
Number of students :	31	42	51	35	31

44. Expand $f(x) = x \sin x$ as a Fourier series in the interval $0 < x < 2\pi$.

(2 × 15 = 30 Marks)

(Pages : 4) **P – 3908**

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2023

First Degree Programme Under CBCSS

PHYSICS

Complementary Course for Statistics

PY 1331.3 – OPTICS, MAGNETISM AND ELECTRICITY

(2019 Admission onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Answer should not exceed two sentences; **Each** question carries **1** mark.

1. What is interference?
2. Write the relation between fringe width, slit width order of interference and wavelength and distance between the slit and the screen.
3. What is a grating?
4. Name any two applications of diffraction.
5. What is population inversion?
6. Explain optical pumping.
7. Define Curie temperature.
8. Define the term - 'Inclination' related to the magnetic field of earth.

9. Define Wattles current

10. Write the expression for the rms value of ac current

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions in a paragraph. **Each** question carries **2** marks.

11. What are the properties of coherent sources? How coherent sources can be constructed?

12. Write the relation between path difference and phase difference to get interference.

13. Explain the colour of thin films when they ate illuminated by white light.

14. What are the uses of Newtons ring experiment?

15. Distinguish between Fresnel and Fraunhofer diffractions.

16. Explain the diffraction pattern at a straight edge.

17. Explain the principle of a plane transmission grating?

18. Distinguish between interference and diffraction.

19. Explain the term stimulated emission

20. Write any two differences between step indexed and graded indexed optical fibres.

21. Explain total internal reflection and its use in optical fibres.

22. Write the relations connecting B, M and H in magnetism and define the magnetic vectors.

23. What are the reasons of earth's magnetic behaviour?

24. Write a note on ferromagnetic domains?

25. Explain the working of a transformer

26. Explain the production of EMF in a coil rotating in a magnetic field

(8 × 2 = 16 Marks)

SECTION – C

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

27. Light of wavelength 500 nm from a narrow slit is incident on a double slit. The separation of twenty fringes on the screen is 4 cm, when the screen is placed at a distance of 2 m from the double slit. Calculate the slit separation.

28. A thin layer of oil film of refractive index 1.33 is illuminated by white light at an angle of 45°. Complete destructive interference is happening at a wavelength of 500 nm in the first order. Find the thickness of the film.

29. In a Newtons ring experiment, the diameter of the 15^{th} ring is found to 5.6 mm and that of the 5^{th} ring is 3.26 mm. If the radius of curvature of the lens used is 1m. Calculate the wavelength of light used?

30. A circular aperture of 1.00 mm diameter is illuminated by a source of monochromatic light. The centre of the circular patch of light originated from diffraction phenomena becomes dark when the screen is from a distance of 32 cm from the aperture. Calculate the wavelength of light used.

31. Find the half angular width of the central bright maximum in the Fraunhofer diffraction pattern of a slit of width 12×10^{-7} m. when the slit is illuminated by a monochromatic source of 500 nm.

32. Calculate the highest order of the spectra which may be seen with a monochromatic light of wavelength 600 nm, using a plane diffraction grating of 5000 lines per cm. In what condition, the grating can be used to get the higher order spectra.

33. Why two-level lasers could not be designed?

34. What are the applications of optical fibres? Briefly explain.

35. An electric device works at 120 V and 10 A current is connected to 220 V 50 Hz ac mains. Calculate the inductance of the choke coil of the circuit.

36. Derive the expression for the current in an ac circuit containing a resistance and inductance in series. What is the impedance of the circuit and the actual current in the circuit?

37. Derive the relation between magnetic permeability and susceptibility $\mu_r = 1 + \chi_m$

38. A rode of magnetic material 0.2 m in length has a coil of 100 turns wound over it uniformly. A current of 1.2 A is sent through it, calculate the magnetizing field H and the relative permeability of the material. Given that $\chi_m = 5 \times 10^{-2}$.

(6 × 4 = 24 Marks)

SECTION – D

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

39. Using analytical treatment, explain the theory of formation of interference fringes and their bandwidth.

40. Explain the Fresnel theory of rectilinear propagation of light.

41. Explain the Fraunhofer diffraction due to a single slit?

42. With necessary theory and schematics explain the working of Ruby laser in detail

43. Explain the properties of different kinds of magnetic materials.

44. Explain a series LCR circuit under ac current.

(2 × 15 = 30 Marks)

(Pages : 6) **P – 3909**

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2023

First Degree Programme under CBCSS

Statistics

Core Course

ST 1341 : PROBABILITY AND DISTRIBUTION – I

(2019 Admission Onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. Define random experiment.

2. Write down the sample space for the random experiment of tossing a coin three times.

3. State multiplication theorem on probability.

4. If $V(X) = 1.5$ what is $V(3X+1)$?

5. Let a random variable X takes values –3, 0, 1 and 3 with respective probabilities 0.25, 0.33. 0.12 and 0.30. Write down the distribution of X^2.

6. Define probability generating function.

7. Give the relation between MGF and cumulant generating function.

P.T.O.

8. Define mathematical expectation.

9. Suppose A and B events with $P(A) = 0.6$, $P(B) = 0.3$ and $P(AB) = 0.2$, What is the probability of neither A nor B occurs?

10. Define correlation in terms of random variables X and Y in a bivariate distribution.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Define axiomatic approach to probability. What is its importance?

12. Let a class contains 10 men and 20 women of which half the men and half the women have brown eyes. Find the probability that person chosen at random is a man or has brown eyes.

13. Given $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$, and $P(A/B) = \frac{1}{8}$. What is $P(B/A)$?

14. Distinguish between discrete and continuous random variables.

15. A random variable X has the following probability function :

X :	–2	1	2	4
$P(x)$:	1/4	1/8	1/2	1/8

Find the cumulative distribution function.

16. Prove (a) Probability of impossible event is zero and (b) $P(A^c) = 1 - P(A)$.

17. Let $f(x, y) = K$, for $0 < x < 1$, $x < y < x + 1$ and $f(x, y) = 0$, otherwise. Find the value of K.

18. Define characteristic function. State the reason why it always exists.

19. Define (a) conditional expectation and (b) conditional variance in continuous case.

20. Let $f(x, y) = e^{-(x+y)}$, $0 < x < \infty$, $0 < y < \infty$ be the joint pdf of (X, Y). Examine whether X and Y are independent or not.

21. A random variable X has the probability mass function $P(x) = \frac{1}{3}\left(\frac{2}{3}\right)^x$, $x = 0, 1, 2 \ldots$ Find the mean of X.

22. Show that variance is not independent of change of scale.

23. Distinguish between probability density function and probability mass function.

24. Find the MGF of a random variable X having pdf $f(x) = 1/\theta$, $0 \le x \le \theta$ and $f(x) = 0$, otherwise.

25. A single card is drawn from an ordinary pack of 52 cards. Find the probability that the card is a red face card.

26. How to find median in case of a continuous probability distribution?

(8 × 2 = 16 Marks)

SECTION – C

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

27. Define the following terms with examples :

    (a) event,

    (b) exhaustive events,

    (c) equally likely events , and

    (d) mutually exclusive events

28. Distinguish between classical and empirical definitions of statistics.

29. The pdf of random variable X is $f(x) = 30x^2(1-x)^2$, $0 < x < 1$ and $f(x) = 0$, otherwise. Find the distribution of $Y = X^2$.

30. State and prove addition theorem on probability.

31. In a certain college, 25 percent of the students failed in mathematics, 15 percent failed in chemistry, and 10 percent failed in both mathematics and chemistry. A student is selected at random. If the student failed in chemistry, what is the probability that the student fail in mathematics? What is the probability that student fail in chemistry if the student has failed in mathematics?

32 If X and Y are random variables, show that $[E(XY)]^2 \leq E(X^2)E(Y^2)$.

33. Distinguish between Pairwise and mutually independent events.

34. Let (X, Y) have a joint pdf :

$f(x, y) = x^2 + \frac{xy}{3}$, $0 \leq x \leq 1, 0 \leq y \leq 2$ and $f(x, y) = 0$, otherwise, find $P(X < Y)$.

35 Define (a) conditional distributions and (b) marginal distributions and (c) independence of random variables.

36. If $\phi_X(t)$ is the characteristics function of a random variable X, prove the following :

(a) $\phi_X(t)$ and $\phi_X(-t)$ are conjugate functions

(b) $\phi_X(t)$ is a real valued and even function of t if the random variable X is symmetrical about zero.

37. Let $f(x, y) = 8xy, 0 < x < y < 1$ and $f(x, y) = 0$, otherwise. Find conditional expectation of Y given X.

38. Two unbiased dice are thrown. Find the expected value of the sum of the points on them.

(6 × 4 = 24 Marks)

SECTION – D

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

39. (a) State and prove Bayes theorem on probability.

(b) Three machines A, B and C produce, respectively 40 percent, 10 percent and 50 percent of the items in a factory. The percentage of defective items produced by the machines is, respectively, 2 percent, 3 percent and 4 percent. An item from the factory is selected at random.

(i) Find the probability that the item is defective

(ii) If the item is defective, find the probability that the item was produced by (1) machine A, (2) machine B and (3) machine C. **6 + 9 = 15**

40. (a) Define distribution function. State its properties.

(b) Let X be a continuous random variable with probability density function :

$f(x) = 6x(1-x)$ *if* $0 \le x \le 1$ and $f(x) = 0$, otherwise.

Find $P\left(X \le \frac{1}{2} \Big/ \frac{1}{3} \le X \le \frac{2}{3}\right)$

(c) State and prove addition and multiplication theorems on expectation in discrete case. **4 + 4 + 7 = 15**

41. The joint distribution of (X, Y) is given below :

$P(1, 1) = 0.1$, $P(2, 1) = 0.1$, $P(3, 1) = 0.2$, $P(1, 2) = 0.2$, $P(2, 2) = 0.3$ and $P(3, 2) = 0.1$.

Find (a) marginal distributions (b) $E(Y/X = 3)$, and (c) $V(X/Y = 1)$.

Also examine whether the random variables X and Y are independent or not.

4 + 3 + 7 + 1 = 15

42. (a) Obtain the first four cumulants in terms of central moments.

(b) Show that for a random variable X having probability density function

$f(x) = \frac{\beta\alpha^{\beta}}{x^{\beta+1}}$ if $0 < \alpha \le x$, $\beta > 0$ and $f(x) = 0$, otherwise, the moment generating function does not exist for $\alpha > 0$, $\beta > 0$, but mean exists for $\beta > 1$.

(c) Define moment generating function in case of a bivariate distributions **7 + 5 + 3 = 15**

43. Suppose that the time in minutes that a person has to wait at a certain bus stop for a bus is found to be a random phenomenon with probability distribution specified by the cumulative distribution function :

$$f(x)=\begin{cases}0, & x<0\\ \frac{x}{8}, & 0\le x<2\\ \frac{x^2}{16}, & 2\le x<4\\ 1, & x\ge 4\end{cases}$$

(a) Is the distribution function continuous? If so, find the probability density function.

(b) What is the probability that a person with have to wait (i) more than 2 minutes (ii) less than 2 minutes and (iii) between 1 and 2 minutes?

(c) What is the conditional probability that the person will have to wait for a bus for (i) more than 2 minutes given that it is more than one minute, and (ii) less than 2 minutes, given that it is more than 1 minute? **3 + 5 + 7 = 15**

44. (a) Find the moment generating function of sample mean of n independently and identically distributed random variables $\left(\bar{X}=\frac{X_1X_2+\ldots+X_n}{n}\right)$.

(b) The MGF of a random variable X is $M_X(t)=\frac{2}{5}+\frac{1}{3}e^{2t}+\frac{4}{15}e^{3t}$. Find the mean and variance of X.

(c) Point out the limitations of moment generating function.

(d) If X is a random variable with probability generating function $P(s)$, find the probability generating function of (i) $X+1$ and (ii) $2X$.

3 + 5 + 3 + 4 = 15

(2 × 15 = 30 Marks)

Supply

(Pages : 4) **P – 3906**

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2023

First Degree Programme Under CBCSS

Mathematics

Complementary Course for Statistics

MM 1331.4 — MATHEMATICS III – FOURIER SERIES, NUMERICAL METHODS AND ODE

(2019-2020 Admission)

Time : 3 Hours Max. Marks : 80

PART – A

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

1. Define an odd function.
2. Define amplitude of a function.
3. Find the order of the differential equation $y\left(\frac{dy}{dx}\right)^2 + 2x = 0$.
4. Write the general form of Bernoulli's Equation.
5. Write the general form of Legendre's linear differential equation.
6. Check whether the equation $ydx + \left(x^2y - x\right)dy = 0$ is exact.
7. Define a transcendental equation.
8. Write the Linear Interpolation formula.

9. Define tridiagonal matrices

10. State Trapezoidal rule for numerical integration

(10 × 1 = 10 Marks)

PART – B

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

11. What is the period of $\sin\frac{2\pi x}{T}$.

12. State Dirichlets Theorem.

13. Define Fourier Cosine Series.

14. Sketch the function $f(x) = x$, $0 < x <$

15. Write an application of Fourier Series

16. Solve $dx + dy = 0$.

17. Find the Wronskian of cos x and sin x

18. Solve $\frac{d^2y}{dx^2} + 10\frac{dy}{dx} + 29y = 0$.

19. Solve $\frac{dy}{dx} + xy = x$.

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

21. Solve $y = px + \log p$.

22. Explain Newton Raphson Method

23. Define backward difference operator

24. Explain Greens function.

25. Explain Gaussian Elimination method.

26. Using Simpsons rule, evaluate the integral $\int_1^3 \frac{1}{x} dx$ with 4 strips.

(8 × 2 = 16 Marks)

PART – C

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

27. Find the amplitude, period, frequency and velocity amplitude for the motion of a particle whose distances from the origin is given by $s = 3\cos 5t$.

28. Find the average value of the function $f(x) = 1 - e^{-x}$ on (0,1).

29. Given $f(x) = \begin{cases} 0, & 0 < x < l \\ 1, & l < x < 2l \end{cases}$. Expand $f(x)$ in an exponential Fourier series of period $2l$.

30. Solve $(3x^2 + 4xy)dx + (2x^2 + 2y)dy = 0$.

31. Solve $\frac{dy}{dx} - y = e^{2x}$.

32. Solve $\frac{dy}{dx} = \frac{2x - 5y + 3}{2x + 4y - 6}$.

33. Find the particular integral of $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} - 3y = 2e^x - 10\sin x$.

34. Use Green's function to solve $\frac{d^2y}{dx^2} + y = f(x)$, $y'(0) = 0$.

35. Using Trapezium rule, evaluate $I = \int_0^2 (x^2 - 3x + 4)dx$, by taking $h = 0.5$.

36. Evaluate $I = \int_0^1 \frac{1}{1+x^2} dx$ using Gaussian Integration.

37. Solve $x^5 - 2x^2 - 3 = 0$ using binary chopping method.

38. Explain Runge-Kutta Method.

(6 × 4 = 24 Marks)

PART – D

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

39. Find the Fourier Cosine series and Sine series of the function $f(x) = \begin{cases} 1, & 0 < x < 1/2 \\ 0, & \frac{1}{2} < x < 1 \end{cases}$.

40. Find the Fourier Series of the function $f(x) = x^2$, $-\pi < x < \pi$.

41. Solve

    (a) Solve $(x - y)dx + xdy = 0$

    (b) $x\frac{dy}{dx} + y = xy^3$.

42. Solve

    (a) $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - 4y = 0$

    (b) $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$

43. (a) Find a real root of the equation using the Newton Raphson Method.

    (b) Solve the simultaneous equations

    $-4x_2 = 8$

    $3x_2 - x_3 = 12$

    $x_1 + 3x_2 - 5x_3 = 3$,

    using Gauss Siedal method.

44. (a) Solve $\frac{dy}{dx} = -y$, $y(0) = 1$. using Euler Forward Difference Formula.

    (b) Find the numerical solution of the equation $\frac{dy}{dx} = 2y^{3/2}$, $y(0) = 1$, for $x = 0.1$ to 0.5 in steps of 0.1.

(2 × 15 = 30 Marks)

PART – D

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

39. Find the Fourier Cosine series and Sine series of the function $f(x) = \begin{cases} 1, & 0 < x < 1/2 \\ 0, & \frac{1}{2} < x < 1 \end{cases}$.

40. Find the Fourier Series of the function $f(x) = x^2$, $-\pi < x < \pi$.

41. Solve

    (a) Solve $(x - y)dx + xdy = 0$

    (b) $x\frac{dy}{dx} + y = xy^3$.

42. Solve

    (a) $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - 4y = 0$

    (b) $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$

43. (a) Find a real root of the equation $x = e^{-x}$, using the Newton Raphson Method.

    (b) Solve the simultaneous equation $x_1 + 6x_2 - 4x_3 = 8$

    $$3x_1 - 20x_2 + x_3 = 12$$
    $$-x_1 + 3x_2 + 5x_3 = 3,$$

    using Gauss Siedal method.

44. (a) Solve $\frac{dy}{dx} = -y$, $y(0) = 1$, using Euler Forward Difference Formula.

    (b) Find the numerical solution of the equation $\frac{dy}{dx} = 2y^{3/2}$, $y(0) = 1$, for $x = 0.1$ to 0.5 in steps of 0.1.

(2 × 15 = 30 Marks)

(Pages : 4) **P – 3825**

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2023

First Degree Programme under CBCSS

Mathematics

Core Course

MM 1341 : ELEMENTARY NUMBER THEORY AND CALCULUS – I

(2018 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions

1. For every positive integer n, find n consecutive integers that are composite numbers.

2. Prove that there are infinitely many primes.

3. State Dirichlet's theorem.

4. State the Pigeonhole principle.

5. If $r(t) = t^2 i - e^t j - (2\cos \pi t)k$. find $r'(t)$.

6. Prove that a straight line has zero curvature at every point.

7. Evaluate: $\int_0^2 r(t)dt$. where $r(t) = 2ti + 3t^2 j$.

P.T.O.

8. If f is a function of x, y and z, what is the gradient of f ?

9. State the chain rule for partial derivatives if $z = f(x, y)$, $x = x(u)$, $y = y(u)$.

10. Let $f(x, y) = y^2 e^x + y$. Evaluate f_{xyy}.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions.

11. Using recursion, evaluate, (18, 30, 60, 75, 132).

12. Derive a necessary and sufficient condition for two positive integers to be relatively prime.

13. Prove that (a, b) = (a, a – b).

14. Find the number of positive integers ≤ 2076 and divisible by neither 4 nor 5.

15. If $r(t)$ is a differentiable vector - valued function in 2 – space or 3-space and $\|r(t)\|$ is constant for all t, then show that $r(t)$ and $r'(t)$ are orthogonal vectors for all t.

16. State the Newton's laws of universal gravitation.

17. Show that the circle of radius a which centred at the origin has constant curvature $\frac{1}{a}$.

18. Evaluate the unit tangent vector to the graph of $r(t) = t^2 i + t^3 j$ at the point where $t = 2$.

19. Estimate an equation for the tangent plane and parametric equations for the normal line to the surface $z = x^2 y$ at the point (2, 1, 4).

20. Find the directional derivative of $f(x, y, z) = x^2 y - yz^3 + z$ at (1, –2, 0) in the direction of the vector $a = 2i + j - 2k$.

21. Evaluate $f_x(1, 3)$ and $f_y(1, 3)$ by finding $f_x(x, y)$ and $f_y(x, y)$ where $f(x,y) = 2x^3y^2 + 2y + 4x$.

22. Prove that $f(x, y) = x^2 + y^2$ is differentiable at the origin.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions.

23. Let e denote the highest power of 2 that divides $n!$ and b the number of 1s in the binary representation of n. Then show that $n = e + b$.

24. Show that the gcd of the positive integers a and b is a linear combination of a and b.

25. Show that 3, 5 and 7 are the only three consecutive odd integers that are primes.

26. Find parametric equations of the tangent line to the circular helix $x = \cos t$, $y = \sin t$, $z = t$ where $t = t_0$, and use that result to find parametric equations for the tangent line at the point $t = \pi$.

27. Find the curvature of the ellipse with vector equation $r = 2\cos t\, i + 3\sin t\, j$, $(0 \le t \le 2\pi)$ at the end points of the major and minor axes.

28. Derive Kepler's third law.

29. Find the slope of the sphere $x^2 + y^2 + z^2 = 1$ in the y – direction at the points $\left(\frac{2}{3}, \frac{1}{3}, \frac{2}{3}\right)$ and $\left(\frac{2}{3}, \frac{1}{3}, -\frac{2}{3}\right)$.

30. Verify whether the function $z = e^x \sin y + e^y \cos x$ satisfies the equation $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$.

31. Locate all relative extrema and saddle points of $f(x, y) = 3x^2 - 2xy + y^2 - 8y$.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions.

32. (a) Prove that there is no polynomial $f(n)$ with integral coefficients that will produce primes for all integers n.

(b) Find the general solution of the LDE $6x + 8y + 12z = 10$.

33. (a) State and prove the division algorithm.

(b) Show that the number of leap years l after 1600 and not exceeding a given year y is given by $l = [y/4] - [y/100] + [y/400] - 388$.

34. Suppose that a particle moves through 3 – space so that its position vector at time t is $r(t) = ti + t^2 j + t^3 k$.

(a) Find the scalar tangential and normal components of acceleration at time t.

(b) Find the scalar tangential and normal components of acceleration at time $t = 1$.

(c) Find the vector tangential and normal components of acceleration at time $t = 1$.

(d) Find the curvature of the path at the point where the particle is located at time $t = 1$.

35. Find the points on the sphere $x^2 + y^2 - z^2 = 36$ that are closest to and farthest from the point (1, 2, 2).

(2 × 15 = 30 Marks)
