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Reg. No. : ....

Name : ....

Fourth Semester B.A./B.Sc. Degree Examination, July 2024

First Degree Programme under CBCSS

Language Course – English

EN 1411.1/EN 1411.3 : READINGS IN LITERATURE

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

(2019 Admission Onwards)

Time : 3 Hours　　　　　　　　　　　　　　　　　　Max. Marks : 80

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

1.　What is the question the poet asks the labourers of England?

2.　List the main themes of "The Gift Outright".

3.　What is the central theme of "Telephone Conversation"?

4.　What is the meaning of the word 'interior' in Atwood's poem?

5.　What does the sound of the flute signify in "House of a Thousand Doors"?

6.　Why is the colour yellow associated with the Indian bride?

7.　Theme of "The Exercise Book".

8.　How did the narrator understand that his liver was out of order?

9.　What does "You are Under Surveillance" talk about?

10.　Who was Kochuraman in "The Power of Faith"?

(10 × 1 = 10 Marks)

P.T.O.

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

11.   What are the things the poor labourers do not get although they work very hard?

12.   What helped Frost establish his reputation as a truly national poet?

13.   The protagonists of "Telephone Conversation".

14.   What does 'The House of a Thousand Doors' symbolize?

15.   Comment on card in the poem "Identity Card".

16.   What did the white men do to the aboriginals according to Oodgeroo Noonuccal?

17.   What does "Agony" depict?

18.   The sad fate of Uma in "The Exercise Book".

19.   The attitude of Krishnan's daughter to her grandmother.

20.   The character of Lomov.

21.   What effect did John Kurian's notice about the surveillance camera have on his daughter Sini?

22.   What is Arundhati Roy's first comment on nuclear weapons?

                                                                    (8 × 2 = 16 Marks)

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

23.   What does Frost's "The Gift Outright" convey?

24.   Write a note on the aesthetics of "I cannot help blossoming".

25.   How does Atwood describe her journey to the interior?

26.   How does the poem "We are Going" end?

27.   Why did Krishnan refuse to help his sister when she was ill?

28. The disease of the protagonist in "The Man Who was a Hospital".

29. What was peculiar in the character of Natalya Stepanovna?

30. What does Malcolm X say about Marcus Garvey?

31. What is Arundhati Roy's opinion about the common people of India?

(6 × 4 = 24 Marks)

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

32. What is Shelley's exhortation to the men of England?

33. "The Exercise Book" as the story of the sad predicament of the Indian girl child.

34. Chekhov's use of humour and exaggeration in "A Marriage Proposal'.

35. What does Arundhati Roy say about India's last nuclear test?

(2 × 15 = 30 Marks)

Reg. No. : ....

Name : ....

Fourth Semester B.Sc. Degree Examination, July 2024

Career Related First Degree Programme under CBCSS

Physics And Computer Applications

Core Course

PC 1441 – CLASSICAL MECHANICS AND THEORY OF RELATIVITY

(2015 Admission Onwards)

Time : 3 Hours   Max. Marks : 80

SECTION – A

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

1. What are the conditions for an oscillatory motion to be simple harmonic?

2. Define constraints.

3. Give two examples of harmonic oscillators.

4. Write down the mass energy equivalence relation.

5. What is meant by central force?

6. State Kepler's second law.

7. Give the expression for period of oscillation of a loaded spring and name the parameters involved.

8. What is the time period of a compound pendulum?

9. What is the length of a compound pendulum when its period is the maximum?

10. What is twin paradox?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Compare simple pendulum and compound pendulum.

12. Consider a ship moving with a uniform velocity 18 m/s relative to the earth. Let a ball be rolled along the direction of motion of the ship at 2 m/s. What is the speed of the ball relative to the earth?

13. Arrive at the equation of motion of a two dimensional harmonic oscillator.

14. What happens to a moving clock?

15. State Kepler's third law.

16. Show that centre of suspension and centre of oscillation of a compound pendulum are interchangeable.

17. Give the Lagrangian equation of motion of a simple pendulum in a uniform gravitational field.

18. Give mass – energy relation and discuss its significance.

19. What is D'Alembert's principle?

20. Calculate the reduced mass of hydrogen molecule.

21. Explain time dilation.

22. Explain principle of virtual work.

(8 × 2 = 16 Marks)

SECTION – C

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

23. From Kepler's law arrive at Newton's law of gravitation.

24. What will be the apparent length of a matter scale measured by an observer at rest, When the scale is moving along its length with a velocity c/2(c is the speed of light)?

25. Is an accelerated frame of reference is non-inertial? Justify.

26. Describe the negative result from Michelson – Morley experiment.

27. What are the consequences of Einstein's postulates of special relativity?

28. Find the frequency of oscillation of a mass of 1 kg suspended on a spring. The mass stretches the spring by 7 cm when attached to it.

29. A rocket propels itself rectilinearly through empty space by emitting radiation, whose recoil provides the necessary thrust. Show that the ratio of initial and final rest mass of the rocket is given by $\dfrac{m_i}{m_f} = \left[\dfrac{c+v}{c-v}\right]^{1/2}$, where v is the final velocity relative to the rest frame.

30. Arrive at the equation of motion of a system of two masses, connected by an inextensible string passing over a small smooth pulley.

31. Compare Lagrangian approach over Newtonian approach.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Arrive at the general solution of a harmonic oscillator in the presence of damping force. Discuss the three cases of the solution.

33. Determine the acceleration due to gravity of a compound pendulum.

34. Derive Lagrange's equations of motion using D'Alembert's principle.

35. Describe Michelson-Morley experiment with suitable diagram. What was the null result from the experiment?

(2 × 15 = 30 Marks)

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Reg. No. : ....

Name : ....

Fourth Semester B.Sc. Degree Examination, July 2024

Career Related First Degree Programme under CBCSS

Physics and Computer Applications

Core Course

PC 1442 : OPTICS

(2014 Admission Onwards)

Time : 3 Hours   Max. Marks : 80

PART – A

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

1. Discuss the phenomenon of normal dispersion.

2. Why should the two coherent sources be kept close to each other to get interference pattern.

3. Why is the centre of Newton's rings dark in reflected light?

4. What is the basic condition for diffraction to occur?

5. Mention any one use of a polaroid.

6. How is the polarizing angle related to refractive index?

7. What is meant by double refraction?

8. Why is it difficult to attain lasing action at higher frequencies?

9. Give any two applications of lasers.

10. How is holography different from conventional photography?

<div align="right">(10 x 1 = 10 Marks)</div>

PART – B

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

11. Plot the shape of the wave fronts in Fresnel and Fraunhoffer diffraction.

12. Give any two difference between interference and diffraction bands.

13. Point out any two difference between prism spectra and gratting spectra.

14. Differentiate between dispersive power and resolving power of an optical instrument.

15. Mention the application of optical fibres.

16. What is the role of Helium in a He-Ne laser?

17. Of the two optically plane parallel glass plates in Michelson's Interferometer, why is one of them called compensating glass plate?

18. What is the benefit of having a wide band in pumping level in lasers?

19. Explain Malus law.

20. Define zone plate.

21. Write the properties of laser.

22. Explain stimulated emission.

<div align="right">(8 x 2 = 16 Marks)</div>

PART – C

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

23. When a movable mirror M1 of Michelson interferometer is moved through 0.0295 mm, 100 fringes are observed to cross the field of view. Calculate the wavelength of light.

24. In a Newton's ring experiment, diameter of the nth dark ring is 0.293 cm. When a liquid is introduced between the glass plate and lens, it changes to 0.254 cm. Find the refractive index of the liquid.

25. The radius of the first ring of a zone plate is 0.4 mm. Plane waves of wavelength 5000 Å fall on the plate. Find the position of the screen to get the brightest image.

26. Light of wavelength 5000 Å is incident normally on a gratting having 5000 lines/cm. Find the angle of diffraction in the first order.

27. Find the polarizing angle for a ray of light incident from glass to water. Given refractive indices of glass and water are 1.33 and 1.55.

28. Plane polarized light passes through a quartz plate with optic axis parallel to the faces. Calculate the least thickness of the plate for which the emergent beam will be plane polarized.

    (wavelength of light =500 nm, Refractive index of Quartz for ordinary and extraordinary rays are 1.5422 and 1.5533 respectively)

29. Sugar solution in a 20 cm tube is placed between crossed Nichols and is illuminated with light of wavelength 600nm. If the optical rotation produced is 13° and specific rotation is 65°, determine the strength of the solution.

30. Calculate the coherance length for CO_2 laser whose line width is 10.5 nm at IR emission wavelength of 10.6 micrometer.

31. A glass fiber is made with core of refractive index 1.55 and cladding is doped with fractional difference of 0.005. Find

   (a) The refractive index of cladding

   (b) Critical internal reflection angle

   (c) External critical acceptance angle

   (d) Numerical Aperture

(6 × 4 = 24 Marks)

PART – D

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

32. Explain how Newton's rings are formed by reflected light. Explain with relevant theory how the wavelength of light can be determined using Newton's rings setup.

33. Explain the phenomenon of Fraunhoffer Diffraction in a single slit.

34. Discuss the various processes taking place during the interaction between light and matter. Obtain Einstein's coefficients.

35. Discuss the propagation of light through an optical fiber. Obtain expressions for critical angle, acceptance angle and numerical aperture.

(2 × 15 = 30 Marks)

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Fourth Semester B.Sc. Degree Examination, July 2024

Career Related First Degree Programme under CBCSS

Mathematics

Complementary Course for Physics and Computer Applications

MM 1431.6 : MATHEMATICS — IV — ABSTRACT ALGEBRA, LAPLACE TRANSFORMS, SPECIAL FUNCTIONS AND FUNCTIONS OF A COMPLEX VARIABLE

(2019 Admission Onwards)

Time : 3 Hours   Max. Marks : 80

SECTION – I

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

1. Determine whether the binary operation * defined on Z by letting $a * b = ab$, gives a group structure.

2. Define an abelian group.

3. Define an integral domain.

4. Find the Laplace transform of $\sin 3t \cos 2t$.

5. Find the Laplace transform of $e^{-t} \cosh 4t$.

6. Find the Inverse Laplace transform of $\dfrac{2}{(s+4)^3}$

7. State Cauchy – Riemann relations in connection with analytic functions.

8. Show that $u(x,y) = e^x \sin y$ is a harmonic function.

9. Show that $\int_C \dfrac{\sin z}{z - \pi} dz = 0$ where C is the circle $|z| = 1$.

10. Find $\beta(1, n)$.

(10 × 1 = 10 Marks)

SECTION – II

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

11. Define a group with an example.

12. State the left and right cancellation laws in a group.

13. Is Z a field or not? Justify.

14. Prove that every cyclic group is abelian.

15. Find the Laplace transform of $f(t) = t \cos 4t$.

16. Evaluate $L^{-1}\left[\dfrac{2}{(s+4)^3}\right]$.

17. Find $L^{-1}\left(\dfrac{1}{(s+1)(s+2)}\right)$.

18. Is $L[f(t)g(t)] = L[f(t)]L[g(t)]$? Explain.

19. If $f(z) = e^z$, show that $f(z)$ is an analytic function.

20. Locate and classify the singular points of the function $f(z) = \dfrac{z+1}{z^2 - 2z}$.

21. Find the residue of $z e^{\frac{1}{z}}$ at its singular points.

22. Prove that $\int_0^\infty x^n e^{-x} dx = n!$.

(8 × 2 = 16 Marks)

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SECTION – III

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

23. Let G be a group. Prove that $(a*b)' = b'*a'$ for all $a, b \in G$.

24. Define a ring with example.

25. Find the Laplace transform of the function $f(t) = \begin{cases} t & t \geq 2 \\ 0 & t < 2 \end{cases}$.

26. Find the inverse transform of $\dfrac{3s - 137}{s^2 + 2s + 401}$.

27. Find the Laplace transform of $\int_0^t t e^{-4t} \sin 3t \, dt$.

28. Find the inverse Laplace transform of $\log \dfrac{s+a}{s+b}$.

29. Expand $f(z) = \dfrac{1}{(z+1)(z+3)}$ in Laurent's series valid for $1 < |z| < 3$.

30. Using Cauchy's integral formula evaluate the integral $\displaystyle\int_C \dfrac{e^z}{(2z-1)^2} dz$ over the circle $|z| = 1$.

31. Show that $\Gamma(1/2) = \sqrt{\pi}$.

(6 × 4 = 24 Marks)

SECTION – IV

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

32. (a) Show that any group is abelian if and only if $(a*b)^2 = a^2*b^2$ for all $a, b \in G$.

    (b) Let $G = \{1, -1, i, -i\}$ and $\cdot$ defines multiplication.

    (i) Show that $(G, .)$ is a group.

    (ii) Is $(G, .)$ a cyclic group. If so find the generators of G

    (iii) Find a subgroup of G

3

33. (a) Use convolution theorem to find the inverse Laplace transform of $\dfrac{s}{(s-1)(s^2+4)}$. Verify the result by finding the inverse using partial fraction technique.

(b) Using Laplace transform solve $y'' + 4y' + 3y = e^{-t}, y(0) = y'(0) = 1$.

34. (a) Using residue theorem, evaluate $\displaystyle\int_C \dfrac{dz}{(z^2+4)^2}$ over the circle $|z - i| = 2$.

(b) Evaluate $\displaystyle\int_0^{2\pi} \dfrac{d\theta}{5 + 4\sin\theta}$.

35. (a) Represent Beta function in terms of $\sin\theta$ and $\cos\theta$.

(b) Show that $\beta(m,n) = \displaystyle\int_0^{\infty} \dfrac{x^{m-1}}{(1+x)^{m+n}} dx$ where $m > 0, n > 0$.

(2 × 15 = 30 Marks)

Reg. No. : ....

Name : ....

Fourth Semester B.C.A./B.Sc. Degree Examination, July 2024

Career Related First Degree Programme under CBCSS

Group 2 (b)/ Group 2 (a) – Computer Applications/ Physics and Computer Applications

Core Course

CP 1442/ PC 1472 : PYTHON PROGRAMMING

(2021 Admission Onwards)

Time : 3 Hours   Max. Marks : 80

SECTION – A

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

1. What is membership operator?

2. Define dictionary comprehensions.

3. Write the syntax of update command in Python.

4. How do you create an iterator in Python?

5. What is the purpose of radio buttons in Python?

6. What is the syntax for raising an exception?

7. Explain the concept of anonymous functions in Python.

8. How are regular expressions used in Python?

9. What is a match() function?

10. What is an import statement?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Write the syntax of for loop in Python.

12. What are the features of Python language?

13. What is datatype conversion?

14. What are HTTP headers in Python? What is their role in web development?

15. What is a nested function in Python? How is it different from a regular function?

16. State the difference between the commit and rollback commands in Python, and when would you use each one?

17. How are assertions defined in Python?

18. How are objects created in Python?

19. What is the difference between private and protected attributes and methods?

20. Write a Python function to check whether a given string is a palindrome or not.

21. Explain the concept of namespaces and scope in Python modules.

22. What are file pointers?

(8 × 2 = 16 Marks)

T – 2890

SECTION – C

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

23. Briefly explain Python operators.

24. Write a short note on control statements.

25. Explain exception handling in database with the help of an example.

26. What is a class decorator in Python? How does it differ from a function decorator?

27. How does inheritance work in Python and how do you implement it?

28. What is polymorphism in Python and how is it useful?

29. What are some potential pitfalls of using destructors in Python?

30. Can you explain the process of creating and utilizing modules in Python?

31. Explain if else statement with examples.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Discuss different data types available in Python.

33. What are the key concepts involved in database programming? Discuss its importance in modern software development.

34. Discuss how to raise exceptions in Python programs with the help of examples.

35. Explain the concept of a function in Python.

(2 × 15 = 30 Marks)

3   T – 2890

Reg. No. : ....

Name : ....

Fourth Semester B.C.A./B.Sc. Degree Examination, July 2024

Career Related First Degree Programme under CBCSS

**Group 2(b) / Group 2(a) – Computer Applications /
Physics and Computer Applications**

Core Course

CP 1441/PC 1471 - SOFTWARE ENGINEERING

(2021 Admission onwards)

Time : 3 Hours   Max. Marks : 80

SECTION – A (Very short answer)

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

1. What is MSPEC document?

2. What is Person-Month?

3. What is Code Walkthrough?

4. What is SRS?

5. Define AoE.

6. What is Critical path?

7. Explain any two advantages of evolutionary development model.

8. What is smoke testing?

9.   What is coupling?

10. Function point metric was proposed by ———————.

<div align="right">

(10 × 1 = 10 Marks)

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SECTION – B (Short answer type)

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

11. What is communication Cohesion?

12. Explain any four users of SRS document.

13. Define CPM.

14. Explain any four characteristics of a good software design.

15. What is Layered design?

16. Write note on activity network.

17. What is control coupling?

18. Differentiate between classical and iterative Waterfall model.

19. Explain types of software maintenance.

20. What is customized software product?

21. Explain any two approaches to integration testing.

22. Write short note on CORBA.

<div align="right">

(8 × 2 = 16 Marks)

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SECTION – C (Short essay type)

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

23. Write expressions to calculate effort and Tdev for basic Cocomo model.

24. Write short note on Pert chart.

25. Explain equivalence class Partitioning.

26. Write short note on prototyping model.

27. What is synchronous and asynchronous data flow?

28. Write note on feasibility study.

29. What is LOC? Explain any three shortcomings of LOC.

30. Write note on Function point metric.

31. Discuss SA/SD methodology.

(6 × 4 = 24 Marks)

SECTION – D (Long essay type)

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

32. Explain white box testing in detail.

33. Discuss RAD and v model in detail.

34. Explain project estimation technique in detail.

35. Explain class, activity and state diagram with suitable example.

(2 × 15 = 30 Marks)