(Pages : 3) **J – 1014**

Reg. No. : .....

Name : .....

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

LANGUAGE COURSE: READINGS IN LITERATURE

Common For B.A./B.Sc. EN 1411.1 (Language Course VIII)

And Career Related 2(a) (Language Course VI) EN1411.3

(2015 Admission Onwards)

Time : 3 Hours Max. Marks : 80

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

1. Why is the boy 'creeping like snail' in 'All the World is a Stage'?
2. What does the title 'La Belle Dame Sans Merci' mean?
3. Why does Ulysses think of leaving his kingdom?
4. What has caused insensibility among soldiers?
5. Where is the essay 'Tolerance' taken from?
6. What, according to Einstein, is the noblest motive for scientific research?
7. What was the persistent legend spun around Nehru's relation with the Prince of Wales?
8. What is Umkhonto we sizwe?
9. What reason did Vera give for the sudden exit of Mr. Nuttle?
10. Why was the cat named Sherlock?

(10 × 1 = 10 Marks)

P.T.O.

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

11. Shakespeare's views on the stage of the soldiers.

12. Resolution and perseverance of the leech gatherer.

13. The employment of Greek myths on 'A Prayer for My Daughter'.

14. The impact of the constable's visit on the narrator.

15. The difference in the attitude of the poet and his neighbour in 'Mending Wall'.

16. Social prescriptions on the use of language in 'An Introduction'.

17. The idea of 'cosmic religious feeling' as enunciated by Einstein.

18. The two solutions to deal with people whom we dislike, as proposed by E.M. Forster.

19. Two of the most persistent legends about Nehru.

20. The dilemma of Dr. Raman regarding the illness of Gopal.

21. The bet between the Banker and the youngman.

22. The reason for Chechi's dejection after receiving the call from Jayant.

(8 × 2 = 16 Marks)

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

23. The Knight's love for the beautiful lady.

24. The significance of Arnold's statement- "Let us be true to one another".

25. The implication of the dictum "good fences make good neighbours".

26. Tolerance as a practical replacement for love.

27. Einstein's account of three types of religions.

28. Poverty and misery of the Africans in South Africa.

29. Longing as a theme in 'Yellow is the Colour of Longing'.

30. The ending of the story 'The Open Window'.

31. Cat as a prominent character in 'Sherlock'.

(6 × 4 = 24 Marks)

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

32. Describe the seven stages in human life as portrayed in 'All the World is a Stage'.

33. Comment on the atmosphere of oppression and fear in 'A constable Calls'.

34. Explain J.B. Priestley's arguments favouring idling.

35. Evaluate R.K. Narayan's craftsmanship as evident in 'The Doctor's Word'.

(2 × 15 = 30 Marks)

(Pages : 4) J – 1017

Reg. No. : .....

Name : .....

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Malayalam Language

Language Course — Additional Language IV

ML 1411.1 — ആശയവിനിമയം, സർഗ്ഗാത്മകരചന, ഭാഷാവബോധം

(2018 admission)

Time : 3 Hours Max. Marks : 80

I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.

1. മലയാളത്തിലെ വാക്യങ്ങളുടെ സ്വാഭാവികമായ പദക്രമം എങ്ങനെയാണ്?

2. ഒരു വാക്യം അവസാനിച്ചിട്ട് അതിൽ പറഞ്ഞതിനു വിശദീകരണമോ ഉദാഹരണമോ നല്കുമ്പോൾ അന്വയം അവസാനിക്കുന്നിടത്തു ചേർക്കുന്ന ചിഹ്നമേത്?

3. കാഥികന്റെ കല എന്ന ലേഖനമെഴുതിയതാര്?

4. Genius എന്ന പദത്തെ മലയാളത്തിലേയ്ക്ക് എങ്ങനെ പരിഭാഷപ്പെടുത്താം?

5. സത്യവാങ്മൂലം എന്ന വാക്കിന് ഉചിതമായ ഇംഗ്ലീഷ് തർജ്ജമ എഴുതുക.

6. Where there is a will there is a way എന്ന പഴഞ്ചൊല്ല് മലയാളത്തിലേയ്ക്ക് പരിഭാഷപ്പെടുത്തുക.

7. വിവരസാങ്കേതികവിദ്യ നിത്യജീവിതത്തിൽ എന്ന പുസ്തകമെഴുതിയതാര്?

P.T.O.

8. Precis എന്ന വാക്കിന്റെ മലയാളവിവർത്തനമെന്ത്?

9. www - പൂർണ്ണരൂപമെന്ത്?

10. മലയാളശൈലി എഴുതിയതാര്?

(10 × 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ **എട്ടു** ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. സംഗ്രഹിക്കുക.

കവിതകൾ മധുരമായി പാടിക്കൊണ്ട് മലയാളികളെ പുളകമണിയിക്കുകയും ചിന്തോദ്ദീപകമായ കവിതകളെഴുതുകയും ചെയ്തിട്ടുള്ള കവിയാണ് വി. മധുസൂദനൻ നായർ. കുട്ടിക്കാലം മുതലേ കവിതകളെഴുതുമായിരുന്നുവെങ്കിലും, മധുസൂദനൻ നായരിലെ കവിയെ മലയാളികളറിയുന്നത് 1986-ൽ നാറാണത്തുഭ്രാന്തൻ എന്ന കവിത പ്രസിദ്ധീകരിക്കുന്നതോടെയാണ്. എട്ടു വർഷത്തിനുള്ളിൽ 20 എഡിഷനുകൾ അച്ചടിച്ച ഏകമലയാളകൃതിയും ഇതാണെന്നതിൽ കവിക്ക് അഭിമാനിക്കാം.

12. ആശയം വിപുലമാക്കുക.

"നാട്യപ്രധാനം നഗരം ദരിദ്രം
നാട്ടിൻപുറം നന്മകളാൽ സമൃദ്ധം".

13. സർഗ്ഗാത്മകതയുടെ ഉറവിടമെന്ത്?

14. അനുഭവാവിഷ്കാരത്തിന്റെ സവിശേഷതകളെന്തെല്ലാം?

15. Face is index of mind, Brevity is the soul of art - മലയാളത്തിലേയ്ക്കു വിവർത്തനം ചെയ്യുക.

16. ഇംഗ്ലീഷിലേയ്ക്കു പരിഭാഷപ്പെടുത്തുക.
ഉടമ്പടി, മേല്നടപടി

17. റേഡിയോയുടെ സമകാലപ്രസക്തി.

18. സൈബറിടത്തിലെ സ്വാതന്ത്ര്യത്തിന്റെ സ്വഭാവമെന്ത്?

19. ഇന്റർനെറ്റിന്റെ ഉപയോഗങ്ങളെന്തെല്ലാം?

20. അച്ചടിമാധ്യമങ്ങൾ നേരിടുന്ന വെല്ലുവിളികൾ എന്തെല്ലാം?

21. വാട്ട്സ്ആപ് എന്ന സാമൂഹ്യമാദ്ധ്യമം.

22. എം.ടി. യുടെ നിരീക്ഷണത്തിൽ കഥ രൂപംകൊള്ളുന്നതെങ്ങനെ?

(8 × 2 = 16 Marks)

III. **നൂറ്റിയിരുപതു** വാക്കിൽ കവിയാതെ **ആറു** ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

23. വാക്യരചനയിൽ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങളെന്തെല്ലാം? വിശദീകരിക്കുക.

24. മലയാളത്തിലുപയോഗിക്കുന്ന പ്രധാന ചിഹ്നങ്ങൾ പ്രയോഗസാഹചര്യം നല്കി പരിചയപ്പെടുത്തുക.

25. സർഗ്ഗാത്മകതയെ സംബന്ധിക്കുന്ന വിവിധ കാഴ്ചപ്പാടുകൾ വിശദീകരിക്കുക.

26. ജന്മവാസനയും എഴുത്തും തമ്മിലുള്ള ബന്ധം വിശദീകരിക്കുക.

27. മലയാളത്തിലേയ്ക്കു വിവർത്തനം ചെയ്യുക.

Amazon.com., is an American multinational technology company based in Seattle that focuses on e-commerce, cloud computing, digital streaming, and artificial intelligence. It is considered one of the Big Four tech companies, along with Google, Apple, and Facebook.

28. ഇംഗ്ലീഷിലേയ്ക്കു പരിഭാഷപ്പെടുത്തുക.

കാളിദാസമഹാകവിയെക്കുറിച്ച് അദ്ദേഹത്തിന്റെ കാലത്തോ അതിനടുത്ത കാലത്തോ ജീവിച്ചിരുന്നവരിൽ ആരുംതന്നെ ഒന്നും എഴുതിയിട്ടില്ലാത്തതുകൊണ്ട് അദ്ദേഹത്തിന്റെ കാലത്തേയും മാതാപിതാക്കന്മാരേയും വിദ്യാഭ്യാസത്തേയും ഗുരുഭൂതന്മാരേയും കുറിച്ച് അറിയുന്നതിന് ഇപ്പോൾ ശരിയായ ഒരു മാർഗ്ഗവുമില്ല. ജീവിതകഥയെക്കുറിച്ചറിയുന്നതിനു തന്നെയും ചില ഐതിഹ്യങ്ങളല്ലാതെ വേറെ ഒരാധാരവുമില്ലാതെയാണിരിക്കുന്നത്. ഐതിഹ്യങ്ങളിൽത്തന്നെ ചിലത് പരസ്പരവിരുദ്ധങ്ങളായുമിരിക്കുന്നു. അദ്ദേഹത്തിന്റെ ജീവചരിത്രത്തിൽ അനേകം പക്ഷാന്തരങ്ങളും കാണുന്നുണ്ട്.

29. ടെലിവിഷൻ ചാനലുകളുടെ സാമൂഹികസ്വാധീനം വിലയിരുത്തുക.

30. സൈബറിടത്തിന്റെ സർഗ്ഗാത്മകസാദ്ധ്യതകളെന്തെല്ലാം?

31. മലയാളം കമ്പ്യൂട്ടിംഗിന്റെ വർത്തമാനകാലം വിശകലനം ചെയ്യുക.

(6 × 4 = 24 Marks)

IV. **മൂന്നു** പുറത്തിൽ കവിയാതെ **രണ്ടു** ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

32. അവനവൻതന്നെ പ്രസാധകരാകുന്ന കാലമാണ് സൈബർസാഹിത്യത്തിന്റേത്. വിശദീകരിക്കുക.

33. എം.ടി. വാസുദേവൻ നായരുടെ അഭിപ്രായത്തിൽ എഴുത്തുകാരൻ പിന്തുടരുന്ന രചനാമാർഗ്ഗങ്ങളെന്തെല്ലാം? വിശദമാക്കുക.

34. ഇന്റർനെറ്റ് അവതരിപ്പിക്കുന്ന പുതിയ വിനിമയസാദ്ധ്യതകൾ പരിചയപ്പെടുത്തുക.

35. കേരളത്തിലെ ഗ്രാമജീവിതം - ഉപന്യാസം തയ്യാറാക്കുക.

(2 × 15 = 30 Marks)

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(Pages : 3) J – 1014

Reg. No. : .....

Name : .....

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

LANGUAGE COURSE: READINGS IN LITERATURE

Common For B.A./B.Sc. EN 1411.1 (Language Course VIII)

And Career Related 2(a) (Language Course VI) EN1411.3

(2015 Admission Onwards)

Time : 3 Hours Max. Marks : 80

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

1. Why is the boy 'creeping like snail' in 'All the World is a Stage'?
2. What does the title 'La Belle Dame Sans Merci' mean?
3. Why does Ulysses think of leaving his kingdom?
4. What has caused insensibility among soldiers?
5. Where is the essay 'Tolerance' taken from?
6. What, according to Einstein, is the noblest motive for scientific research?
7. What was the persistent legend spun around Nehru's relation with the Prince of Wales?
8. What is Umkhonto we sizwe?
9. What reason did Vera give for the sudden exit of Mr. Nuttle?
10. Why was the cat named Sherlock?

(10 × 1 = 10 Marks)

P.T.O.

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

11. Shakespeare's views on the stage of the soldiers.

12. Resolution and perseverance of the leech gatherer.

13. The employment of Greek myths on 'A Prayer for My Daughter'.

14. The impact of the constable's visit on the narrator.

15. The difference in the attitude of the poet and his neighbour in 'Mending Wall'.

16. Social prescriptions on the use of language in 'An Introduction'.

17. The idea of 'cosmic religious feeling' as enunciated by Einstein.

18. The two solutions to deal with people whom we dislike, as proposed by E.M. Forster.

19. Two of the most persistent legends about Nehru.

20. The dilemma of Dr. Raman regarding the illness of Gopal.

21. The bet between the Banker and the youngman.

22. The reason for Chechi's dejection after receiving the call from Jayant.

(8 × 2 = 16 Marks)

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

23. The Knight's love for the beautiful lady.

24. The significance of Arnold's statement- "Let us be true to one another".

25. The implication of the dictum "good fences make good neighbours".

26. Tolerance as a practical replacement for love.

27. Einstein's account of three types of religions.

28. Poverty and misery of the Africans in South Africa.

29. Longing as a theme in 'Yellow is the Colour of Longing'.

30. The ending of the story 'The Open Window'.

31. Cat as a prominent character in 'Sherlock'.

(6 × 4 = 24 Marks)

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

32. Describe the seven stages in human life as portrayed in 'All the World is a Stage'.

33. Comment on the atmosphere of oppression and fear in 'A constable Calls'.

34. Explain J.B. Priestley's arguments favouring idling.

35. Evaluate R.K. Narayan's craftsmanship as evident in 'The Doctor's Word'.

(2 × 15 = 30 Marks)

(Pages : 3) J – 1016

Reg. No. : .....

Name : .....

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Language Course (Additional Language IV) — Hindi

HN 1411.1 – DRAMA, TRANSLATION AND CORRESPONDENCE

(2017 Admission Onwards)

Time : 3 Hours Max. Marks : 80

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

1. 'बिना दीवारों के घर' किस विधा की रचना है?

2. मन्नू भण्डारी के किसी एक उपन्यास का नाम बताइए।

3. 'बिना दिवारों के घर' में कुल कितने अंक हैं?

4. 'बिना दिवारों के घर' की मुख्य समस्या कौन-सी है?

5. 'I am unable to go the to market' का हिन्दी अनुवाद कीजिए।

6. 'A bolt from the blue' के लिए प्रयुक्त हिन्दी अनुवाद लिखिए।

7. पत्र-लेखन में अंग्रेज़ी के 'From' के स्थान पर हिन्दी में किस शब्द का प्रयोग किया जाता है?

8. 'Letters of Enquiry' के लिए प्रयुक्त हिन्दी शब्द।

P.T.O.

9. 'Commercial Letters' के लिए हिन्दी में प्रयुक्त शब्द कौन-सा है?

10. "मैं पूछता हूँ इस घर में कभी कोई चीज़ ठीक जगह पर भी रहती है या नहीं?" – यह किसका कथन है?

(10 × 1 = 10 Marks)

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

11. 'बिना दिवारों के घर' में अभिव्यक्त स्त्री मानसिकता का चित्रण कीजिए।

12. अजित का चरित्र-चित्रण कीजिए।

13. अनुवाद कितने प्रकार के होते हैं? समझाइए।

14. 'अनुवाद' का व्युत्पत्तिपरक अर्थ समझाइए।

15. अनुवाद करते वक्त ध्वन्यात्मक स्तर पर किन-किन बातों पर ध्यान देना पड़ता है?

16. लेखक के नाम, प्रकाशक के पत्र का एक नमूना तैयार कीजिए।

17. अपने भाई के विवाह का निमन्त्रण पत्र तैयार कीजिए।

18. अनुवाद करते समय वाक्यात्मक स्तर पर किन-किन बातों पर ध्यान देना आवश्यक है?

19. मीना जयन्त से क्यों विवाह-विच्छेद कर स्वतंत्रता की राह लेती है?

20. "लगता है जैसे जितना-जितना ऊपर से बढ़ती जा रही हूँ, भीतर से उतनी ही मेरी जडें कटती जा रही है। मैं अपनी धरती से उखडती जा रही हूँ।।" — व्याख्या कीजिए।

21. शोभा के नौकरी करने के बारे में अजित का विचार क्या है?

22. सब्जी-मण्ठी में होनेवाले वार्तालाप का नमुना तैयार कीजिए। **(8 × 2 = 16 Marks)**

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

23. व्यक्ति जीवन में पत्र-लेखन का महत्व क्या है?

24. अनुवाद करते समय भाषा संबन्धी किन-किन बातों पर ध्यान देना चाहिए?

25. 'बिना दिवारों के घर' नाटक के शीर्षक की सार्थकता पर विचार कीजिए।

26. अजित और शोभा का वैवाहिक जीवन कैसा है?

27. प्रारंभ, मध्य एवं अंत का परिचय देते हुए, एक पत्र के स्वरूप की चर्चा कीजिए।

28. "तुम उसके पापा हो, झूठे अभिमान ने तुम्हें इतना अन्धा बना दिया है कि तुम्हें उसका भी ख्याल नहीं।" – व्याख्या कीजिए।

29. अपनी छोटी बहन को ताजमहल के महत्व का विवरण देते हुए एक पत्र लिखिए।

30. डाक अधिकारी के नाम एक शिकायती पत्र लिखिए।

31. चरित्र-चित्रण की दृष्टि में 'बिना दिवारों के घर' का मूल्यांकन कीजिए। **(6 × 4 = 24 Marks)**

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

32. 'बिना दिवारों के घर' में अभिव्यक्त मुख्य समस्याओं का विश्लेषण कीजिए।

33. नाटक के तत्वों के आधार पर बिना दीवारों के घर की विवेचना कीजिए।

34. अपनी सखी को उसके सैनिक पति की मृत्यु पर एक सांत्वना पत्र लिखिए।

35. निम्नलिखित गद्यांश का हिन्दी में अनुवाद कीजिए।

Many of you will be known for your discoveries and inventions. But the University has to train year after year such cards for building free India in which want, squalor, ignorance and disease must be unknown. In this great task of cadre-making the teacher has a vital role to play, for teacher is the cornerstone of the arch of education, he is no less, if not more than books and curriculum, building and equipment, administration and the rest.

(कठिन शब्द : University - विश्व विद्यालय, Squalor - अभाव, Ignorance - अज्ञान, Disease - बीमारी, Cadre making - संवर्ग निर्माण, Arch - मेहराब, Curriculum - पाठ्यक्रम, Administration - प्रशासन)

(2 × 15 = 30 Marks)

(Pages : 6) J – 3007

Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, June 2020

First Degree Programme under CBCSS

Mathematics

Complementary Course for Statistics

MM 1431.4 : MATHEMATICS IV – LINEAR ALGEBRA

(2018 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – I

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

1. Find the norm of the vector $\begin{bmatrix} 6 \\ -2 \\ 3 \end{bmatrix}$.

2. Check whether the vectors $u = \begin{bmatrix} 2 \\ 5 \\ -1 \end{bmatrix}$ and $v = \begin{bmatrix} 3 \\ 2 \\ -3 \end{bmatrix}$ are orthogonal.

3. Given $u = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}$, $v = \begin{bmatrix} 0 \\ 5 \\ 6 \end{bmatrix}$, $w = \begin{bmatrix} 1 \\ -1 \\ -3 \end{bmatrix}$, find $2u - 3v - w$.

P.T.O.

4. Are the matrices A and B row equivalent?

$$A=\begin{bmatrix} 1 & -2 & -1 & 3 & 0 \\ -2 & 4 & 5 & -5 & 3 \\ 3 & -6 & -6 & 8 & 2 \end{bmatrix}, \quad B=\begin{bmatrix} 1 & -2 & -1 & 3 & 0 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 0 & 0 & 5 \end{bmatrix}.$$

5. Find the inverse of $A=\begin{bmatrix} 8 & 6 \\ 5 & 4 \end{bmatrix}$.

6. Check whether the matrix $\begin{bmatrix} 1 & -2 & 1 \\ 4 & -7 & 3 \\ -2 & 6 & -4 \end{bmatrix}$ is singular.

7. Find the rank of the matrix $\begin{bmatrix} 5 & -5 & 0 \\ 0 & 0 & 0 \end{bmatrix}$.

8. Define dilation from $\mathcal{R}^2$ to $\mathcal{R}^2$.

9. What is the order of the matrix of the transformation $T : \mathcal{R}^7 \rightarrow \mathcal{R}^4$?

10. Write the standard matrix corresponding to the transformation of reflection through the $x_2 = -x_1$.

(10 × 1 = 10 Marks)

SECTION – II

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

11. Verify Cauchy Schwarz inequality for the vectors $x=(1, 1)$, $y=(5, -1)$

12. Is the third quadrant a vector subspace of $\mathcal{R}^2$? Justify your answer.

13. Check whether the vectors $\begin{bmatrix} 1 \\ -3 \\ 0 \end{bmatrix}, \begin{bmatrix} -2 \\ 9 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$ are linearly independent in $\mathcal{R}^3$.

14. Define dimension of a vector space.

15. If $A = \begin{bmatrix} 2 & -1 \\ 3 & -4 \end{bmatrix}$, show that $A^2 + 2A - 5I = 0$.

16. Find the eigen values of the matrix $\begin{bmatrix} 7 & 4 \\ -3 & 1 \end{bmatrix}$.

17. If 3 is an eigen value of $\begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & 1 \\ 1 & -1 & 3 \end{bmatrix}$, find all the eigen values of A^{-1} without using characteristic equation.

18. By reducing to echelon form, find the rank of the matrix $\begin{bmatrix} 1 & 3 & 5 & 7 \\ 3 & 5 & 7 & 9 \\ 5 & 7 & 9 & 1 \end{bmatrix}$.

19. Check whether $T : \mathcal{R}^2 \to \mathcal{R}^3$ given by $T[(x_1, x_2)] = (x_1 - 2x_2, 0, 3x_1 - 2x_2)$ is a linear transformation.

20. Find the standard matrix of the linear transformation $T : \mathcal{R}^2 \to \mathcal{R}^2$ which is rotation through $\frac{\pi}{2}$ radians.

21. Find the B–co-ordinate vector of x where $\{b_1, b_2\}$, $b_1 = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$, $b_2 = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$, $x = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$.

22. Find a basis for the null space and column space of the matrix $\begin{bmatrix} -3 & 9 & -2 & -7 \\ 2 & -6 & 4 & 8 \\ 3 & -9 & -2 & 2 \end{bmatrix}$.

(8 × 2 = 16 Marks)

SECTION – III

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

23. Solve the system of equations by Cramer's rule :

$$x + y - z = 9$$
$$y + 6z = -6$$
$$-2x + 4y - 6z = 4.$$

24. For what value of λ and μ do the system of equations :

$$x + 2y + 3z = 6$$
$$x + 3y + 5z = 9$$
$$2x + 5y + \lambda z = \mu$$

has (a) no solution (b) unique solution (c) infinite solution.

25. Find the eigen values and eigen vectors of $\begin{bmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{bmatrix}$.

26. Show that $\mathcal{B} = \{b_1, b_2, b_3\}$ form a basis of $\mathcal{R}^3$ where $b_1 = \begin{bmatrix} 1 \\ 1 \\ -2 \end{bmatrix}$, $b_2 = \begin{bmatrix} -5 \\ -1 \\ 2 \end{bmatrix}$, $b_3 = \begin{bmatrix} 7 \\ 0 \\ -5 \end{bmatrix}$.

27. Determine whether the transformation, $T : \mathcal{R}^3 \to \mathcal{R}^2$ given by $T(x_1, x_2, x_3) = (x_1 - 5x_2 + 4x_3, x_2 - 6x_3)$ is

(a) one-one

(b) onto.

28. Diagonalize the matrix $\begin{bmatrix} 7 & 2 \\ -4 & 1 \end{bmatrix}$.

29. Let $\mathcal{B}=\{b_1, b_2\}$, $C=\{c_1, c_2\}$ be bases of $\mathcal{R}^2$ where $b_1=\begin{bmatrix} -6 \\ -1 \end{bmatrix}$, $b_2=\begin{bmatrix} 2 \\ 0 \end{bmatrix}$, $c_1=\begin{bmatrix} 2 \\ -1 \end{bmatrix}$, $c_2=\begin{bmatrix} 6 \\ -2 \end{bmatrix}$. Find the change of co-ordinate matrix from B to C and the change of co-ordinate matrix from C to B.

30. Find the B-matrix of the transformation $T : \mathcal{R}^2 \to \mathcal{R}^2$ given by $T(x)=Ax$, where $A=\begin{bmatrix} 3 & 4 \\ -1 & -1 \end{bmatrix}$, $b_1=\begin{bmatrix} 2 \\ -1 \end{bmatrix}$, $b_2=\begin{bmatrix} 1 \\ 2 \end{bmatrix}$, $\mathcal{B}=\{b_1, b_2\}$.

31. Prove that the vectors $u=\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$, $v=\begin{bmatrix} 2 \\ 1 \\ 4 \end{bmatrix}$, $w=\begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$ are linearly dependent and find the linear dependence relation between them.

(6 × 4 = 24 Marks)

SECTION – IV

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

32. Find an orthonormal basis for the subspace spanned by the vectors $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}$ of $\mathcal{R}^3$, using Gram Schmidt process.

33. Classify the quadratic form $2x_1^2 + 10x_1x_2 + 2x_2^2$ and make a change of variable $x = Py$ that transforms the quadratic form into one with no cross product term. Write P and the new quadratic form.

34. Diagonalize the matrix $\begin{bmatrix} 2 & 2 & -1 \\ 1 & 3 & -1 \\ -1 & -2 & 2 \end{bmatrix}$.

35. Define $T : \mathcal{R}^2 \to \mathcal{R}^2$ given by $T(x) = Ax$ where $A = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$. Find a basis of $\mathcal{B}$ of $\mathcal{R}^2$. with the property that $[T]_{\mathcal{B}}$ is diagonal

(2 × 15 = 30 Marks)

(Pages : 4) **J – 1231**

Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course

PY 1431.3 – Modern Physics and Electronics

(For statistics)

(2018 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions in one or two sentences; each question carries **1**mark

1. What is the significance of Pauli's exclusion principle?
2. What are the four different quantum numbers?
3. What are the properties of beta rays?
4. What is carbon dating?
5. Give two properties of superconductors?
6. What is the purpose of Eigen values?
7. Which semiconductor device acts as a rectifier? Why?

P.T.O.

8. What is a zener diode?

9. What do you meant by stabilization of operating point?

10. What is faithful amplifications?

(10 × 1 = 10 Marks)

SECTION – B

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

11. What are the basic features of Bohr atom model?

12. Explain the L-S and j-j coupling schemes?

13. What is meant by secular equilibrium?

14. What are the features of nuclear forces?

15. Explain Meissner effect?

16. Write a note on high temperature ceramic superconductors?

17. What is the inadequacy of classical mechanics?

18. What does quantum theory explains? Write down any one experimental evidence for quantum theory?

19. Write any three postulates of quantum mechanics?

20. Draw the input and out characteristics of CE configurations?

21. Draw the V-I characteristics of zener diode and explain?

22. Why CE configuration is commonly used?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions; each questions carries **4** marks

23. Calculate the strength of the magnetic field required to give processional frequency of 100*MHz for* ^{17}O nucleus. Given $g_N = -0.757, \mu_N = 5.051 \times 10^{-27} JT^{-1}, I = 5/2$.

24. What is the nuclear g_N factor for the 19F nucleus which has a magnetic moment of 2.6273 μN. Nuclear spin quantum number I=1/2.

25. What are the frequency and wavelength of a photon whose energy equals the rest energy of an electron?

26. What is the de Broglie wavelength associated with an electron moving with a velocity $1.5 \times 10^7 m/s$.

27. Find the binding energy per nucleus $^{20}Ne_{10}$. Mass of proton = 1.007276u, mass of neutron =1.008665u and mass of $^{20}Ne_{10} = 19.987u$, $1u = 931.49MeV$.

28. In a common base connection, $I_E = 1mA, I_C = 0.95mA$, Calculate the value of I_B.

29. The half-life period of radium in 1620 years. In how many years will one gram of pure element lose 0.01gm?

30. A transistor uses potential divider method of biasing. $R_1 = 50\Omega$, $R_2 = 10\Omega$ *and* $R_E = 1k\Omega$. If $V_{CC} = 12V$, Find the value of IC. Given $V_{BE} = 0.1V$.

31. The current gain of a transistor in CE configuration is 49.What will be the current gain of same transistor in CB configurations?

(6 × 4 = 24 Marks)

SECTION – D

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

32. State and explain the law of radioactive disintegration. Derive expressions for half-life and mean life in terms of disintegration constant.

33. What is superconductivity? Distinguish between type-I and type-II superconductors? Mention the applications of superconductors

34. Derive Schrodinger's time dependent wave equation. What is the significance of wave functions?

35. With neat sketch explain the working of a Bridge rectifier. Derive an expression for the efficiency of full wave rectifier?

(2 × 15 = 30 Marks)

Stat
Math

(Pages : 4) **J – 1229**

Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Statistics

Core Course

ST 1441 – PROBABILITY AND DISTRIBUTION II

(2018 Admission)

Time : 3 Hours Max. Marks : 80

Instructions: Scientific Calculators and Mathematical/statistical tables are permitted to use.

SECTION – A

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

1. Find mean and variance of a Bernoulli distribution with parameter p?

2. If X – B(10,0.4) find P(Y=3) where Y = 10 – X

3. If X is a Poisson random variable with $P(X = 0) – e^{-2}$, find mean and variance of the distribution.

4. Two percent of tools produced in a certain manufacturing process turn out to be defective Using Poisson approximation, find the probability that in a sample of 200 units, exactly 2 units are defective.

5. An unbiased coin is tossed until a head is obtained, If X is the number of tosses required, find the probability mass function of X.

6. Write down the probability mass function of a negative binomial distribution.

7. If the moment generating function of X is $\frac{3}{4-e^t}$, identify the distribution.

8. If X and Y are two independent standard normal random variables, what is the distribution of 2X + 3Y?

9. For a Uniform random variable over (-2,2) find $P(|x|>1)$.

10. For a Cauchy distribution with probability density function $f(x)=\frac{1}{\pi 1+x^2}-\infty<x<\infty$ find the distribution function.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Suppose X is a discrete uniform random variable with values 1,2....n Find the variance of the distribution.

12. Obtain moment generating function of a Binomial random variable with n=7 and p = 0.4 and hence find its Cumulant generating function.

13. If X is a Poisson random variable such that P(X = I)= 2 P(X = 2) find Mean and Variance of X.

14. If X and Y are independent Poisson random variables with parameters λ_1 and λ_2 respectively, find P(X=Y).

15. Find the mean of a geometric distribution with parameter p.

16. Define Multinomial distribution.

17. Define bivariate normal distribution.

18. Find the characteristic function of an exponential random variable with parameters θ

19. Given that X is normally distributed with mean 10 and P(X > 12) = 0.1587 find its standard deviation.

20. Find the moment generating function of a standard normal random variable.

21. Write down the characteristic function of a standard Cauchy distribution and hence find the distribution of $\frac{1}{n}\sum_{1-1}^{n} x_i$ where $X_1, X_2 \ldots X_n$ are independent and identically distributed standard Cauchy random variables.

22. Write down the probability density function of random variable that follows Beta distribution of second kind. What is the transformation required in order to transform a random variable of Beta distribution of second kind to Beta distribution of first kind.

(8 × 2 = 16 Marks)

SECTION – C

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

23. Obtain the moment generating function of a Binomial random variable and using this function derive the additive property of Binomial variables.

24. For a Poisson distribution with parameter λ find the mode of the distribution. When do you say the Poisson distribution is a bimodal distribution?

25. If X – P(λ_1) and X – P(λ_2) are two independent Poisson random variables then show that the conditional distribution of X given X+Y is Binomial.

26. If X and Y are two independent geometric random variables with same probability of success P show that $P(X=Y)=\frac{P}{2-p}$.

27. Define Hyper geometric distribution. Find the mean of the distribution.

28. For a Uniform random variable with probability density function $f(x)=\frac{1}{20}, -0 \le x \le 0$ derive coefficient of skewness and Kurtosis of the distribution.

29. For a normal distribution with mean μ and variance σ^2, find the Quartile deviation.

30. For a normal distribution 7% items are under 35 and 89% are under 63.Find the mean and variance of the distribution.

31. Suppose (X. Y) – BN($\mu_1, \mu_2, \sigma_1^2 \sigma_2^2, \rho$) is a bivariate normal random vector, then establish the condition $\rho = 0$ for independence of X and Y.

(6 × 4 = 24 Marks)

SECTION – D

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

32. (i) The probability that a man hitting the target is 1/3.How many times must he fire so that the probability of hitting the target at least once is more than 90%?

(ii) The probability of getting no misprint in a page of a book is e^{-4}. What is the probability that a page contains more than 2 misprints?

(iii) Let X and Y be two independent normal random variables with equal means and standard deviations 2 and 3 respectively and let $P(4X + 2Y \leq 3) = P(2X - Y \geq -4)$, determine the common mean of X and Y.

33. Derive the recurrence relation between central moments of a Normal distribution with mean μ and variance σ^2. Hence find coefficient of skewness and Kurtosis of the distribution.

34. (i) If X is a gamma random variable with parameter (α, β),find its moment generating function and hence find mean of the distribution.

(ii) If X is a Beta distribution of first kind with parameters p and q find the mean and Harmonic mean of X.

35. (i) Define log normal distribution and find its r^{th} moment.

(ii) Let $X_i - \exp(0_i), i = 1,2...n$ be n independent exponential random variables then find distribution function of the random variable Y= min($X_1, X_2 .... X_n$).

(2 × 15 = 30 Marks)
