

(Pages : 4)

M – 2136

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc./B.Com. Degree Examination, December 2021.**

**First Degree Programme under CBCSS**

**Language Course – English**

**EN 1212.1/EN 1211.2/ EN 1211.3 – ENGLISH GRAMMAR USAGE  
AND WRITING**

**(Common for B.A/ B.Sc./ B.Com. and Career Related Group 2(a))**

**(2019 Admission)**

Time : 3 Hours

Max. Marks : 80

- I. Answer **all** questions each in a word or a sentence.
  1. Change the voice in the sentence.  
Let them go.
  2. Change the sentence "I love eating ice cream" into negative.
  3. Supply the question tag for, "You are ok \_\_\_\_\_".
  4. Correct the following sentence.  
I write fictions.
  5. Begin the following sentence with it.  
To write an essay is not easy.
  6. Choose the correct verb form.  
Trouble \_\_\_\_\_ (choose/chose) to follow the politician wherever he went.
  7. Identify if the following sentence is grammatically correct or not.  
The actor grew up as an only child.

P.T.O.

8. Rewrite the sentence using the adverb provided.  
I am sad. (quite)
9. Complete the sentences with the correct option.  
They are two \_\_\_\_\_ of the same puzzle. (half/halves)
10. The majority of workers \_\_\_\_\_ not turned up for the strike. (has/have)

(10 × 1 = 10 Marks)

II. Answer **any eight** of the following questions as per instructions:

11. Convert the following into a compound sentence.  
(a) I have an interview. I am late for it.  
(b) The menagerie is far away. It is flooded.
12. Convert the following into a simple sentence.  
(a) He is a cop. It is true.  
(b) Gopal is alone. He is still cheerful.
13. Correct the following sentences.  
(a) Ritu shaked the pencil.  
(b) He gave to me a pen holder.
14. Change the voice.  
(a) We must take care of the puppy.  
(b) Close the gate.
15. Fill in the blanks using the correct verb given in brackets.  
(a) The boy has been \_\_\_\_\_ (missing/to miss) since last week.  
(b) Unicorns \_\_\_\_\_ only in fairy tales. (exist/existed).
16. Choose the correct usage.  
(a) Half the shelf \_\_\_\_\_ (is/are) filled with organic products.  
(b) Everyone \_\_\_\_\_ (has/have) duties.
17. Change into comparative degree:  
(a) His bike is as old as mine.  
(b) Megha is the brightest student in the class.

18. Frame a question to get the underlined word as answer.
- (a) He is a critically acclaimed novelist.
- (b) I am living in Melbourne since last year.
19. Add the correct question tag.
- (a) Everyone came to the movie premiere, \_\_\_\_\_ ?
- (b) Buying a new house is a risky affair, \_\_\_\_\_ ?
20. Reorder the jumbled sentences.
- (a) Stuggling dancer/ been/ // have/a
- (b) Went/ hiking trip/ they/ on a
21. Choose the appropriate option to fill in the blanks.
- (a) The principal did not intend to discuss it any (further/ farther)
- (b) Ravi had done it with the \_\_\_\_\_ intentions in mind (best/better).
22. Rewrite into positive sentences.
- (a) I hate cooking.
- (b) He does not like giving impromptu speeches.

(8 × 2 = 16 Marks)

III. Answer **any six**, as directed:

23. Write a conversation between two friends on a matter of importance.
24. Expand the following proverb:  
A stitch in time saves nine.
25. Prepare a questionnaire to assess the pattern of spending time online among teenagers.
26. Prepare a conversation between a teacher and a student who failed a test paper.
27. Change the following conversation into Reported Speech:  
Zain: What are you doing?  
Cathy: Trying to prepare a quick lunch.  
Zain: Do you need my help?  
Cathy: Sure. Prep these ingredients for me!

28. Change the following into passive voice.
- (a) You can listen to the new song now.
  - (b) I saw a Banksy painting for sale at the auction.
  - (c) Somebody stole my purse.
  - (d) He gave the correct directions.
29. Fill up using articles:
- She has bought \_\_\_\_\_ new watch for you \_\_\_\_\_ watch is very expensive. It is \_\_\_\_\_ smart watch with \_\_\_\_\_ latest features and \_\_\_\_\_ platinum strap.
30. Correct the following sentences.
- (a) Good friends is harder to come by these days.
  - (b) I and you can clean this mess.
  - (c) She is here since seven days.
  - (d) He gave the speech herself.
31. Complete using suitable modals.
- (a) I \_\_\_\_\_ leave now, as I have to finish my homework. (should/would)
  - (b) It \_\_\_\_\_ rain tomorrow. (may/have)
  - (c) You \_\_\_\_\_ deliver the talk now. (must/should)
  - (d) She \_\_\_\_\_ dance properly. (can/would)

(6 × 4 = 24 Marks)

IV. Answer **any two** of the following:

- 32. Expand the proverb "A thing of beauty is a joy forever".
- 33. Write a report on the PTA meeting that took place in your college.
- 34. Write a short essay on the importance of health care workers during the pandemic.
- 35. Write a report on the importance of world peace.

(2 × 15 = 30 Marks)

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M – 2612

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, December 2021**

**Career Related First Degree Programme Under CBCSS**

**Physics with Computer Applications**

**Core Course**

**PC 1241 : ENVIRONMENTAL STUDIES**

**(2020 Admission – Regular)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A (Very short answer type)**

Answer **all** questions (one word or one sentence) Marks – 1 each.

1. What is mutualism?
2. Name any endemic species in western ghats of south India.
3. What is water table?
4. The average rainfall of Kerala is \_\_\_\_\_.
5. Which is the largest ecosystem in the world?
6. Name any two minerals found in Kerala beaches.
7. Define effluent.
8. Define biome.

P.T.O.

9. Expand UNEP.
10. What is population explosion?

**(10 × 1 = 10 Marks)**

**SECTION – B (Short Answer Type)**

Answer any **eight** questions, **2** marks each.

11. What is the importance of ecological succession?
12. What are predators?
13. What is exsitu and insitu conservation?
14. What is the structure of the ecosystem?
15. What do we mean by ambient air?
16. What is an energy pyramid and why is it important?
17. Define Geothermal energy.
18. What is Food chain?
19. Write a note on Vermicomposting.
20. Explain Noise pollution.
21. What is open dumping?
22. Explain "Anthropogenic emissions".
23. What are Greenhouse gases?
24. Detail about Environmental impact assessment.
25. Explain Cyclone.
26. What is particulate matter?

**(8 × 2 = 16 Marks)**

**SECTION – C (Short essay type)**

Answer any **six** questions not exceeding **120** words, **4** Marks each.

27. What is water pollution?
28. Explain Biodiversity hotspots in India. Why they are critical?
29. What are the effects of photochemical smog?
30. What are the advantages and disadvantages of nuclear energy?
31. Explain the causes of marine pollution.
32. What are the effects of ozone layer depletion?
33. Explain the economic and scientific role of biodiversity.
34. What are the advantages of incineration?
35. What is ground level ozone?
36. Write short note on hazardous waste.
37. What are the benefits of composting?
38. What is thermal pollution? Explain its effects on aquatic life.

**(6 × 4 = 24 Marks)**

**SECTION – D (Long Essay type)**

Answer any **two** questions, **15** Marks each.

39. Write an essay on waste land reclamation.
40. Explain the advantages and problems of dams.
41. What are the direct and indirect benefits of forests?
42. Explain ecological pyramid its types and importance.
43. Describe Environment (Protection) Act. 1986.
44. Write an essay on global warming.

**(2 × 15 = 30 Marks)**

(Pages : 4)

M – 2610

Reg. No. : .....

Name : .....

Seconds Semester B.Sc. Degree Examination, December 2021.

Career Related First Degree Programme under CBCSS

Mathematics

Group 2(a) Complementary Course II for physics  
and Computer Applications

MM 1231.6 – MATHEMATICS – II PARTIAL DIFFERENTIATION, VECTOR  
DIFFERENTIATION COMPLEX NUMBERS AND MULTIPLE INTEGRALS

(2019 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the first 10 questions are compulsory. they carry 1 mark each.

1. Find  $\frac{\partial f}{\partial x}$  of the functions  $f(x, y) = \sin(x/y)$ .
2. Determine whether  $y^2 dx + 2xy dy$  is exact or not.
3. Define Laplacian of a scalar field.
4. Find the gradient of the scalar field  $\phi = xy^2z^3$ .
5. Find the divergence of the vector field.  
 $\vec{a} = xy\hat{i} - y^2z\hat{j} + x^2z\hat{k}$ .
6. Find  $\cosh(ix)$
7. Write the imaginary part of  $e^z$ .

P.T.O.

8. State de Moivre's theorem.

9. Evaluate  $\int_{-2y-2}^{1-y^2} dx dy$ .

10. Change the cartesian integral.

$$\int_{-1}^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dy dx \text{ into polar integrals.}$$

(10 × 1 = 10 Marks)

### SECTION – II

Answer **any eight** questions each questions carry 2 marks.

11. Find the total differential of the function  $f(x, y) = \sin x + 3y^2$ .

12. Using chain rule find  $\frac{df}{dt}$  gives  $f(x, y) = x^2y$ ,  $x(t) = \cos t$ ,  $y(t) = \sin t$ .

13. State Taylor's theorem for two variables  $x$  and  $y$ .

14. Determine the stationary points of the function  $f(x, y) = y^2 - x^2$  and describe the nature of the function of those points.

15. Find the velocity and acceleration at time  $t = \frac{\pi}{2}$  of a particle which moves along a curve whose position vector at time  $t$  is

$$r(t) = a \cos t \hat{i} + b \sin t \hat{j} + ct \hat{k}.$$

16. Find the curl of the vector field.

$$\vec{a} = (y^2 \cos x + z^3) \hat{i} + (2y \sin x - 4) \hat{j} + (3xz^2 + 2) \hat{k}$$

17. Prove  $\text{div}(\text{grad} \phi) = \nabla^2 \phi$ .

18. Find the solution of the equation  $z^3 = 1$

19. Find an expression for  $\cos^3 \theta$  in terms of  $\cos 3\theta$  and  $\cos \theta$ .

20. Evaluate  $\text{Ln}(i)$ .

21. Find the Jacobian  $\frac{\partial(x,y)}{\partial(u,v)}$  of the transformation  $x = u \cos V$ ,  $y = u \sin V$

22. Evaluate  $\int_0^1 \int_0^\pi \int_0^\pi y \sin z \, dx \, dy \, dz$ .

(8 × 2 = 16 Marks)

### SECTION – III

Answer any six questions. Each question carry 4 marks.

23. Find the total derivative of the function  $f(x,y,z) = xyz$ ,  $y = \sin^{-1} x$ ,  $z = x^2$ .

24. Find the Taylor expansion, up to quadratic terms in  $x$  and  $y$  of  $f(x,y) = e^x \cos y$  about the point  $(0,0)$ .

25. Find the greatest and smallest value the function  $f(x,y) = xy$  takes on the ellipse  $\frac{x^2}{8} + \frac{y^2}{2} = 1$ .

26. Find the directional derivative of  $\phi = xy^2z - x^2yz^3$  at the point  $(-1,2,1)$  in the direction  $3\hat{i} + \hat{j} - 4\hat{k}$ .

27. For  $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$  and  $|\vec{r}| = r$  show that  $\nabla\left(\frac{1}{r}\right) = \frac{-\vec{r}}{r^3}$ .

28. Find all the  $n^{\text{th}}$  roots of unity.

29. Find the closed form expression for the inverse hyperbolic function  $y = \tanh^{-1} x$ .

30. Evaluate  $I = \iint_R y^2 \, dx \, dy$  where  $R$  is the region bounded by  $y = 2x$ ,  $y = 5x$  and  $x = 2$ .

31. Evaluate the double integral  $I = \int_0^4 \int_{x/2}^2 dy \, dx$ . Also reverse the order of integration and show that same result is obtained.

(6 × 4 = 24 Marks)

SECTION – IV

Answer any two questions, Each questions carry 15 marks

32. (a) Find the maxima, minima and saddle point of the function  $2x^3 + 2y^3 - 9x^2 + 3y^2 - 12y$ .
- (b) Find the stationary points pf  $f(x,y,z) = xyz$  subject to constraints  $g(x,y,z) = x + y + z = 40$  and  $h(x,y,z) = x + y - z = 0$ .

33. Evaluate the laplacian of the function  $\psi(x,y,z) = \frac{zx^2}{x^2 + y^2 + z^2}$ .

- (a) directly by cartesian coordinates and  
(b) after changing to spherical polar coordinate system.

Verify that the two methods gives the same result.

34. (a) Find the volume of the tetrahedron bounded by the three coordinate surfaces  $x = 0$ ,  $y = 0$  and  $z = 0$  and the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$
- (b) Evaluate the double integral

$$I = \iint_R (a + \sqrt{x^2 + y^2}) dx dy \text{ where } R \text{ is the region bounded by the circle } x^2 + y^2 = a^2$$

35. (a) Draw the graph of  $\sinh x$ ,  $\operatorname{cosech} x$ .
- (b) Use de moivres theorem to prove that

$$\cos 4\theta = 8 \cos^4 \theta - 8 \cos^2 \theta + 1$$

- (c) Solve the equation  $z^3 - 2 = 0$

(2 × 15 = 30 Marks)

(Pages : 4)

M – 2522

Reg. No. : .....

Name : .....

Second Semester B.A./B.Sc./B.Com. Degree Examination, December 2021

Career Related First Degree Programme under CBCSS

Language Course IV – Additional Language – Malayalam

ML 1211.3 : ദൃശ്യകലാസാഹിത്യം

(2020 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. മഹാഭാരതത്തിലെ ഏതു പർവ്വത്തിലാണു കല്യാണസൗഗന്ധികത്തിന്റെ ഇതിവൃത്തമുള്ളത്?
2. രാമനാട്ടം ആവിഷ്കരിച്ചതാര്?
3. കൈരളിയുടെ കഥ രചിച്ചതാര്?
4. പത്മരാജന്റെ തിരക്കഥ രചിച്ച ആദ്യചിത്രം ഏത്?
5. കേരളത്തിന്റെ ശാക്യന്തളം എന്നു വിശേഷിപ്പിക്കപ്പെട്ട കൃതിയേത്?
6. മാധവൻ നായരുടെ മൂത്ത മകളുടെ പേരെന്ത്?
7. ഓരോരോ കാലത്തിലും എന്ന നാടകം രചിച്ചതാര്?
8. ആദ്യത്തെ തുള്ളൽക്കഥയായി കണക്കാക്കപ്പെടുന്നതേത്?

P.T.O.

9. സിനിമയുടെ ജ്യൂപ്രിന്റ് എന്നറിയപ്പെടുന്നതെന്ത്?
10. മലയാളത്തിലെ ആദ്യ രാഷ്ട്രീയനാടകമായി അറിയപ്പെടുന്നത് ഏത്?

**(10 × 1 = 10 Marks)**

- II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ ഏതെങ്കിലും എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.
11. മണലിൽ നിന്ന് കയറുപിരിക്കാനൊക്കുമോ കൃണേ? സൂചിതം വ്യക്തമാക്കുക.
12. മൃദിതം മാനസം മമ - പറഞ്ഞതാര്? കാരണമെന്ത്?
13. പഥ്യമല്ലെങ്കിൽ പറഞ്ഞതുമില്ല ഞാൻ - സന്ദർഭവും ആശയവും വ്യക്തമാക്കുക.
14. മാധത്തിനെങ്ങനെയെങ്കിലും ഇതൊന്ന് ഒഴിവാക്കുവാനായിരുന്നൂ - ആരാണു മാധം? കാരണമെന്ത്?
15. യൗവനം വന്നുദിച്ചിട്ടും ചെറുതായില്ല ചെറുപ്പം - സന്ദർഭവും ആശയവും വ്യക്തമാക്കുക.
16. ഈ നാട്ടിവെച്ച് ഈ തടിയനെ മലർത്തിയടിച്ചില്ലേൽ എന്റപ്പൻ വേറെയാ! - പറഞ്ഞതാര്? കാരണമെന്ത്?
17. എനിക്കു ജീവിക്കണം. മരിച്ചതു ധാരാളം മതി - പറഞ്ഞതാര്? സന്ദർഭം വ്യക്തമാക്കുക.
18. അതിദുഃഖകാരണമിന്നാരാമസഞ്ചരണം - കാരണമെന്ത്?
19. അന്യഗ്രഹത്തിലെ ഗർഭിണിക്ക് ഭൂമിയിൽ നിന്നുള്ള സ്നേഹോപഹാരമല്ലേ - എന്ത്? സന്ദർഭം വ്യക്തമാക്കുക.
20. പ്രശ്നനാടകത്തിന്റെ സവിശേഷതയെന്ത്?
21. തവ വാചികം അഴൽമോചകം - ആര് ആരോടു പറയുന്നു? കാരണമെന്ത്?
22. രണ്ടുഭാവം നിനക്കുണ്ടാക വേണ്ടടോ! സന്ദർഭവും ആശയവും വ്യക്തമാക്കുക.

23. തുള്ളൽ എത്രവിധം? ഏതെല്ലാം? കല്യാണസൗഗന്ധികം ഏതു വിഭാഗത്തിൽപ്പെടുന്നു?
24. പണ്ടാരടങ്ങാൻ, ഇതൊന്നു തീർന്നു കിട്ടാ മതിയായിരുന്നു. പറഞ്ഞതാർ? സൂചിതമെന്ത്?
25. രത്നമെല്ലാം നിനക്കുള്ള യജ്ഞമേ ദേവന്മാർക്കുള്ളൂ. സൂചിതം വ്യക്തമാക്കുക.
26. അത് എല്ലാ ഫയൽമാന്റേം വിധിയാ. ഏത്?

**(8 × 2 = 16 Marks)**

- III. ഓരോന്നിനും ഒന്നരപ്പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും ആറു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.
27. ദ്രുപദനദീനിയുടെ വാക്കുകളോടു ഭീമൻ പ്രതികരിച്ചതെങ്ങനെ?
  28. രാധ - കഥാപാത്രനിരുപണം തയ്യാറാക്കുക.
  29. നല്ല/ചീത്ത ദ്വന്ദ്വത്തെ ലേഖർ രൂമിൽ പ്രശ്നവൽക്കരിക്കുന്നതെങ്ങനെ?
  30. ഗുണവുമനവധി ദോഷമായിതു. പറഞ്ഞതാർ? കാരണമെന്ത്?
  31. എൻ. കൃഷ്ണപിള്ളയ്ക്കു നാടകചരിത്രത്തിലുള്ള സ്ഥാനമെന്ത്?
  32. തൽപ്രദേശം മഹാഘോഷം വനാന്തരം - ഭീമൻ കണ്ട കാഴ്ചകൾ എന്തെല്ലാം?
  33. എടാ, കണ്ണില്ലാത്ത ദൈവമേ! നീ എന്റെ മൺകൂടിൽ തകർത്തു കളഞ്ഞല്ലോ? - സൂചിതം വ്യക്തമാക്കുക.
  34. ശിവൻപിള്ള എന്ന കഥാപാത്രത്തിന്റെ പ്രത്യേകതകൾ ഏവ?
  35. ദൂതനെന്ന നിലയിലുള്ള ഹംസത്തിന്റെ സാമർത്ഥ്യം പരിശോധിക്കുക.
  36. തിരക്കഥ എന്നാലെന്ത്? തിരക്കഥയ്ക്കു ചലച്ചിത്രത്തിലുള്ള സ്ഥാനമെന്ത്?
  37. ചലച്ചിത്രവും നാടകവും തമ്മിലുള്ള വൈജാത്യങ്ങൾ വ്യക്തമാക്കുക.
  38. “ഗോവാലകൃഷ്ണനെപ്പോലെ, എന്തിനാ അമ്മേ, കാര്യം നേടാൻ അതുവിതും പരേന്നേ?” സൂചിതം വ്യക്തമാക്കുക.

**(6 × 4 = 24 Marks)**

- IV. മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.
39. സ്ത്രീനാടകം എന്ന വിശേഷണത്തിന് ലേഖകൻ വും അർഹമാണോ? സമർത്ഥിക്കുക.
  40. ഭീമന്റെ വനയാത്രയെ നമ്പ്യാർ വർണ്ണിക്കുന്നതെങ്ങനെ? ഉപന്യസിക്കുക.
  41. ഗോദയിൽ വിജയിക്കുകയും ജീവിതത്തിൽ പരാജയപ്പെടുകയും ചെയ്യുന്ന മനുഷ്യാവസ്ഥയുടെ ദുരന്തം പത്മരാജൻ ആവിഷ്കരിക്കുന്നതെങ്ങനെ?
  42. പാത്രസൃഷ്ടിയിൽ ഉണ്ണായിവാദ്യർ പ്രകടിപ്പിക്കുന്ന കൃതഹസ്തത പാഠഭാഗത്തെ മുൻനിർത്തി പരിശോധിക്കുക.
  43. ഗേഭവനം എന്ന പേരിന്റെ ഔചിത്യം ഇതിവൃത്തവിശകലനത്തിലൂടെ സ്ഥാപിക്കുക.
  44. കേരളത്തിന്റെ ദൃശ്യകലാപാരമ്പര്യം - ഉപന്യസിക്കുക.

(2 × 15 = 30 Marks)

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, December 2021**

**Career Related First Degree Programme Under CBCSS**

**Mathematics**

**Complementary Course II for Physics and Computer Applications**

**MM 1231.6 : ANALYTIC GEOMETRY, INTEGRATION, DIFFERENTIAL EQUATIONS AND MATRICES**

**(2014 – 2018 Admission)**

Time : 3 Hours

Max. Marks : 80

**SECTION – I**

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

1. Write down the equations for a rotation of axes through an angle  $\frac{\pi}{4}$ .
2. Show that the equation  $17x^2 - 12xy + 8y^2 + 46x - 28y + 17 = 0$  represents an ellipse.
3. A particle moves with a velocity of  $v(t) = \sin t$  along an s-axis. Find the distance traveled by a particle during the time interval  $0 \leq t \leq \pi/2$ .
4. Suppose that the velocity function of a particle moving along a coordinate line is  $v(t) = 3t^3 + 2$ . Find the average velocity of the particle over the time interval  $1 \leq t \leq 4$ .
5. Evaluate  $\int_0^{\pi} \int_0^{1+\cos\theta} r \, dr \, d\theta$ .

6. Find the general solution of the differential equation  $\frac{dy}{dx} + 2y = 6e^x$ .
7. Solve  $(D^2 - D - 2)y = 0$  where  $D$  is the differential operator.
8. Find the particular integral of  $(D - 1)^3 y = 12e^x$ .
9. State the condition for the existence of solution of a system of linear equations.
10. State Cramer's rule.

(10 × 1 = 10 Marks)

### SECTION – II

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

11. Find the equation of the hyperbola with foci  $(5, 2)$ ,  $(-3, 2)$  and eccentricity 2.
12. Find the equation of the normal to the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  at the point  $(x_1, y_1)$  on it.
13. Find the area of the region enclosed by the curves  $x^2 = y$  and  $x = y - 2$ .
14. Find the volume of the solid generated when the region between the graphs of the equations  $f(x) = \frac{1}{2} + x^2$  and  $g(x) = x$  over the interval  $[0, 2]$  is resolved about the  $\bar{x}$ -axis.
15. Evaluate  $\iint_R xy^2 dA$  where  $R$  is the region enclosed by  $y = 1$ ,  $y = 2$ ,  $x = 0$  and  $y = x$ .
16. Use double integral in polar coordinates to find the area of the region enclosed by the cardioid  $r = 1 - \cos \theta$ .
17. Solve  $(x^2 - y^2)dx - xy dy = 0$ .
18. Solve  $\frac{dy}{dx} + \frac{y \cos x + \sin y + y}{\sin x + x \cos y + x} = 0$ .
19. Solve  $y'' + 16y = \cos 4x$ .

20. Find the rank of the matrix  $\begin{bmatrix} 2 & 3 & 4 \\ 3 & 1 & 2 \\ -1 & 2 & 2 \end{bmatrix}$  by using elementary row operations.
21. Let  $A$  be any one singular matrix. Prove that if  $\lambda$  is an eigen value of the matrix  $A$ , then  $\frac{1}{\lambda}$  is an eigen value of  $A^{-1}$ .
22. Find the characteristic equation of the matrix  $\begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ .

(8 × 2 = 16 Marks)

### SECTION – III

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

23. Show that the equation  $8x^2 - 4xy - 16x - 14y + 17 = 0$  is an ellipse whose major axis and minor axis lie along the lines  $y - 2x + 1 = 0$  and  $2x + 4y - 11 = 0$  and whose eccentricity is  $\frac{\sqrt{5}}{8}$ .
24. Obtain the equation of a rectangular hyperbola referred to its asymptotes as axes of coordinates.
25. Find the exact arc length of the curve  $x = a \cos^3 \phi$  and  $y = a \sin^3 \phi$ .
26. Change into polar coordinates and evaluate  $\int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{2}} \frac{x \, dx \, dy}{x^2 + y^2}$ .
27. Solve  $(x + 2y^3) \frac{dy}{dx} = y$ .
28. Find the orthogonal trajectories of the curve  $y = cx^2$ .
29. Solve  $y'' - 3y' + 2y = x^2 e^{2x}$ .

30. For what values of  $a$  and  $b$ , the system of equations

$$x + y + 2z = 2$$

$$2x - y + 3z = 10$$

$$5x - y + az = b$$

has finite number of solutions.

31. Find all the eigen values of the matrix  $\begin{bmatrix} 3 & 1 & 1 \\ 2 & 4 & 2 \\ 1 & 1 & 3 \end{bmatrix}$ .

(6 × 4 = 24 Marks)

#### SECTION – IV

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

32. (a) Find the equation of the hyperbola passing through the point  $(1, -1)$  and having the lines  $x + 2y + 3 = 0$  and  $3x + 4y + 5 = 0$  for asymptotes.

(b) Determine the equation of the curve  $4x^2 - 11xy + 6y^2 = 0$  when the axes are rotated through the acute angle whose tangent is  $\frac{4}{3}$ .

33. (a) Find the area of the surface that is generated by revolving the portion of the curve  $y = 7x$  between  $x = 0$  and  $x = 1$  about the  $x$ -axis.

(b) Find the area of the plane region enclosed by the curve  $y^2 = 9 - x$  and  $y^2 = 9 - 9x$ .

34. (a) A moving body is opposed by a force per unit mass of value  $cx$  and resistance per unit mass of value  $bv^2$ , when  $x$  and  $v$  are the displacement and velocity of the particle at that instant. Show that the velocity of the particle, if it starts from rest, is given by  $v^2 = \frac{c}{2b^2}(1 - e^{-2bx}) - \frac{cx}{b}$ .

(b) Solve  $x^2y'' - xy' + y = \log x$ .

35. Diagonalize the matrix  $A = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$ .

(2 × 15 = 30 Marks)

(Pages : 4)

M – 2523

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc. Degree Examination, December 2021**

**Career Related First Degree Programme Under CBCSS**

**Language Course : Additional Language – Hindi**

**HN 1211.3 – HINDI PADYASAHITYA**

**(2020 Admission Regular)**

Time : 3 Hours

Max. Marks : 80

- I. निर्देश : एक वाक्य या दो वाक्यों में उत्तर लिखिए।
1. तुलसीदास की लोकप्रिय रचना कौनसी है?
  2. कबीरदास के गुरु कौन थे?
  3. सूरदास की भाषा कौनसी है?
  4. तुलसीदास के बचपन का नाम क्या है?
  5. बिहारी का जन्म कहाँ हुआ?
  6. प्रसादजी प्रारंभ में किस नाम से कविताएँ लिखा करते थे?
  7. 'किरण' कविता का कवि कौन है?
  8. 'तुलसीदास' किसकी रचना है?

P.T.O.

9. 'नीड का निर्माण फिर' किस विद्या की रचना है?
10. मधुशाला के रचनाकार कौन है?

(10 × 1 = 10 Marks)

II. निर्देश : किन्हीं आठ प्रश्नों के उत्तर दो या तीन वाक्यों में लिखिए।

11. 'बिहारी सतसई' में किस विजय के दोहे हैं?
12. श्रमिक महिला ने कवि को किस भाव से देखा?
13. निरालाजी के तीन कहानी संग्रहों के नाम लिखिए।
14. तुलसीदास के अनुसार मुखिया को किस प्रकार होना चाहिए?
15. कवि निराला पर एक लघु टिप्पणी लिखिए।
16. 'मरझाया फूल' कविता का उद्देश्य क्या है?
17. 'सुख दुख' कविता का मूल विषय क्या है?
18. हरिवंशराय बच्चन के तीन काव्य संग्रहों के नाम लिखिए।
19. कीर्ति चौधरी की भाषा कैसी है?
20. अनामिका की चार रचनाओं के नाम लिखिए।
21. 'मधुशाला' कविता का उद्देश्य क्या है?
22. गुरु के बारे में कबीर का क्या विचार है?
23. 'मुक्ति' कविता का भाव समझाइए।

24. सुमित्रानन्तन पंत का जन्म कब हुआ?
25. निर्मला गर्ग ने हिन्दी साहित्य में अपनी अलग पहचान कैसे बनायी है?
26. अरुण कमल का जन्म कहाँ हुआ?

(8 × 2 = 16 Marks)

III. निर्देश : किन्हीं छः प्रश्नों के उत्तर लिखिए। (करीब 120 शब्दों में)

27. कबीरदास का परिचय दीजिए।
28. राम भक्त कवियों में तुलसीदास का स्थान सर्वोपयी है – स्पष्ट कीजिए।
29. किरण कविता का सारांश लिखिए।
30. एकलव्य कविता का प्रतिपाद्य क्या है?
31. पठित पदों के अनुसार कृष्ण की बाल लीला का वर्णन कीजिए।
32. मुरझाया फूल कविता की प्रासंगिकता क्या है?
33. 'मधुशाला' कविता में अभिव्यक्त विचार प्रकट कीजिए।
34. तुलसीदास कहाँ जाने से मना करते हैं?
35. कृष्ण की अनुपस्थिति में वृन्दावन वासियों की अवस्था कैसी थी?
36. सूरदास ने घटनों के बल पर चलनेवाले कृष्ण का कौन सा चित्र प्रस्तुत किया है?
37. कबीर के अनुसार सच्चा पंडित कौन होता है?
38. कवि बिहारीलाल का परिचय दीजिए।

(6 × 4 = 24 Marks)

- IV. निर्देश : किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए।
39. 'नालंदा के खंडहर' कविता का सारांश लिखिए।
40. 'बेजगह' कविता में नारी जीवन की विडंबनाओं का चित्रण है – स्पष्ट कीजिए।
41. 'एकलव्य' में चित्रित सामाजिक विसंगतियों पर प्रकाश डालिए।
42. 'मुरझाया फूल' कविता की दार्शनिकता पर निबंध लिखिए।
43. 'मुक्ति' कविता का उद्देश्य स्पष्ट कीजिए।
44. 'मरने से नहीं डरता हूँ' कविता का भाव समझाकर उसकी विशेषताओं पर प्रकाश डालिए।

(2 × 15 = 30 Marks)

(Pages : 3)

**M – 2609**

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, December 2021**

**Career Related First Degree Programme under CBCSS**

**Group 2 (a) - Physics and Computer Applications**

**Foundation Course**

**PC 1221 : INTRODUCTION TO PROGRAMMING**

**(2018 and 2019 Admission)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

Answer all questions in one or two sentences.

1. Explain flowchart.
2. What is object code?
3. Mention the range of the data type 'char'.
4. What is the significance of logical OR operator?
5. What is the role of == operator?
6. Discuss the use of printf() function.
7. Discuss call-by-reference.
8. Define pointers.

P.T.O.

9. What are strings?

10. Define a file.

**(10 × 1 = 10 Marks)**

### SECTION – B

Answer any **eight** questions not exceeding a paragraph of **50** words.

11. Write a short note on storage classes in C language.

12. Compare long and short modifiers in C language.

13. What do you mean by an executable file?

14. List the operators from higher priority to lower priority.

15. Discuss formatted I/O functions.

16. How to declare and initialize a one dimensional array?

17. Write a short note on if statement in C language.

18. What are the significances of using functions in a programming language?

19. Explain function prototype.

20. What is pointer to array?

21. How to initialize a structure?

22. What is the use of dot(.) operator in C?

**(8 × 2 = 16 Marks)**

## SECTION – C

Answer any **six** questions, in a page of **100** words.

23. Generate an algorithm to find first N prime numbers.
24. Write a short note on static variables in C.
25. List the rules for naming variables.
26. Explain different types of assignment operators.
27. Write a note on switch-case statement.
28. Write a C program to find the factorial of a number using recursion.
29. Write a C program which contains a function `calc_cube()`, takes an integer argument and calculate its cube return the result to the `main()` function.
30. How to define a union? Give example.
31. How does file append mode differ from file write mode?

**(6 × 4 = 24 Marks)**

## SECTION – D

Answer any **two** questions, not exceeding **four** pages.

32. Mention different basic data types in C. Also write about space requirement for variables of different data types.
33. Explain two dimensional array in detail. Also write a C program to perform matrix multiplication using 2-D array.
34. Explain the concept of dynamic memory allocation in C programming.
35. Write a C program to find total mark of N students using structure.

**(2 × 15 = 30 Marks)**

(Pages : 6)

M – 2137

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc./B.Com. Degree Examination, December 2021**

**First Degree Programme Under CBCSS**

**Language Course – English**

**EN 1212.1/EN 1211.2/ EN 1211.3: ENGLISH GRAMMAR USAGE AND  
WRITING**

**(Common for B.A./B.Sc./B.Com. and Career Related Group 2(a))**

**(2020 Admission Regular)**

Time : 3 Hours

Max. Marks : 80

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

1. Change the voice in the sentence.

Let them go.

2. Change the sentence "I love eating ice cream" into negative.

3. Supply the question tag for, "You are ok, ....."

4. Correct the following sentence.

I write fictions.

5. Begin the following sentence with it.

To write an essay is not easy.

6. Choose the correct verb form.

Trouble \_\_\_\_\_ (choose/chose) to follow the politician wherever he went.

P.T.O.

7. Identify if the following sentence is grammatically correct or not.  
The actor grew up as an only child.
8. Rewrite the sentence using the adverb provided.  
I am sad. (quite)
9. Complete the sentences with the correct option.  
They are two \_\_\_\_\_ of the same puzzle. (half/halves)
10. The majority of workers \_\_\_\_\_ not turned up for the strike. (has/have)

**(10 × 1 = 10 Marks)**

II. Answer any **eight** of the following questions as per instructions:

11. Convert the following into a compound sentence.
  - (a) I have an interview. I am late for it.
  - (b) The menagerie is far away. It is flooded.
12. Convert the following into a simple sentence.
  - (a) He is cop. It is true.
  - (b) Gopal is alone. He is still cheerful.
13. Correct the following sentences.
  - (a) Ritu shaked the pencil.
  - (b) He gave to me a pen holder.
14. Change the voice.
  - (a) We must take care of the puppy.
  - (b) Close the gate.
15. Fill in the blanks using the correct verb given in brackets.
  - (a) The boy has been \_\_\_\_\_ (missing/to miss) since last week.
  - (b) Unicorns \_\_\_\_\_ only in fairy tales. (exist/existed).

16. Choose the correct usage.
- (a) Half the shelf \_\_\_\_\_ (is/are) filled with organic products.
  - (b) Everyone \_\_\_\_\_ (has/have) duties.
17. Change into comparative degree:
- (a) His bike is as old as mine.
  - (b) Megha is the brightest student in the class.
18. Frame a question to get the underlined word as answer.
- (a) He is a critically acclaimed novelist.
  - (b) I am living in Melbourne since last year.
19. Add the correct question tag.
- (a) Everyone came to the movie premiere, \_\_\_\_\_ ?
  - (b) Buying a new house is a risky affair, \_\_\_\_\_ ?
20. Reorder the jumbled sentences.
- (a) Struggling dancer/been//have/a
  - (b) Went/hiking trip/they/on a
21. Choose the appropriate option to fill in the blanks.
- (a) The principal did not intend to discuss it any (further/farther)
  - (b) Ravi had done it with the \_\_\_\_\_ intentions in mind (best/better)
22. Rewrite into positive sentences.
- (a) I hate cooking.
  - (b) He does not like giving impromptu speeches.
23. Change into Direct speech.
- (a) She said that she had bought a new Audi.
  - (b) She said that she won the sweepstakes.

24. Change into exclamatory sentence.
- (a) The holiday ended with a bang.
  - (b) It was a great movie.
25. Write a conversation between two friends on a matter of importance.
26. Expand the following proverb:
- A Stitch in time saves nine.

**(8 × 2 = 16 Marks)**

III. Answer any **six**, as directed:

27. Prepare a questionnaire to assess the pattern of spending time online among teenagers.
28. Prepare a conversation between a teacher and a student who failed in a test paper.
29. Change the following conversation into Reported Speech:
- Zain: What are you doing?
- Cathy: Trying to prepare a quick lunch.
- Zain: Do you need my help?
- Cathy: Sure. Prep these ingredients for me!
30. Change the following into passive voice.
- (a) You can listen to the new song now.
  - (b) I saw a Banksy painting for sale at the auction.
  - (c) Somebody stole my purse.
  - (d) He gave the correct directions.

31. Fill up using articles:

She has bought \_\_\_\_\_ new watch for you \_\_\_\_\_ watch is very expensive. It is \_\_\_\_\_ smart watch with \_\_\_\_\_ latest features and \_\_\_\_\_ platinum strap.

32. Correct the following sentences.

- (a) Good friends is harder to come by these days.
- (b) I and you can clean this mess.
- (c) She is here since seven days.
- (d) He gave the speech herself.

33. Complete using suitable modals.

- (a) I \_\_\_\_\_ leave now, as I have to finish my homework. (should/would)
- (b) It \_\_\_\_\_ rain tomorrow. (may/have)
- (c) You \_\_\_\_\_ deliver the talk now. (must/should)
- (d) She \_\_\_\_\_ dance properly. (can, would)

34. Prepare a questionnaire to analyse the fitness routine of software professionals.

35. Rewrite using the adverbs provided.

- (a) He reaches office late. (generally)
- (b) Her judgement is on point. (mostly)
- (c) I am happy. (quite)
- (d) I have no regrets. (usually)

36. Fill up using suitable prepositions.

- (a) I go \_\_\_\_\_ the library every day.
- (b) The car fell \_\_\_\_\_ a ditch.
- (c) She was popular \_\_\_\_\_ old people.
- (d) He was sitting \_\_\_\_\_ me on the plane.

37. Fill up using suitable conjunctions.

- (a) The room was spic \_\_\_\_\_ span.
- (b) The child is strong \_\_\_\_\_ emotional.
- (c) Meena forgot whether to stay \_\_\_\_\_ leave.
- (d) Let me know \_\_\_\_\_ you reach the destination.

38. Attempt a dialogue between you and your teacher on how effective online exams were during the pandemic period.

**(6 × 4 = 24 Marks)**

IV. Answer any **two** of the following:

39. Expand the proverb "A thing of beauty is a joy forever".

40. Write a report on the PTA meeting that took place in your college.

41. Write a short essay on the importance of health care workers during the pandemic.

42. Write a report on the importance of world peace.

43. Outline story.

Snake — middle of the night — scared — child scared — called mother — torch light — black rope — child happy — mother relieved.

44. Expand the proverb "A bird in hand is worth two in the bush".

**(2 × 15 = 30 Marks)**

(Pages : 3)

**M – 2608**

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, December 2021**

**Career Related First Degree Programme under CBCSS**

**Physics with Computer Applications**

**Core Course**

**PC 1241 : ENVIRONMENTAL STUDIES**

**(2015-2019 Admission)**

Time : 3 Hours

Max. Marks : 80

**PART – A**

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

1. According to Engine Odum define ecology.
2. Define Ecomark.
3. Write the full form of UNFCCC.
4. Differentiate renewable resources and non-renewable resources with example.
5. What is Ex-situ conservation?
6. What are the focal theme of world wetland Day-2019?
7. What is Endemism?

P.T.O.

8. Difference between greywater and blackwater.
9. What is Global warming potential?
10. The Act constituted in India after Bhopal gas tragedy. Explain.

**(10 × 1 = 10 Marks)**

### PART – B

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

11. Explain Fluorosis.
12. What is hot spots of biodiversity? Name two biodiversity hotspots in India.
13. Write a note on Ecological succession.
14. Explain photochemical smog.
15. Detail about rainwater harvesting.
16. State and explain Anthropocentrism.
17. What are the effects of noise pollution?
18. What is greenhouse effect?
19. Describe any two institutions in India that deal with environmental protection and conservation.
20. Write a note on eutrophication.
21. 'Activated sludge process' Explain.
22. What is chipko movement?

**(8 × 2 = 16 Marks)**

### PART – C

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

23. Explain in detail food chain.
24. Explain biogeographical classification in India.
25. Write a short note on wild life protection Act.
26. Describe Nitrogen cycle.
27. What are the different types of disaster management cycle?
28. How population explosion will affect the environment?
29. Briefly explain the functions of wetlands.
30. What are the effects of acid rain?
31. Write a short note on consumerism.

**(6 × 4 = 24 Marks)**

### PART – D

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

32. What are the major threats of biodiversity?
33. Write an essay about the impacts of climate and weather a human life and health issues.
34. Critically examine the interconnection between development and its sustainability.
35. Discuss the importance of environment Impact Assessment (EIA).

**(2 × 15 = 30 Marks)**

(Pages : 4)

**M – 2611**

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, December 2021**

**Career Related First Degree Programme under CBCSS**

**Group 2 (a) - Physics and Computer Applications**

**Foundation Course**

**PC 1221 : INTRODUCTION TO PROGRAMMING**

**(2020 Admission Regular)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A (Very Short Answer)**

**(One Word to Maximum of two Sentences. Answer all questions)**

1. How many keywords are there in C?
2. What is a token?
3. Calloc() belongs to which library?
4. getch () function is used for?
5. Who developed C language?
6. Which loop is guaranteed to execute at least one time.
7. Define string.
8. Which symbol is used as a statement terminator in C?

**P.T.O.**

9. What does a rectangle box represent in a flowchart?
10. What is a built-in function in C?

**(10 × 1 = 10 Marks)**

**SECTION – B (Short Answer Type)**

**(Not to Exceed One Paragraph. Answer any eight questions.  
Each question carries 2 marks)**

11. What is an infinite loop?
12. Define array.
13. Explain while statement.
14. What are executable files?
15. Explain strlen() function.
16. What is the use of & operator?
17. Define object code.
18. Explain malloc() function.
19. What are the two types of comments in C?
20. Explain the use of putchar() function.
21. What are Relational expressions?
22. What are Arithmetic operators in C?
23. What does open () do in C?
24. Explain break statement.
25. Define binary file.
26. What are local and global variables?

**(8 × 2 = 16 Marks)**

### SECTION – C (Short Essay Type)

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

27. Write a program to store given data into a file.
28. Explain conditional operator with an example.
29. Explain formatted output functions.
30. Differentiate between `strcat()` and `strcpy()` functions.
31. Define structure. Explain with an example.
32. What do you mean by pointer arithmetic?
33. Draw a flowchart to print whether the given number is odd or even.
34. Explain switch statement with an example.
35. What are the rules for naming a variable?
36. Write an algorithm to find largest number among three numbers.
37. What is pointer and how will you declare it?
38. Define the term algorithm. Explain classification of algorithm with suitable example.

**(6 × 4 = 24 Marks)**

### SECTION – D (Long Essay Type)

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

39. Write detailed note on file handling functions.
40. Explain if statement with suitable example.

41. Explain storage classes in C.
42. Differentiate call by value and call by reference with suitable example.
43. Explain function with suitable example.
44. Write a program to read  $n$  values to an array and print it.

**(2 × 15 = 30 Marks)**

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(Pages : 6)

M – 2613

Reg. No. : .....

Name : .....

Second Semester B.Sc. Degree Examination, December 2021

Career Related First Degree Programme Under CBCSS

Mathematics

Complementary Course II for Physics and Computer Applications

MM 1231.6 : MATHEMATICS – II PARTIAL DIFFERENTIATION, VECTOR  
DIFFERENTIATION, COMPLEX NUMBERS AND MULTIPLE INTEGRALS

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

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

1. Find  $f_{xx}$  for the function  $f(x, y) = 4x^3y - x^2y$ .
2. Show that  $2xy - 9x^2 + (2y + x^2 + 1)\frac{dy}{dx} = 0$  is exact.
3. Define divergence of a vector field.
4. Define del operator in Cartesian coordinates.
5. Write the value of  $e^{3\pi i}$ .
6. Find  $\frac{dy}{dx}$  of  $3\cosh(2x^4)$ .

P.T.O.

7. Find  $\frac{z_1}{z_2}$  where  $z_1 = e^{3i}$  and  $z_2 = e^{2i}$ .

8. Evaluate  $\int_{-3}^2 \int_0^1 y^2 x \, dy dx$ .

9. Reverse the order of integration in  $\int_0^1 \int_0^{1-x} f(x, y) \, dy dx$ .

10. Set up a double integral of  $f(x, y)$  over the region given by  $0 < y < 1, 0 < x < y^2$ .

(10 × 1 = 10 Marks)

### SECTION – II

Answer any eight questions from among the questions 11 to 26. These questions carry 2 marks each.

11. Find the total differential of the function  $f(x, y) = \cos xy$ .

12. Find  $\frac{df}{dx}$  for the function  $f(x, y) = x^2 + xy$ , given that  $y = \sin^{-1} x$ .

13. Define Saddle point.

14. Find  $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y}$  for  $(x^2 + y^2 + z^2)^{5/2} = 1$ .

15. Find the Laplacian of the scalar field  $\phi = x^2 yz$ .

16. Find  $\text{curl } \vec{F}$  for the vector field  $\vec{F}(x, y, z) = yz\vec{i} + xy^2\vec{j} + yz^2\vec{k}$ .

17. Find the direction in which the function  $f(x, y) = xe^y$  increase interest at the point (2, 0).

18. Find the gradient of the scalar field  $\phi = x^2 y + yz$ .

19. Write the real and imaginary part of  $\frac{z}{z^*}$ , where  $z^*$  is the conjugate of  $z$ .
20. Express  $\sin 3\theta$  in terms of powers of  $\sin \theta$ .
21. Prove that  $z^n - \frac{1}{z^n} = 2i \sin n\theta$ , if  $z = e^{i\theta}$ .
22. Suppose  $\sinh x = \frac{3}{4}$  find the exact value of  $x$ .
23. Evaluate the double integral  $\iint_R y^2 x \, dA$  over the rectangle  $R = \{(x, y); -3 \leq x \leq 2, 0 \leq y \leq 1\}$ .
24. Evaluate  $\int_0^4 \int_0^4 \int_0^4 k z \, dx \, dy \, dz$ .
25. Find an expression for a volume element in spherical polar coordinates.
26. Find the Jacobian for  $x = r \sin \theta \cos \phi$ ,  $y = r \sin \theta \sin \phi$ ,  $z = r \cos \theta$ .

(8 × 2 = 16 Marks)

### SECTION – III

Answer any six questions from among the questions 27 to 38. These questions carry 4 marks each.

27. Show that  $\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial y \partial x}$  for the function  $f(x, y) = y^3 \cos x$ .
28. Find the Taylor expansion, up to quadratic terms in  $x-1$  and  $y-1$ , of  $2x^2 - 3xy + x$  about the point (1,1).
29. Discuss method of Lagrange undetermined multipliers.

30. A particle moves in three dimensional space with velocity  $\vec{v}(t) = \vec{i} + t\vec{j} + t^2\vec{k}$  where  $t$  is the time variable. Find the position vector of the particle when  $t = 1$  given that the particle is at  $(-1, 2, 4)$  when  $t = 0$ .

31. If  $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$  show that  $\text{div grad} \left( \frac{1}{r} \right) = 0$ .

32. Show that the acceleration of a particle travelling along a trajectory  $r(t)$  is given

$$\text{by } a(t) = \frac{dv}{dt} \hat{i} + \frac{v^2}{\rho} \hat{n}$$

where  $v$  is the speed of the particle,  $\hat{i}$  is the unit tangent to the trajectory,  $\hat{n}$  is its principal normal and  $\rho$  is its radius of curvature.

33. Prove that  $\omega^3 = 1$  and  $1 + \omega^2 + \omega^3 = 0$ .

34. Solve the equation  $z^4 - 3z^3 - 2z + 6 = 0$ .

35. Show that  $i^i$  is a real number.

36. Draw the region of integration and evaluate  $\int_0^{\pi/3} \int_0^{\cos y} x \sin y \, dx \, dy$ .

37. Find the volume of the solid bounded by the cylinder  $x^2 + y^2 = 4$  and the planes  $y + z = 4$  and  $z = 0$ .

38. Evaluate  $\int_0^8 \int_{y^{\frac{1}{3}}}^2 \sqrt{x^4 - 1} \, dx \, dy$ .

**(6 × 4 = 24 Marks)**

## SECTION – IV

Answer any two questions from among the questions 39 to 44. These questions carry 15 marks each.

39. (a) Locate all relative extrema and saddle points of

$$f(x, y) = 2x^3 + 6xy^2 - 3y^3 - 150x.$$

- (b) The temperature of a point  $(x, y)$  on a unit circle is given by  $T(x, y) = xy$ . Find the temperature of the two hottest points on the circle.

40. (a) Find expressions for the equations of the tangent plane and line normal to the surface  $\phi(x, y, z) = c$  at the point  $P$  with coordinates  $x_0, y_0, z_0$ . Use the results to find the equations of the tangent plane and the line normal to the surface of the sphere  $\phi = x^2 + y^2 + z^2 = a^2$  at the point  $(0, 0, a)$ .

- (b) Find  $\nabla \cdot (\nabla \times \vec{F})$  and  $\nabla \times (\nabla \times \vec{F})$  where  $\vec{F}(x, y, z) = \sin x \vec{i} + \cos(x - y) \vec{j} + z \vec{k}$ .

41. (a) Find the derivative with respect to  $x$  of  $e^{5x}(\cos 7x)$  using complex exponential.

- (b) Evaluate the integral  $I = \int e^{ax} \cos bx \, dx$ .

42. (a) Use a triple integral to find the volume of the solid within the cylinder  $x^2 + y^2 = 9$  and between the planes  $z = 1$  and  $x + z = 5$ .

- (b) Evaluate  $\iiint_G z \, dV$ , where  $G$  is the wedge in the first octant cut off from the cylindrical solid  $y^2 + z^2 \leq 1$  and the planes  $y = x$  and  $x = 0$ .

43. (a) If  $u = f\left(\frac{x}{y}, \frac{y}{z}, \frac{z}{x}\right)$  find the value of  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ .

- (b) Show that  $\nabla \times (\phi \mathbf{a}) = \nabla \phi \times \mathbf{a} + \phi \nabla \times \mathbf{a}$ .

44. (a) Solve the hyperbolic equation  $\cosh x - 5 \sinh x - 5 = 0$ .

(b) Evaluate the double integral  $I = \iint_R (a + \sqrt{x^2 + y^2}) dx dy$ , where  $R$  is the region bounded by the circle  $x^2 + y^2 = a^2$ .

**(2 × 15 = 30 Marks)**

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(Pages : 4)

M – 2506

Reg. No. : .....

Name : .....

Second Semester B.A./B.Sc./B.Com. Degree Examination, December 2021

Career Related First Degree Programme under CBCSS

Language Course IV — Additional Language — Malayalam

ML 1211.3 : ഭൃശ്യകലാസാഹിത്യം

(2018 & 2019 Admission)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ രണ്ടു വാക്യത്തിലോ ഉത്തരം എഴുതുക.
1. കുഞ്ചൻ നമ്പ്യാർ ആദ്യം എഴുതിയ തുള്ളൽ കൃതി ഏത്?
2. നളചരിതത്തെ മലയാളത്തിലെ ശാകുന്തളം എന്ന് വിശേഷിപ്പിച്ചതാർ?
3. നളചരിതം ആട്ടക്കഥയ്ക്ക് എ.ആർ. എഴുതിയ അവതാരികയുടെ പേര്?
4. ഇരയിമ്മൻ തമ്പി രചിച്ച ആട്ടക്കഥകളുടെ പേരെഴുതുക.
5. കഥകളിയുടെ പൂർവ്വരൂപത്തിന്റെ പേരെന്ത്?
6. 'കൈരളിയുടെ കഥ' എഴുതിയതാർ?
7. ഞാൻ ഗന്ധർവ്വൻ എന്ന ചലച്ചിത്രത്തിന്റെ സംവിധായകൻ ആർ?
8. ചലച്ചിത്രത്തിന്റെ സാഹിത്യരൂപത്തിനു പറയുന്ന പേരെന്ത്?

P.T.O.

9. വാക്കുകൾ കൊണ്ട് ആശയ പ്രകാശനം നിർവ്വഹിച്ചു നടത്തുന്ന അഭിനയത്തിന്റെ പേരെന്ത്?
10. മലയാളത്തിലെ ആദ്യ രാഷ്ട്രീയ നാടകം ഏത്?

**(10 × 1 = 10 Marks)**

- II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ എട്ടു ചോദ്യത്തിന് ഉത്തരം എഴുതുക.
11. പെണ്ണിന്റെ ചൊൽ കേട്ടു ചാടിപ്പുറപ്പെട്ട  
പൊണ്ണൻ മഹാഭോഷനയ്യോ! മഹാജൻ!  
- സന്ദർഭം എഴുതി ആശയം വ്യക്തമാക്കുക.
12. “വാമാക്ഷീവാക്യം പ്രമാണിക്ക കാരണം  
രാമാദികൾക്കുമബദ്ധം പിണഞ്ഞുപോൽ”  
- സന്ദർഭം എഴുതി ആശയം വ്യക്തമാക്കുക.
13. ഗന്ധമാദന പർവ്വത്തിലെ വ്യക്തങ്ങളെ നമ്പ്യാർ വർണ്ണിച്ചിരിക്കുന്നതെങ്ങനെ? വ്യാഖ്യാനിക്കുക.
14. “ചപലസ്ത്രീകളെപ്പോലെ കഥിക്കുന്നെന്നെടോ ഞാലേ!  
സഫലം നിന്നുടെ കാര്യം സപദി സംഭവിച്ചിടും”  
- എന്ത് കാര്യം സംഭവിക്കുമെന്നാണ് ഇവിടെ സൂചിപ്പിക്കുന്നത്?
15. “പെരിയൊരു ദോർബ്ബലപാവകദേവനു വിറകാക്കി വിമതഘലം”  
- സന്ദർഭം എഴുതി ആശയം വ്യക്തമാക്കുക.
16. “ജഗൽപതിയും രതിപതിയും  
തവ കൊതിയുള്ളൊരു പതിവരുമേ”  
- വ്യാഖ്യാനിക്കുക.
17. ദമയന്തിയെപ്പറ്റി നാരദൻ നളനോട് പറഞ്ഞ കാര്യങ്ങൾ എന്തെല്ലാം?
18. പെണ്ണിനൊരാണിലൊരു പ്രേമ താമരയ്ക്കിന്നു  
കന്ദർപ്പൻ വേണമല്ലോ കന്ദം സമർപ്പയിതും.”  
- ആരുടെ വാക്കുകളാണിത്? വിശദീകരിക്കുക.
19. “ഗുണവുമനവധി ദോഷമായിതു” - വ്യാഖ്യാനിക്കുക.

- 20. ലേബർ റൂമിൽ കഴിയുന്നത് ഒരന്യഗ്രഹത്തിൽ കഴിയുന്നതുപോലെയാണെന്ന് പറയാൻ കാരണം എന്ത്?
- 21. "ഒരു ജീവൻ! കുഞ്ഞിച്ഛികുകൾ വിരുത്തി പുറത്തുവരാൻ വെമ്പി നില്ക്കുന്ന ഒരു ജീവൻ! എന്തൊരഭ്യുതം" - ഇവിടെ ഉണ്ടാകുന്ന അഭ്യുതം എന്ത്?
- 22. ഒരിടത്തൊരു ഫയൽവാനിലെ കണ്ണന്റെ അച്ഛൻ വേലുത്തിന്റെ മരണം ആവിഷ്കരിച്ചിരിക്കുന്ന തെങ്ങനെ?

(8 × 2 = 16 Marks)

III. 120 വാക്കിൽ കവിയാതെ ആറു ചോദ്യത്തിന് ഉത്തരം എഴുതുക.

- 23. ഇതിവൃത്തത്തിൽ സ്വീകരിച്ചിരിക്കുന്ന പുതുമ കൊണ്ട് വ്യത്യസ്തമായി നിൽക്കുന്ന ഒരു നാടകമാണ് ലേബർ റൂം. എന്താണ് പുതുമ? സമർത്ഥിക്കുക.
- 24. കല്യാണസൗഗന്ധികത്തിലെ വനവർണ്ണന ചുരുക്കി എഴുതുക.
- 25. ഉണ്ണായിവാദ്യരുടെ പാത്രസൃഷ്ടി വൈഭവം ഹംസത്തിന്റെയും ദമയന്തിയുടെയും സംഭാഷണത്തിലൂടെ ആവിഷ്കരിച്ചിരിക്കുന്നതെങ്ങനെ?
- 26. "വിധുമുഖിയുടെ രൂപമധുരത കേട്ടു മമ  
വിധുരത വന്നു; കൃത്യചതുരത പോയി;  
മുദിര തത കബരീ പരിചയ പദവിയോ  
വിജനേ വസതിയോ മേ ഗതിയി നി രണ്ടിലൊന്നേ."  
- ആരാണിങ്ങനെ ചിന്തിക്കുന്നത്? വിശദീകരിക്കുക.
- 27. "അർണ്ണവം തന്നിലല്ലോ നിമ്നഗ ചേർന്നു ഞായം  
അന്യമാ വരുത്തുവാൻ കുന്നു മുതിർന്നീടുമോ?" വ്യാഖ്യാനിക്കുക.
- 28. ഭഗവേനത്തിലെ സുമതിയുടെ ജീവിതത്തിലുണ്ടാകുന്ന മാറ്റങ്ങളെന്തെല്ലാം?

29. കുഞ്ചൻ നമ്പ്യാരുടെ കൃതികളെ കൈരളിയുടെ പൊട്ടിച്ചിരി എന്ന് വിശേഷിപ്പിക്കുന്നത് എന്തുകൊണ്ട്?
30. മലയാളനാടകങ്ങളുടെ വികാസം എങ്ങനെയായിരുന്നു?
31. കഥകളിയുടെ ഉത്ഭവം ചുരുക്കി എഴുതുക.

**(6 × 4 = 24 Marks)**

IV. മൂന്നു പുറത്തിൽ കവിയാതെ രണ്ട് ചോദ്യത്തിന് ഉത്തരം എഴുതുക.

32. എൻ. കൃഷ്ണപിള്ളയുടെ നാടകങ്ങളെ പറ്റി ഭഗവതനെ മുൻനിർത്തി ഉപന്യസിക്കുക.
33. ഒരു സ്ത്രീപക്ഷ നാടകമെന്ന നിലയിൽ ലേഖൻ റൂമിനെ വിലയിരുത്തുക.
34. നളചരിതം ആട്ടക്കഥയുടെ പ്രത്യേകതകൾ ഒന്നാം ദിവസത്തെ അടിസ്ഥാനമാക്കി പ്രതിപാദിക്കുക.
35. പി. പത്മരാജന്റെ തിരക്കഥയുടെ സവിശേഷതകൾ ഒരിടത്തൊരു ഫയൽവാനിൽ പ്രകടമാകുന്ന തെങ്ങനെ? വിശദമാക്കുക.

**(2 × 15 = 30 Marks)**