UG – 037

IV Semester B.Sc./B.C.A./B.Sc. (FAD)/B.Sc. (IDD) Examination,
September/October 2022
(Repeaters) (CBCS) (2015-16 and Onwards)
ENGLISH
Language English – IV

Time : 3 Hours Max. Marks : 70

Instructions : *1) Answer **all** the questions.*
*2) Mention the question numbers **correctly**.*

SECTION – A
(Drama)

1. Answer **any two** of the following in about a page each. **(2×5=10)**
   i) Write a note on mock trail.
   ii) Comment on the relationship between Mr. and Mrs. Kashiker.
   iii) Sketch the character of Leela Benare.

2. Answer **any one** in about **two** pages. **(1×10=10)**
   i) Mrs. Kashikar is both a victim and an agents of patriarchy – Discuss.
   ii) Comment on the irony of the title "Silence ! The Court is in Session".

SECTION – B
(Poetry)

3. Answer **any two** of the following in about a paragraph each. **(2×5=10)**
   i) How does nationalisation affect the rights and livelihood of the tribals in the poem "Anything can happen" ?
   ii) "Tongue is the story of every woman" – Comment.
   iii) How does Shylock defend himself ?

4. Answer **any one** in about **two** pages. **(1×10=10)**
   i) Compassion and cruelty are co-existent – Discuss with reference to the poem "Vultures".
   ii) Should issues of spirituality take precedence over issues of poverty ? Comment with reference to "Bertolt Brecht and The Gautama Buddha".

P.T.O.

SECTION – C
(Work Book)

(5×1=5)

5. Answer the following questions.

   a) Give an example for non-verbal communication.

   b) Borrowing from sources without acknowledging is _____.

   c) Give an example of a search engine.

   d) Mention any one difference between resume and CV.

   e) What is a covering letter ?

6. Complete the following dialogue between a student and a English teacher by filling up the blanks : 5

   English teacher : Have you brought your assignment for submission ?

   Student : _____

   English teacher : What is the reason ?

   Student : _____

   English teacher : In that case, you could have taken permission from me in advance ?

   Student : _____

   English teacher : What do you intend to do now ?

   Student : _____

   English teacher : Anyway, let me see what can be done about it now !

   Student : _____

7. 1) Prepare five slides that you would use to make a presentation on "Why is Yoga so popular". Each slide should have a title followed by subtitles. 10

   OR

2) The Director of Health Department has decided to conduct a survey in Bangalore on the increase in patients with heart problems due to stress. Imagine, you are the person in charge to conduct the survey and prepare a report in accordance with the procedure of project report by using the following hints,

Prepare :

A) An outline of the objectives of study.

B) Suggest the scope of study.

Hints :

i) Increase in the work stress.

ii) Bad food habit.

iii) Irregular activities.

8. Prepare a suitable resume and covering letter for the following job :

Advertisement, at Accenture, #317, 2nd Floor, Tumkur Road, Jalahalli, Bangalore for the post of Marketing Executive. Candidates must preferably be graduates from a recognized university and should have prior experience of at least one year in the marketing field, with excellent communication skills. Freshers can also apply. **(5+5=10)**

61402

ನಾಲ್ಕನೇ ಸೆಮಿಸ್ಟರ್ ಬಿ.ಎಸ್ಸಿ. ಪದವಿ ಪರೀಕ್ಷೆ, ಸೆಪ್ಟೆಂಬರ್ / ಅಕ್ಟೋಬರ್ 2022

(CBCS) (F+R) (2019 – 20 Onwards)

ಕನ್ನಡ ಭಾಷೆ – IV

ಸುವರ್ಣ ಸಂಪದ

Time : 3 Hours Max. Marks : 70

I. ಅ) ಈ ಕೆಳಗಿನ ಪದ್ಯದ ಭಾವಾರ್ಥವನ್ನು ಬರೆಯಿರಿ. (1×6=6)

ಕಾಮವೆತ್ತಲು ಪರಮ ತತ್ವದ
ಸೀಮೆಯೆತ್ತಲು ತಿಮಿರವೆತ್ತಲು
ತಾಮರಸ ಸಖನೆತ್ತ ಮೇಣಱವೆತ್ತ ಮಱವೆತ್ತ
ಭ್ರಾಮಕದ ನುಡಿಸಾಕು ನೀನೆ
ತ್ತಾ ಮಹಾಘನವೆತ್ತ ಮರುಳೇ
ಕ್ಷೇಮದಲಿ ನೀ ಬಂದ ಬಟ್ಟೆಯಲಬಳೆ ಹೋಗೆಂದ ॥

ಆ) **ಎರಡು** ವಿಷಯಗಳಿಗೆ ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ. (2×2=4)

1) ಸಾಹಸಭೀಮ ವಿಜಯ
2) ಚಾಮರಸ
3) ಅಲ್ಲಮಪ್ರಭು
4) ಕೀರ್ತನ ಸಾಹಿತ್ಯ.

ಇ) **ಒಂದು** ಪ್ರಶ್ನೆಗೆ ವಿವರವಾಗಿ ಉತ್ತರಿಸಿ. (1×10=10)

1) ಅಲ್ಲಮ ಮಾಯೆಯನ್ನು ತಿರಸ್ಕರಿಸುವ ಸನ್ನಿವೇಶವನ್ನು ಕುರಿತು ಬರೆಯಿರಿ.
2) ಲೌಕಿಕ ವೃತ್ತಿಗಳನ್ನು ಕೀರ್ತನೆಯಲ್ಲಿ ಆಧ್ಯಾತ್ಮಿಕವಾಗಿ ಹೇಗೆ ವಿಸ್ತರಿಸಿದ್ದಾರೆ ? ವಿವರಿಸಿ.

II. ಅ) **ಎರಡು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಸಂಕ್ಷಿಪ್ತವಾಗಿ ಉತ್ತರಿಸಿ. (2×5=10)

1) ವಿಶ್ವಮಾನ್ಯ ಮೆಂಡಲಿಯನ್ ಸಿದ್ಧಾಂತ.
2) ಪ್ರಾಚೀನ ಸಂಸ್ಕೃತಿಯಲ್ಲಿ ಹೆಣ್ಣಿನ ಸ್ಥಾನಮಾನ.
3) ಗಾಂಧೀಜಿಯವರು ಮಹಿಳೆಯನ್ನು ಗ್ರಹಿಸಿರುವ ಬಗೆ.

P.T.O.

ಆ) ಒಂದು ಪ್ರಶ್ನೆಗೆ ವಿವರವಾಗಿ ಉತ್ತರಿಸಿ. (1×10=10)

1) ಗಜಮುಖನ ಕ್ಷೀರದಾಹದ ಪವಾಡವನ್ನು, ಅದಕ್ಕೆ ನೀಡಿದ ವೈಜ್ಞಾನಿಕ ವಿವರಣೆಯನ್ನು ವಿವರಿಸಿ.

2) ಮಹಿಳೆಗೆ ಯಶಸ್ಸಿನ ಹಾದಿಯಲ್ಲಿ ಎದುರಾಗುವ ಕಂಟಕಗಳು ಹಾಗೂ ಸವಾಲುಗಳನ್ನು ವಿವರಿಸಿ.

III. ಅ) ಒಂದು ಪ್ರಶ್ನೆಗೆ ಸಂಕ್ಷಿಪ್ತವಾಗಿ ಉತ್ತರಿಸಿ. (1×5=5)

1) ಮರುಭೂಮಿಯ ದೈತ್ಯ ಚಿತ್ರಗಳನ್ನು ಕುರಿತು ಬರೆಯಿರಿ.

2) ಕುಸ್ಕೊ ನೆಲದ ದಂತಕಥೆಯನ್ನು ತಿಳಿಸಿ.

ಆ) ಒಂದು ಪ್ರಶ್ನೆಗೆ ವಿವರವಾಗಿ ಉತ್ತರಿಸಿ. (1×10=10)

1) ಇನ್ಕಾ ದೊರೆಗಳು ಆಚರಿಸುವ ಸೂರ್ಯ ಹಾಗೂ ವೀರಕೋಚ ದೇವರ ಆರಾಧನೆ ಹಾಗೂ ಹಬ್ಬವನ್ನು ಕುರಿತು ಬರೆಯಿರಿ.

2) ಭಾರತೀಯರಿಗೂ ಇನ್ಕಾಗಳಿಗೂ ಇರುವ ಪ್ರಕೃತಿ ಪೂಜೆಯಲ್ಲಿನ ಸಾಮ್ಯತೆಯನ್ನು ತಿಳಿಸಿ.

IV. ಅ) ಒಂದು ಪ್ರಶ್ನೆಗೆ ಸಂಕ್ಷಿಪ್ತವಾಗಿ ಉತ್ತರಿಸಿ. (1×5=5)

1) ಇತರರ ತಪ್ಪುಗಳನ್ನೇ ಎತ್ತಿ ತೋರಿಸುವ ಮನುಷ್ಯನ ಗುಣದ ವಿಡಂಬನೆ ಲೇಖನದಲ್ಲಿ ಹೇಗೆ ಮೂಡಿದೆ ? ವಿವರಿಸಿ.

2) ಧಾರ್ಮಿಕ ಆಚರಣೆಗಳನ್ನು ಕುರಿತ ವಚನಕಾರರ ಧೋರಣೆಗಳನ್ನು ಕುರಿತು ಬರೆಯಿರಿ.

ಆ) ಒಂದು ಪ್ರಶ್ನೆಗೆ ವಿವರವಾಗಿ ಉತ್ತರಿಸಿ. (1×10=10)

1) ಮಾನವೀಯತೆಯ ಬದಲಿಗೆ ಅಮಾನವೀಯತೆ ಮಾನವನಲ್ಲಿ ನೆಲೆಸಿರುವುದರ ಬಗ್ಗೆ ಲೇಖಕರು ಹೇಗೆ ವಿವರಿಸಿದ್ದಾರೆ ? ತಿಳಿಸಿ.

2) ನವೋದಯವನ್ನು ಕುರಿತ ಅಕಾಡೆಮಿಕ್ ವಲಯದ ಚರ್ಚೆಯ ಗಡಿರೇಖೆಗಳನ್ನು ಲೇಖಕರು ಹೇಗೆ ವ್ಯಾಖ್ಯಾನಿಸಿದ್ದಾರೆ ? ವಿವರಿಸಿ.

UG – 194

IV Semester B.Sc. Examination, September/October 2022
(CBCS – 2015 – 16 and Onwards) (Fresh + Repeaters)
MICROBIOLOGY – IV
Molecular Biology and Recombinant DNA Technology

Time : 3 Hours | Max. Marks : 70

Instructions : *1) Answer **all** the Sections.*
*2) Draw diagrams **wherever** necessary.*

SECTION – A

I. Write short notes on. **(5×2=10)**

1) tRNA.
2) Shine Dalgarno Sequence.
3) M13 as a vector.
4) Hybridization.
5) Alkaline phosphatase.

SECTION – B

II. Answer **any four** of the following. **(4×5=20)**

6) Explain central dogma of molecular biology.
7) Write a note on structure of ribosomes and its functions.
8) Write a note on Ti plasmids.
9) Explain Gene therapy.
10) Write a note on immunological screening of recombinant host cells.

SECTION – C

III. Answer **any three** of the following. **(3×10=30)**

11) Describe DNA manipulative enzymes in Recombinant DNA technology.
12) Explain the mechanism of protein synthesis in Prokaryotes.
13) What is blotting ? Explain southern blotting technique in detail.
14) Give a detailed account on operon concept.
15) Explain in detail the methods of joining DNA molecules in recombinant DNA technology.

P.T.O.

SECTION – D

IV. Answer in **one** sentence. **(10×1=10)**

16) TATA Box.

17) Anticodons.

18) Corepressor.

19) RNA polymerase.

20) Primers.

21) PAGE.

22) COS site.

23) Microinjection.

24) MCS.

25) PCR.

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IV Semester B.Sc. Examination, September/October 2022
(CBCS) (Freshers + Repeaters) (2017 – 18 and Onwards)
PHYSICS – IV
Optics and Fourier Series

Time : 3 Hours Max. Marks : 70

Instruction : *Answer* ***any five*** *questions from* ***each*** *Part.*

PART – A

Answer **any five** questions. **Each** question carries **eight** marks. **(5×8=40)**

1. a) Explain Huygen's principle.
   b) Deduce the law of refraction for a spherical wavefront on a plane surface using Huygen's principle. **(2+6)**

2. Obtain an expression for the thickness of a glass plate using Fresnel's biprism. **8**

3. a) What is a zone plate ?
   b) Derive an expression for the focal length of a zone plate. **(1+7)**

4. Describe with necessary theory, Fraunhofer diffraction at a single slit and arrive at conditions for position of maxima and minima. **8**

5. What are retarding plates ? Give the theory of retarding plates. **(2+6)**

6. a) What is meant by population inversion ?
   b) Describe with energy level diagram the construction and working of Ruby laser. **(2+6)**

7. Write the mathematical form of Fourier theorem and evaluate the Fourier coefficients. **8**

8. a) Define numerical aperture and acceptance angle of an optical fibre.
   b) Derive an expression for numerical aperture of an optical fibre. **(2+6)**

P.T.O.

PART – B

Solve **any five** problems. **Each** problem carries **four** marks. (5×4=20)

9. An air wedge of length 2.4×10^{-2} m is illuminated by a monochromatic light of wavelength 5893 Å. If the distance between successive fringe is 0.954×10^{-4} m, calculate the thickness of the object kept between the two optically plane glass forming the air wedge.

10. In a Newton's ring experiment, the diameter of the 5^{th} ring was 0.3×10^{-2} m and the diameter of 25^{th} ring was 0.8×10^{-2} m. If the radius of curvature of the plano-convex lens is 1 m, find the wavelength of light used.

11. A zone plate has a diameter of 10 mm. If a light of wavelength 6000 Å falls on it, it comes to focus at a distance of 0.8 m from the zone plate. Calculate the number of zones in the zone plate.

12. In Fraunhofer diffraction pattern due to a narrow slit a screen is placed 2 m away from the lens to obtain the pattern. If the slit width is 0.2 mm and the first minima lie 5 mm on either sides of the central maximum, find the wavelength of light.

13. A column of sugar solution of 0.2 m rotates the plane of polarisation of light through 34°. If the specific rotation of sugar solution is 0.0118 SI unit, calculate the concentration of the solution.

14. A laser beam is focussed on a surface area of 0.5 mm diameter. If the power of the laser source is 5 mW and the wavelength is 6328 Å, calculate the intensity and energy of the photons emitted.

15. Show that the function $f_1(x) = x^2$ and $f_2(x) = x^3$ are orthogonal in the interval $[-1, 1]$.

16. A ray is travelling from air to an optical fibre of core and cladding of refractive indices 1.48 and 1.46 respectively. Calculate the critical angle and numerical aperture.

PART – C

Answer **any five** questions. **Each** question carries **two** marks. **(5×2=10)**

17. a) Does the fringe width decrease with the increase of separation between the coherent sources ? Explain.

b) Are the interference pattern in reflected and transmitted light mutually complimentary ? Justify.

c) Is it possible to get a diffraction pattern due to a wide slit ? Justify.

d) Is angular dispersion independent of grating element ? Justify.

e) Can sound waves be polarised ? Explain.

f) Is laser a coherent light ? Justify.

g) Can we express any function in the form of a Fourier series ? Explain.

h) Can the refractive index of the core be less than the cladding ? Explain.

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IV Semester B.Sc. Examination, Sept./Oct. 2022
(Semester Scheme) (CBCS) (F + R)
ELECTRONICS – IV
Digital Electronics and Verilog

Time : 3 Hours Max. Marks : 70

Instruction : *Answer **all** the questions from Part – **A**, **any five** from Part – **B**, and **any four** from Part – **C**.*

Note : *Answer **all** the questions from Part – **A** in **any one** page, answering the same question multiple times will **not** be considered for evaluation.*

PART – A

Answer **all** the sub-divisions : **(15×1=15)**

1. i) An inverter
   a) Performs the NOT operation
   b) Changes a HIGH to LOW
   c) Changes a LOW to HIGH
   d) All the above

   ii) The minterm designator for the term ABCD is
   a) 12 b) 15 c) 10 d) 08

   iii) Which is the fastest logic family ?
   a) TTL b) CMOS c) RTL d) ECL

   iv) A half-adder is characterized by
   a) Two inputs and two outputs
   b) Three inputs and two outputs
   c) Two inputs and three outputs
   d) Two inputs and one output

   v) A BCD-to-7 segment decoder has 0100 on its inputs. The active output segments are
   a) a, c, f, g b) b, c, f, g c) b, c, e, f d) b, d, e, g

   vi) A De-multiplexer has
   a) One data input line, several data output lines and selection inputs
   b) Several data input lines, several data output lines and selection inputs
   c) One data input line, one data output line and selection input
   d) Several data input lines, one data output line and selection inputs

P.T.O.

vii) When S and R are set to 1-logic, the SR flip-flop output becomes
a) Hold State b) Set State
c) Reset State d) Indeterminate state

viii) The number of flip-flops required for decade counter is
a) 3 b) 4 c) 5 d) 10

ix) A ring counter is a
a) Sequence generator b) Up counter
c) Down counter d) Decade counter

x) In Verilog one-line comment starts with
a) // b) \\ c) /* d) *

xi) In Verilog the conditional operators are
a) ? and : b) ? and ; c) / and ? d) ? and \

xii) In Verilog, ! (A|B) performs _____ operation.
a) OR b) NOR c) X-OR d) X-NOR

xiii) The blocking statement uses _____ as assignment operator.
a) = b) = = c) < = d) = >

xiv) In Verilog the "initial" statement executes the statements
a) Once b) Twice
c) Thrice d) More than thrice

xv) In continuous assignment left hand side must be
a) Net b) Reg
c) Scalar or Vector Net d) Scalar or Vector reg

PART – B

Answer **any five** questions : **(5×7=35)**

2. a) Realize Ex-OR gate using NAND gates.
b) State and prove De-Morgan's theorem. **(2+5)**

3. a) What is full adder ? Write the truth table and draw the logic circuit of full adder using logic gates.
b) Draw the logic circuit of 2 to 4 decoder using AND gates. **(5+2)**

4. a) With a circuit diagram, explain the operation of a successive approximation type of ADC.
   b) Draw the logic circuit of 4 : 1 multiplexer. **(5+2)**

5. Draw the logic diagram of a Master Slave JK flip-flop and explain its working with a truth table.

6. With a logic diagram explain the working of 4-bit SISO shift register. Write its truth table and timing diagram.

7. a) Compare Verilog and VHDL.
   b) Write the syntax for sized and unsized numbers in Verilog. **(4+3)**

8. a) With an example, explain reduction and concatenation operators used in Verilog.
   b) List different types of event control. **(5+2)**

9. a) With an example, explain blocking and non-blocking statements.
   b) Write syntax for repeat statement in Verilog. **(5+2)**

PART – C

Answer **any four** questions : **(4×5=20)**

10. Simplify the Boolean function $f(a, b, c, d) = \Sigma m\ (1, 3, 4, 5, 7, 10, 11, 12, 14, 15)$ using K-map and draw the logic circuit using basic gates.

11. a) Express $f(ABCD) = (A + C)(B + D)$ in standard POS form.
    b) Prove that $(A + \bar{A}B) = A + B$. **(3+2)**

12. Write the truth table and logic diagram for decimal to BCD priority encoder.

13. Design Mod-5 counter using K-map.

14. Write a Verilog code for full adder.

15. Write a Verilog code for S R flip-flop.

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IV Semester B.Sc. Degree Examination, September/October 2022
(CBCS)
CHEMISTRY (Paper – IV)

Time : 3 Hours Max. Marks : 70

Instructions : 1) *The question paper has* ***two*** *Parts, answer* ***both*** *the Parts.*
2) ***Draw*** *diagram and write chemical equation* ***wherever*** *necessary.*

PART – A

I. Answer **any eight** of the following questions. **Each** question carries **2** marks. **(8×2=16)**

1) State the condensed phase rule and indicate the terms.
2) How many components are present in
   i) S (Rhombic) → S (Monoclinic)
   ii) $CaCO_3$ (s) → CaO(s) + CO_2 (g)
3) State law of constantancy of interfacial angles.
4) Define mass defect.
5) Complete the following nuclear reactions.
   i) $_4Be^9 + _1H^2 \rightarrow _5B^{10} +$ ☐
   ii) $_{12}Mg^{24} + _1H^2 \rightarrow _{11}Na^{22} +$ ☐
6) Mention two methods of treatment of water for domestic use.
7) Explain Rosenmund's reduction reaction with an example.
8) P-nitrobenzoic acid is stronger than Benzoic acid. Why ?
9) What is annealing of steel ?
10) What is photochemical smog ?
11) Explain Keto-Enol tautomerism with an example.
12) Explain Perkin condensation with example.

PART – B

II. Answer **any nine** of the following questions. **Each** carries **six** marks. **(9×6=54)**

13) a) Explain the phase diagram of water system.
    b) What is eutectic mixtures ? Give an example. **(4+2)**

P.T.O.

14) a) Explain Pattinson's process for desilverisation of lead.
    b) What is freezing mixture ? Give an example. (4+2)

15) a) Derive the Bragg's equation.
    b) What are Weiss and Miller indices ? (4+2)

16) a) Derive the relation $N = N_0 e^{-\lambda t}$ for the decay of a radioactive element.
    b) Give two applications of radioactive traces in medicine. (4+2)

17) a) Explain nuclear fission and nuclear fusion with an example for each.
    b) Write a note on carbon dating. (4+2)

18) a) Describe the production of tungsten powder from Wolframite.
    b) Write a note on hardness of water. (4+2)

19) a) Explain the process of demineralisation of water by reverse osmosis method.
    b) Explain Clemmensen reduction. (4+2)

20) a) Describe the manufacture of ferrosilicon.
    b) What are carbon steels ? How are they classified ? (4+2)

21) a) Explain the mechanism of aldolcondensation.
    b) Arrange the following in the increasing order of acid strength.
    CH_3COOH, $CH_2CHCOOH$, $ClCH_2COOH$, Cl_3CCOOH. (4+2)

22) a) Discuss the effect of substituents on the acidity of aliphatic carboxylic acids.
    b) What is Mannich reaction ? Give example. (4+2)

23) a) How are the following synthesised from diethyl malonate ?
        i) Butanoic acid
        ii) Cinnamic acid.
    b) How is acetic acid obtained from methyl cyanide ? Give reaction. (4+2)

24) a) What is the action of heat on the following ?
        i) Malonic acid
        ii) Adipic acid.
    b) How is benzaldehyde obtained by Gattermann-Koch synthesis ? (4+2)

25) a) What is acid rain ? Mention the harmful effects of acid rain.
    b) Mention any two green house gases. (4+2)

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IV Semester B.Sc. Examination, September/October 2022
(CBCS)
BIOTECHNOLOGY
Molecular Biology

Time : 3 Hours Max. Marks : 70

***Instruction** : Draw a **neat** labelled diagram **wherever** necessary.*

SECTION – A

I. Write a short notes on the following. **(5×2=10)**

1) Dispersive replication.
2) Hfr conjugation.
3) Prokaryotic promoters.
4) Protein folding.
5) Activators.

SECTION – B

II. Answer **any four** of the following. **(4×5=20)**

6) What are nucleic acids ? Explain the components of nucleic acids.
7) Define replication. Explain the role of enzymes involved in replication.
8) Give an account on Griffith's experiment.
9) Explain the transposable elements in Drosophila.
10) Briefly explain mitochondrial genome.

SECTION – C

III. Answer **any three** of the following. **(3×10=30)**

11) Describe the conjugation process in bacteria . Add a note on its significance.
12) Explain the various steps involved in prokaryotic translation.

P.T.O.

13) Enumerate the structure of DNA. Comment on different forms of DNA.

14) Discuss the process of transcription in eukaryotes.

15) Explain the mechanism of regulation of Lac-operon.

SECTION – D

IV. Answer the following in **a** word or sentence **each**. **(10×1=10)**

16) Nucleotides.

17) Chargaff's rule.

18) DNA polymerase.

19) DNA repair.

20) Plasmid.

21) Spliceosomes.

22) Capping.

23) In prokaryotes AUG is recognized by t-RNA molecule acylated with

24) Recon.

25) The transposable element found in bacteria is

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IV Semester B.Sc./B.C.A./B.S.F.A./B.S.I.D. Examination, September/October 2022
(CBCS) (Freshers and Repeaters-2019-20 Onwards)
LANGUAGE ENGLISH – IV

Time : 3 Hours Max. Marks : 70

Instructions : *1) Answer **all** the questions.*
*2) Write the **correct** question numbers.*

SECTION – A
(Prose and Poetry)

I. Answer **any five** of the following in **one** or **two** sentences **each**. **(5×2=10)**

1) In the poem 'Home Coming Son', what is the unholy stranger wearing ?

2) Slavery and Untouchability is a _____

a) Free social order

b) Unfree social order

c) Democratic order

3) Who does not need an excuse in the poem 'O, How I love your Streets' ?

4) Why was Jeyken's wife not supposed to walk by his side ?

5) What is the symbolic significance of 'evening' in the poem 'Measurements' ?

6) How did Napoleon and Snowball teach themselves to read and write ?

7) What do Mr. Pilkington and Mr. Frederick do to try to prevent animal rebellion on their own farms ?

8) Snowball's main ideal is to build the windmill. (True/False)

II. Answer **any four** of the following in about **80-100** words **each**. **(4×5=20)**

1) Bring out the characteristics of the home/native land as portrayed in the poem, 'Home Coming Son'.

2) How is Untouchability not only worse than slavery but also positively cruel as compared to slavery ?

3) Comment on the functioning of the oppressor as mentioned in the poem 'O, How I love your streets'.

P.T.O.

4) Describe the excitement of the people after the death of Ramapuram tiger.

5) What are some of the measurements to be given in the poem 'Measurements' ?

6) Explain the 'human' ways adopted by the pigs in the Novella 'Animal Farm'.

7) How did Napoleon expel Snowball from the animal farm ?

III. Answer **any one** of the following in about **200-250** words. **(1×10=10)**

1) In the process of welcoming his son back home, the poet Tsegaye Gabre highlights the pride of the rich heritage, glorious culture and black identity. Substantiate.

2) Narrate Anderson's encounter with the tigress and her cubs in the story, 'Ramapuram Tiger'.

3) Discuss the significance of the title 'Animal Farm'.

SECTION – B
(Grammar)

IV. Sonata Software Company, J. C. Road, Bangalore is inviting applications for the post of Marketing executive for their marketing division. Candidates must be graduates from a recognized university, age not above 45 years, should have prior experience in handling large accounts and IT product sales; excellent communication skills, previous experience of working in the respective region is preferred. Fresher's can also apply. **(5+5=10)**

a) Prepare a Resume appropriate to the job advertisement.

b) Write a Cover Letter for this purpose.

V. 1) Answer **any one** of the following in a paragraph. **5**

a) Mention any five points for preparing for an interview.

b) What are the precautions that one should take during a telephonic interview ?

2) Complete the following conversation in a job interview between the interviewer and the candidate. **5**

Candidate : Good Morning Sir.

Interviewer : Good Morning, _____ ?

Candidate : My name is Pranay.

Interviewer : Well, when did _____ ?

Candidate : I passed my Degree in 2005.

Interviewer : Do you _____ ?

Candidate : Yes Sir. I worked at an Auditor's firm for about ten months.

Interviewer : Good. What _____ ?

Candidate : I am interested in reading and participating in social service activities.

Interviewer : Fine. How much _____ ?

Candidate : Sir, I am expecting at least two lakhs per year.

VI. 1) Answer **any one** of the following in a paragraph. 5

a) What are the points that you need to remember to deal with people who use offensive language or body language ?

b) State some methods to motivate the candidates to participate in a Group Discussion in an even way.

2) In a Group Discussion on the topic, "Cigarette smoking is injurious to health", how would you present your views ? Write a paragraph on the topic not exceeding 80 words. 5

_____

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IV Semester B.A./B.Sc. Examination, September/October 2022
(CBCS) (Semester Scheme) (F+R)
COMPUTER SCIENCE – IV
Operating System and UNIX

Time : 3 Hours | Max. Marks : 70

Instruction : *Answer **all** the Sections.*

SECTION – A

I. Answer **any ten** questions. **Each** question carries **two** marks. **(10×2=20)**

1) Mention any two functions of operating system.
2) What is Real time operating system ?
3) What is dispatcher ?
4) What is Monitor ?
5) What are the requirements for critical section problem ?
6) What is Thrashing ?
7) What are the file attributes ?
8) Define Seek time.
9) What is the purpose of sort command ?
10) List the types of shells in UNIX.
11) What is Ownership of files ?
12) Write the syntax for cp and mv commands.

SECTION – B

II. Answer **any 5** questions. **Each** question carries **ten** marks. **(5×10=50)**

13) a) Explain any two types of Operating System in detail. 5

b) What is CPU Scheduling ? Explain different scheduling criteria. 5

P.T.O.

14) a) Explain Batch processing operating system in detail. 5

b) What are semaphores ? Explain the types of semaphores. 5

15) a) Explain any one classical problem of synchronization in detail. 5

b) Explain the concept of Deadlock Detection in detail. 5

16) a) Explain single-level directory and two-level directory. 5

b) Write a note on Segmentation. 5

17) a) Consider the reference string
{7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1} with frame size 3, explain FIFO page replacement algorithm. 5

b) Explain the functions of memory management. 5

18) a) Write a note on UNIX components. 5

b) Write a shell programming to reverse a given number. 5

19) a) Write a note on directory related commands. 5

b) Write a note on vi editor. 5

20) a) Explain any two-looping statement in shell programming. 5

b) Write a note on process communication command. 5

UG – 170

IV Semester B.A./B.Sc. Examination, September/October 2022
(Semester Scheme)
(CBCS) (F+R) (2015 – 16 and Onwards)
MATHEMATICS (Paper – IV)

Time : 3 Hours Max. Marks : 70

***Instruction** : Answer **all** Parts.*

PART – A

1. Answer **any five** questions : **(5×2=10)**
   a) Define homomorphism and isomorphism of a group.
   b) Define centre of a group.
   c) Write the formula for b_n of Fourier sine series expansion.
   d) Find the critical points of the function $f(x, y) = 2x^2 - xy + y^2 + 7x$.
   e) Find $L^{-1}\left\{\frac{5s}{s^2+9}\right\}$.
   f) Find $L\{e^{3t} \sin 5t\}$.
   g) Solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = 0$.
   h) Find the complementary function of $(D^2 - 4)y = 0$.

PART – B

Answer **any one full** question : **(1×15=15)**

2. a) Show that a subgroup H of a group G is normal subgroup iff $gHg^{-1} = H$, $\forall\, g \in G$.
   b) Let $f : G \to G'$ be a homomorphism from the group G into G′ with Kernel K, then show that f is one-one if and only if $K = \{e\}$ where e is the identity element of G.
   c) Prove that the centre of a group G is normal subgroup of G.

OR

P.T.O.

3. a) State and prove fundamental theorem of homomorphism.
   b) Prove that every group of a cyclic group is cyclic.
   c) If $f : G \to G$ be a homomorphism of a group G into itself and H is a cyclic subgroup of G then prove that f(H) is also cyclic.

PART – C

Answer **any two full** questions : **(2×15=30)**

4. a) Obtain the Fourier series for the function $f(x) = x^2$ over the interval $(-\pi, \pi)$.
   b) Obtain the half range cosine series for $f(x) = x$ in the interval $0 < x < \pi$.
   c) Expand e^{ax}cosby in Taylor's series upto second degree terms about the origin.

OR

5. a) Find the extreme value of the function $f(x, y) = x^3 + y^3 - 3x - 12y + 20$.
   b) A rectangular box, open at the top, is to have a volume of 32 cubic units, find the dimensions so that the total surface is a minimum.
   c) Obtain the half range Fourier sine series of $f(x) = (x - 1)^2$ in the interval (0, 1).

6. a) Find L{sint sin2t sin3t}.
   b) Find the Laplace transform of the function $(3t^2 + 4t + 5)(t - 3)$.
   c) Find $L^{-1}\left\{\frac{1}{s(s+1)(s+2)}\right\}$.

OR

7. a) Find $L\left\{\frac{\cos 2t - \sin 3t}{t}\right\}$.
   b) Verify convolution theorem for the function $f(t) = \sin t$, $g(t) = e^{-t}$.
   c) Find $L^{-1}\left[\log\left(\frac{s^2+1}{s(s+1)}\right)\right]$.

PART – D

Answer **any one full** question : **(1×15=15)**

8. a) Solve $(D^2 - 2D + 1)y = \sinh x$.

   b) Solve $(D^2 + 4)y = \sin^2 x$.

   c) Solve $(D^2 + D - 6)y = x$.

OR

9. a) Solve $(D^2 - 2D + 4)y = e^x \cos x$.

   b) Solve $\frac{dy}{dt} = 3x - y$; $\frac{dy}{dt} = x + y$.

   c) Solve $x\frac{d^2y}{dx^2} - \frac{dy}{dx} - 4x^3y = 8x^3 \sin(x^2)$ using the transformation $z = x^2$.

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IV Semester B.A./B.Sc. Examination, September/October 2022
(CBCS) (F + R)
MATHEMATICS – IV

Time : 3 Hours Max. Marks : 70

Instruction : *Answer* ***all*** *Parts.*

PART – A

1. Answer **any five** questions. **(5×2=10)**

   a) Show that every quotient group of an abelian group is abelian.

   b) If $f : G \to G'$ be an isomorphism then prove that $f(e) = e'$ where e and e′ are identities of G and G′ respectively.

   c) Find a_0 in the Fourier series of $f(x) = x^2$ in $(-\pi, \pi)$.

   d) Show that $f(x, y) = x^3 + y^3 - 3xy + 1$ is minimum at (1, 1).

   e) Find the Laplace transform of sin5t cos2t.

   f) Find the inverse Laplace transform of $\left[\frac{1}{(s-4)^3}\right]$.

   g) Solve : $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = 0$.

   h) Show that the equation $(1 - x^2)\, y'' - 3xy' - y = 0$ is exact.

PART – B

Answer **one full** question. **(1×15=15)**

2. a) Prove that a subgroup H of a group G is normal if and only if $gHg^{-1} \in H$, $\forall$ g, h ∈ G.

   b) If $f : G \to G'$ be a homomorphism from the group G into G′ with Kernel K then prove that K is a normal subgroup of G.

   c) If $f : (z_6, +_6) \to (z_2, +_2)$ is given by f(x) = r where r is the remainder when x is divided by 2. Show that f is a homomorphism.

   OR

P.T.O.

3. a) Prove that the product of any two normal subgroups of a group is again a normal subgroup.

   b) If $S = \{1, 2, 3, 4\}$, $f = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix}$, $g = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$ then find $f \circ g$ and $g \circ f$.

   c) State and prove fundamental theorem of homomorphism.

PART – C

Answer **any two full** questions. **(2×15=30)**

4. a) Find the Fourier series of $f(x) = x$, in $-\pi < x < \pi$.

   b) Find the half range cosine series for the function $f(x) = (x - 1)^2$ in the interval $0 < x < 1$.

   c) Obtain Taylor's expansion of $e^x \cos y$ about the point $\left(1, \frac{\pi}{4}\right)$ upto second degree terms.

OR

5. a) Find the extreme values of $f(x, y) = xy(a - x - y)$ at the point $\left(\frac{a}{3}, \frac{a}{3}\right)$.

   b) Show that a rectangular solid of maximum volume which can be inscribed in a sphere is a cube.

   c) Obtain the Fourier series of the function $f(x) = |x|$ in $(-\pi, \pi)$.

6. a) Find $L[e^{-t} \sin 4t + t \cos 2t]$.

   b) Find $L^{-1}\left[\frac{s+2}{s^2 - 2s + 5}\right]$.

   c) Express $f(t) = \begin{cases} 2t, & 0 < t < \pi \\ 1, & t > \pi \end{cases}$ in terms of unit step function and find $L\{f(t)\}$.

OR

7. a) Find $L\left[\frac{2s+3}{(s-1)(s+2)^2}\right]$.

   b) By using the convolution theorem find $L^{-1}\left[\frac{1}{(s+1)(s^2+1)}\right]$.

   c) Find $L^{-1}\left[\log\left(\frac{s^2+1}{s(s+1)}\right)\right]$.

PART – D

Answer **one full** question. **(1×15=15)**

8. a) Solve : $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = \cos 3x$.

   b) $x^2y'' + xy' - y = 2x^2$ $(x > 0)$ given that $\frac{1}{x}$ is a part of its complementary function.

   c) Solve : $(D^2 + 4D + 4)\, y = e^{2x} - e^{-2x}$.

OR

9. a) Solve : $x^2\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} = \sin(\log x)$.

   b) Solve : $\frac{dx}{dt} = 7x - y$, $\frac{dy}{dt} = 2x + 5y$.

   c) Solve by the method of variation of parameters $y'' + a^2y = \sec ax$.
