

(Pages : 12)

R – 3383

Reg. No. :

Name :

Second Semester B.Sc./B.Com./B.B.A./B.C.A./B.S.W./B.M.S./B.Voc. Degree
Examination, September 2023

Career Related First Degree Programme under CBCSS

Language Course – English

EN 1211.4/EN 1211/EN 211 : ENGLISH FOR CAREER

(2019 Admission onwards)

Time : 3 Hours

Max. Marks : 80

- I. Answer **all** the following questions. Follow the instructions given in the brackets wherever needed.
1. The correct spelling of the word 'fortresses' is _____.
 2. Another word for a film director who is involved in all the audio visual elements of his films.
 3. "World view" is another word for _____.
 4. Everybody are interested. (Underline the error).
 5. The audience comprised of students and their parents. (Correct the sentence)
 6. She will call him soon, _____? (Supply suitable question tag).
 7. She is always _____ her husband. (Use the appropriate phrasal verb which means "criticise").
 - (a) Run after
 - (b) Run down
 - (c) Run over
 - (d) Run through

P.T.O.

8. He _____ (study) music since his school days. (Use the correct tense form of the verb in brackets).
9. The antonym of the word 'economical' is _____.
10. _____ is the noun form of 'hinder'.

(10 × 1 = 10 Marks)

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

11. Provide one word substitutes for any two of the phrases.
- (a) The condition of being a candidate.
 - (b) Fraudulent emails making one reveal personal data.
 - (c) search in vain'
 - (d) diminish in size, amount or strength.
12. Give the antonyms of two of the following words.
- (a) Dynamic
 - (b) Native
 - (c) Clustered
 - (d) Urbane
13. Make sentences of your own with any two of the following phrasal verbs.
- (a) Look into
 - (b) Turn up
 - (c) Go ahead with
 - (d) Fan the flames
14. Choose the correct option from the brackets.
- (a) A leading expert in the field, her _____ include a Ph.D. and multiple research publications. (expertise/credentials)
 - (b) Numerous high-rise buildings and infrastructure projects are _____ in every corner. (winding up/mushrooming)
15. Fill in the blanks using a collective noun from those given below.
- (a) The _____ of wolves prowled stealthily through the dense forest.
 - (b) The _____ of fish moved in synchronized harmony through the coral reef.

16. Fill in the blanks using the suitable degree of the adjective given in brackets.

- (a) This book is _____ than the one I read last week. (interesting)
(b) The elephant is the _____ land mammal. (large)

Correct the error in the words given in italics.

17. (a) Reading literature *affording* a person diversion from hard work.
(b) After reading the notice I went *fumes* to my room.

18. (a) He bought a new pair of *scissor*.
(b) Measles *are* sometimes dangerous.

19. (a) She had to face numerous *hinderances* on her way to clear the Civil Service.
(b) The *privetisation* of many state-run companies has sparked a heated debate among the citizens.

20. Fill in the blanks with suitable words from those given in brackets.
(utilising, organized, disappointed, breathtaking)

The sight of Bokaro Steel Plant, the largest steel plant in India was _____ I saw hundreds of men working in an _____ way as the sweat poured off their bodies, while the molten steel flowed from the furnace like a river on fire. Impressive as the plant was, I was _____ to see that there were no industrial estates around it, _____ the steel produced here to make various products.

21. Read the paragraph and answer the question given below.

Solar energy is a renewable source of power that harnesses the energy from the sun. This clean and sustainable energy technology has got environmental benefits and long-term cost savings. Solar power is used in a variety of applications, including residential homes, commercial buildings, and even spacecraft. It offers an alternative to fossil fuels, reducing greenhouse gas emissions and dependence on non-renewable resources. As technology advances, solar energy continues to play a significant role in the global transition toward a cleaner and more sustainable energy future.

- (a) Identify the word which means 'replacement' from the passage.
(b) What are some benefits of solar power?

22. Drug abuse, a term used for obsessive and excessive use of drugs, is a common problem these days. Regular use of drugs is self-damaging. It leads to addiction and causes behavioural changes. Drug abuse particularly impacts the brain and can also lead to other health issues such as kidney failure and heart problem.

- (a) What are the health issues caused by drug abuse?
- (b) Find out the word which is synonymous to 'compulsive'.

(8 × 2 = 16 Marks)

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

23. Fill in the blanks with the correct option.

- (a) Mr Haran is a very _____ person when it comes to business. (affluent/competent)
- (b) All of us quickly _____ to his suggestion. (assented/ascended)
- (c) If he hadn't _____ me to do my work, I would have forgotten. (remembered/reminded)
- (d) Sudev always comes up with a _____ story whenever he is late to the class. (Cock and hen/cock and bull)

24. Fill in the blanks with suitable phrases from those given in brackets.

(go out, gave away, go about, got away, got over, go up)

- (a) The police are looking for two prisoners who _____ last night.
- (b) He has not yet _____ the death of his wife.
- (c) The President _____ the prizes.
- (d) Two days after the accident, people began to _____ their work as usual.

25. Correct the error in four of the following sentence.

- (a) Jim or his brother are sure to come.
- (b) Neither Paul nor I are responsible.
- (c) 'Arms and the Man' were written by G.B. Shaw.
- (d) The jury have given a unanimous verdict.

26. Correct the error in the section in italics in four of the following sentences.
- How* a delightful performance!
 - Which* a beautiful sight!
 - So* an incredible performance!
 - Oh, how* a breathtaking view from the mountaintop!
 - Wow! I'm* such excited for our vacation!
27. Fill in the blanks with the suitable pronouns from those given in brackets (his, it, you, I, me, mine, he, their, them)
- A: Did _____ see what happened at the game last night? _____ was incredible!
- B: No, _____ missed _____. What happened?
- A: The home team scored a goal in the last minute and won the match!
- B: That's amazing! _____ wish _____ had been there to witness _____.
- A: _____ was truly unforgettable! And the team captain played exceptionally well _____ scored the winning goal. _____ should definitely watch the highlights.
- B: Thanks for letting _____ know.
28. Correct the error in the sections in italics.
- Sira is the *shorter* girl in the class.
 - Her sister is *more smarter* than him.
 - The room allotted to us is *big than* all the other rooms.
 - This road is not as broad *than the* other road.
29. Fill in the blanks with suitable words from those given in brackets (reclining, understand, imagined, gossiping, happiness, bossing, prattling, narrating)
- When I was young, I always _____ old age to be a state of _____, with naps taken while _____ in an armchair, playing with all my grandchildren, _____ tales and _____ with them, _____ with friends and relatives who visited, and _____ over people in the house. Now that I am old, I _____ it better.

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

Sportsmanship is a vital aspect of any athletic endeavor. It can be conceptualized as an enduring and relatively stable characteristic or disposition that one is expected to display in sports situations. It refers to virtues such as fairness, self-control, courage and persistence and has been associated with interpersonal concepts of treating others fairly, maintaining self-control in dealing with others and respect for both authority and opponents. It goes beyond winning or losing; it's about how you play the game and treat others. A true sportsman values the spirit of competition over personal glory. In society, the principles of sportsmanship translate into valuable life lessons. It fosters character development and builds a foundation for integrity and respect in all areas of life.

- (a) The word which has a similar meaning to the word 'enduring' in the passage is _____.
- (i) Suffering (ii) Long lasting
(iii) Perishable (iv) Imminent
- (b) What does the term sportsmanship imply?
- (c) The word in the passage which means 'promote' is _____.
- (d) How does sportsmanship help society?

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

Mount Everest, standing at an awe-inspiring height of 8848 meters is the world's highest peak. It has captivated the hearts and minds of adventurers, mountaineers, and nature enthusiasts for centuries. First successfully summited by Sir Edmund Hillary and Tenzing Norgay in 1953, conquering Mount Everest has since become a symbol of human determination and endurance. Despite its allure, climbing Everest presents numerous challenges, including extreme weather conditions, treacherous terrain, and the risk of altitude-related illnesses. As a result, careful planning, physical fitness, and mountaineering expertise are essential prerequisites for those aspiring to reach its coveted summit.

- (a) The word 'captivated' in the given passage is closest in meaning to
- (i) Betray (ii) Disenchant
(iii) Fabulous (iv) Fascinate
- (b) What does conquering Mount Everest symbolize?
- (c) What are the challenges faced by mountaineers while climbing Mount Everest?
- (d) The word in the passage which means 'something required as a prior condition'.

(6 × 4 = 24 Marks)

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

GROUP A

32. Read the following passage and answer the questions given below.

If a person suddenly encounters any terrible danger, the change of nature one undergoes is equally great. Sometimes fear numbs our senses. Like animals, one stands still, powerless to move a step in fright or to lift a hand in defense of our lives, and sometimes one is seized with panic, and again, act more like the inferior animals than rational beings. On the other hand, frequently in cases of sudden extreme peril, which cannot be escaped by flight, and must be instantly faced, even the most timid men at once as if by miracle, become possessed of the necessary courage, sharp quick apprehension and swift decision. This is a miracle very common in nature. Man and the inferior animals alike, when confronted with almost certain death 'gather resolution from despair' but there can really be no trace of so debilitating a feeling in the person fighting, or prepared to fight for dear life. At such times, the mind is clearer than it has ever been, the nerves are steel, there is nothing felt but a wonderful strength and daring.

- (a) The meaning of the word 'debilitating' is
- | | |
|----------------|--------------------|
| (i) Thriving | (ii) Strengthening |
| (iii) Debasing | (iv) Weakening |
- (b) 'Gather resolution from despair' means
- | |
|--|
| (i) Find peace in times of difficulty |
| (ii) A state of utter hopelessness makes one determined to face the difficulty |
| (iii) To remain calm and not to lose hope |
| (iv) To be enthusiastic and brave the odds |
- (c) _____ is a word from the passage which means 'anxiety or fear that something bad or unpleasant will happen'.
- (d) The word 'peril' means
- | | |
|------------|-------------|
| (i) Danger | (ii) Anger |
| (iii) Fear | (iv) Trauma |

33. Answer all the following questions.

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

- (a) You, _____ are the captain of the team, have to show them the way.
- (b) I went to _____ school to meet _____ old friend who is working there as _____ teacher.
- (c) _____ moon is _____ satellite of _____ earth.
- (d) He flies everyday _____ Mumbai and Kolkata.
- (e) Soon after it took off _____ the airport, the plane fell _____ the sea.
- (f) The people sat silent _____ the concert was going on.
- (g) He was arrested _____ he had stolen the car.
- (h) _____ you pay the fee you cannot sit for the examination.
- (i) I have _____ seen her without a hat.
- (j) _____ work ends in success.

Rewrite as directed

- (k) They will honour the champion at a meeting. (Change into passive voice)
- (l) the hindu one of the leading dailies of south india has started an edition from new delhi (punctuate the sentence)
- (m) "Please do not punish the boy," I said to the teacher. (Change into indirect speech).
- (n) The scenery is beautiful. (Write as exclamatory sentence)
- (o) _____ (appoint) to guard the building, he started working today. (Use the correct form of 'appoint').

GROUP B

34. Read the passage and answer the questions given below

The two boys started in surprise at the fresh muddy imprints of a pair of bare feet. What was a barefooted man doing on the steps of a house, in the middle of London? And where was the man?

As they gazed, a remarkable sight met their eyes. A fresh footmark appeared from nowhere! Further footprints followed, one after another, descending the steps and progressing down the street. The boys followed, fascinated, until the muddy impressions became fainter and fainter, and at last disappeared altogether.

The explanation of the mystery was really simple enough. The bewildered boys had been following a scientist who had just discovered how to make the human body transparent.

Griffin, the scientist, had carried out experiment after experiment to prove that the human body could become invisible. Finally he swallowed certain rare drugs and his body became as transparent as a sheet of glass - though it also remained as solid as glass.

Brilliant scientist though he was, Griffin was rather a lawless person. His landlord disliked him and tried to eject him. In revenge Griffin set fire to the house. To get away without being seen he had to remove his clothes. Thus it was that he became a homeless wanderer, without clothes, without money, and quite invisible - until he happened to step in some mud, and left footprints as he walked!

(H.G. Wells: Footprints without Feet)

Questions

- (a) Pick out the antonym of the word 'ascending' from the passage.
- (b) The word 'bewildered' in the passage means
- | | |
|------------------|----------------|
| (i) Contemplated | (ii) Confused |
| (iii) Connived | (iv) Contained |
- (c) Pick out from the passage the one word for 'one who travels aimlessly'.
- (d) The word 'gaze' in the passage means
- | | |
|-----------------------|--------------------|
| (i) Wonder | (ii) Follow |
| (iii) Inspect closely | (iv) Look intently |

- (e) Identify the statement which is true
- (i) Griffin wanted to save humanity
 - (ii) Griffin was a law-abiding citizen
 - (iii) Griffin was a brilliant scientist
 - (iv) Griffin was kind and respectful to others
- (f) The word 'barefooted' means _____.
- (g) Find from the passage the synonym for 'unruly'.
- (h) The word 'fascinated' means
- (i) Attracted
 - (ii) Impressed
 - (iii) Simulated
 - (iv) Disenthralled
- (i) Pick from the passage the antonym for 'opaque'.
- (j) Find out the meaning of the word 'faint' in the passage.
- (k) Where is the story set?
- (l) Why were the boys surprised?
- (m) Whose were the footprints?
- (n) How did Griffin become invisible?
- (o) Based on the passage comment briefly on the character of Griffin.

OR

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

(a) You should do that what you think is right. No error.

a b c d

(b) There are several factors are important in achieving happiness. No error.

a b c d

(c) I am not agree with this idea. No error.

a b c d

(d) I rather enjoy playing football than watching it. No error.

a b c d

(e) The price for the hotel include both breakfast and dinner. No error.

a b c d

- (f) When is you going to get a new car? No error.
 a b c d
- (g) I want to tell you a little about myself. No error.
 a b c d
- (h) I was 13 when I first learnt how to ice skate. No error.
 a b c d
- (i) The lady in front was wearing a hat that was too big seeing. No error.
 a b c d
- (j) The police advised local residents not to leaving their windows
 a b
open at night. No error.
 c d
- (k) My brother is good at sport but he is very bad in English. No error.
 a b c d
- (l) The percentage in women attending university is increasing. No error.
 a b c d
- (m) Tourism can be very benefit to poorer areas. No error.
 a b c d
- (n) The advice my tutor gave was unvaluable in the exam. No error.
 a b c d
- (o) Write a letter complaint to the manager. No error.
 a b c d

(2 × 15 = 30 Marks)

(Pages : 3)

R – 3441

Reg. No. :

Name :

Second Semester B.Sc. Degree Examination, September 2023

Career Related First Degree Programme Under CBCSS

Group 2(b) – Computer Science

Foundation Course

CS 1221 : ENVIRONMENTAL STUDIES

(2021 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Very Short Answer Type)

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

1. Which is the lowest layer in terrestrial food pyramid?
2. _____ layer of atmosphere contains ozone.
3. Name the raw material for producing nuclear energy.
4. Name any one invertebrate found in India.
5. _____ is the percentage of oxygen in atmosphere.
6. _____ is the unit for recording total column ozone.
7. Expand GIS.

P.T.O.

8. Bishno is in which state of India?
9. Name any one heavy metal.
10. Mention any example of reactive waste.

(10 × 1 = 10 Marks)

SECTION – B
(Short Answer)

Not to exceed one paragraph, answer **any eight** questions. **Each** question carries 2 marks.

11. Mention any two terrestrial eco systems.
12. List any two types of broad leaves forest.
13. What is integrated crop management?
14. Define biodiversity.
15. What is biological prospecting?
16. What are mega diversity nations?
17. Define pollution.
18. List down any two types of pollution.
19. Mention any two objectives of "The air prevention and control of pollution act".
20. What do you mean by anthropogenic activity?
21. Explain Incineration process.
22. List down any two components of integrated waste management strategy.

(8 × 2 = 16 Marks)

SECTION – C
(Short Essay)

Not to exceed 120 words, answer **any six** questions. **Each** question carries **4** marks.

23. Explain about non-renewable resources.
24. Explain oxygen cycle.
25. Discuss about consumption use value and productive use value of biodiversity.
26. Discuss about any four plant species of India.
27. Discuss about pollution by hydro carbons.
28. Explain acid rain.
29. Explain about primary treatment in a sewage treatment plant.
30. Write a short note on Chipko movement.
31. Discuss on any four mitigation methods for cyclones.

(6 × 4 = 24 Marks)

SECTION – D
(Long Essay)

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

32. Discuss about various institutions in environment.
33. Discuss about genetic, species and ecosystem diversity.
34. Discuss on the causes and impacts of water pollution.
35. Explain about human population growth and its impact on environment.

(2 × 15 = 30 Marks)

(Pages : 3)

R – 3445

Reg. No. :

Name :

Second Semester B.Sc. Degree Examination, September 2023

Career Related First Degree Programme under CBCSS

Group 2(b) – Computer Science

Core Course

CS 1241 : DATA STRUCTURES

(2021 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Very Short Answer Questions)

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

1. What do you mean by non linear data structures?
2. What do you mean by array?
3. What is a graph?
4. What is a sparse matrix?
5. What is a terminal node?
6. Define an extended binary tree.
7. Which is an undirected graph?

P.T.O.

8. What do you mean by collision handling?
9. What do you mean by dequeue?
10. List out two linear data structures.

(10 × 1 = 10 Marks)

SECTION – B

(Brief Answer Questions)

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

11. Compare space and time complexity.
12. Write short note on various types of queues.
13. Write note on binary tree.
14. Explain memory representation for sparse matrices.
15. Write notes on doubly linked list.
16. What do you mean by post order traversal?
17. What is memory representation of binary tree?
18. Explain applications of queue.
19. What is the height of a tree?
20. List various types of graph and define it.
21. What do you mean by stack overflow and underflow?
22. What are the features of postfix notation?

(8 × 2 = 16 Marks)

SECTION – C

(Short Essay Type Questions)

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

23. Explain search operation in array.
24. Write short note on circular header linked list.
25. Explain operations on circular queue in detail.
26. Express following expression using an expression tree- $A*B+C-D/E+F$
27. Explain the various tree traversal operations.
28. Explain sequential search with example.
29. Write short note on insertion of a node to a binary tree.
30. Write Short note on priority queue.
31. Write Short note on collision handling.

(6 × 4 = 24 Marks)

SECTION – D

(Long essay)

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

32. Explain various types of linked list.
33. Explain insertion Sort algorithm in detail.
34. Explain various graph traversal with example.
35. Explain push and pop algorithm with example.

(2 × 15 = 30 Marks)

(Pages : 3)

R – 3449

Reg. No. :

Name :

Second Semester B.Sc. Degree Examination, September 2023

Career Related First Degree Programme under CBCSS

Computer Science

Core Course

CS 1242 : COMPUTER ARCHITECTURE AND MICROPROCESSORS

(2021 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A (Very Short Answer type)

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

1. Expand RISC.
2. What is T-State?
3. List the instructions of 8086 that affects the direction flag.
4. Name the procedure that calls itself.
5. What is the combination of instruction cycle and execution cycle known as?
6. Define Macro.
7. Which are the two interrupt pins in 8086?
8. Mention the input and output port transfer instructions.

P.T.O.

9. What is The Position of The Stack Pointer After The Pop Instruction?
10. What is a bus?

(10 × 1 = 10 Marks)

SECTION – B (Short Answer)

(Not to exceed **one** paragraph, answer any **eight** questions. Each question carries **2** marks)

11. Discuss the need for timing diagram.
12. How is the operating mode of 8086 decided?
13. Discuss the function of interrupt flag of 8086.
14. What is asynchronous data transfer?
15. List the addressing modes available in 8086.
16. Write about EVEN directive in 8086 ALP.
17. What is the function of 8257?
18. Why is data bus bi-directional?
19. What is interrupt acknowledge cycle?
20. State the disadvantages of macro.
21. Discuss the function of ESC and LOCK instruction.
22. What are pseudo instructions?

(8 × 2 = 16 Marks)

SECTION – C (Short Essay)

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

23. Discuss how 20-bit physical address is computed in 8086?
24. What is HOLD and HLDA? How is it used?
25. (a) What is a bus cycle?
(b) What is the need for timing diagram?
26. State the difference between software and hardware interrupts.
27. Explain what happens when XCHG and XLAT instructions are executed. Give examples.
28. Describe the characteristics of RISC and CISC processors.
29. Compare macro and a procedure.
30. What is an assembler? Describe the function of an assembler.
31. What is stack? Explain the stack structure of 8086 microprocessor with diagram.

(6 × 4 = 24 Marks)

SECTION – D (Long Essay)

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

32. With a neat block diagram explain the architecture of 8086 microprocessor.
33. (a) Explain with necessary circuit how separate read and write signals are generated for memory and I/O devices.
(b) Compare memory mapped I/O and standard I/O mapped I/O.
34. Discuss
(a) Various unconditional and conditional jump instructions of 8086.
(b) Iteration control instructions.
35. Explain procedure and its types with suitable examples.

(2 × 15 = 30 Marks)

(Pages : 4)

R – 3451

Reg. No. :

Name :

Second Semester B.Sc. Degree Examination, September 2023

Career Related First Degree Programme under CBCSS

Mathematics

Complementary Course for Computer Science

MM 1231.10 : MATHEMATICS II-DISCRETE MATHEMATICS

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

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

1. Find the negation of the statement "New Delhi is in India",
2. Define contradiction.
3. Define consistent premises.
4. If $P(x) = \{(-x)^2 = x^2\}$, where the universe consists of all real numbers, find the truth value of $\forall x ((-x)^2 = x^2)$.
5. What is rule ES?
6. Prove that if $\{L, \leq\}$ is a lattice, then $a \vee b = b \vee a$ for any a, b .
7. Define group code.

P.T.O.

8. What is the generating function of a sequence?
9. Prove that $(a * b)^{-1} = b^{-1} * a^{-1}$.
10. Find the weight of the code 1101.

(10 × 1 = 10 Marks)

SECTION – II

Answer any **eight** questions. These questions carry **2** mark each.

11. Define disjunctive and conjunctive normal forms.
12. Find the PCNF of $p \leftrightarrow q$.
13. Define universal and existential quantifiers.
14. Define LUB and GLB of a subset of a poset.
15. Show that cancellation laws are true in a group.
16. Find the Hamming distance between the two codes 010101 and 101010.
17. What is an abelian group. Give example.
18. Define idempotent element and find the number of idempotent elements in a group.
19. Explain poset and lattice.
20. What is the law of duality?
21. Define biconditional proposition.
22. Explain Hasse diagram.

(8 × 2 = 16 Marks)

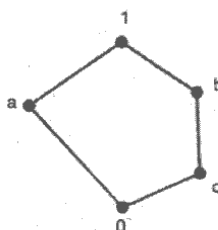
SECTION – III

Answer any six questions. These questions carry 4 marks each.

23. Draw the Hasse diagram for the "less than or equal to" relation on $\{0, 2, 5, 10, 11, 15\}$ starting from the digraph.
24. Explain partition of a set and block of a partition with example.
25. Draw the digraph representing the partial ordering $\{(a, b)/a \text{ divides } b\}$ on the set $\{1, 2, 3, 4, 5, 6, 7, 8\}$. Reduce it in to the Hasse diagram representing the given partial ordering.
26. Solve the recurrence relation $a_n = 2a_{n-1} + 2n; a_0 = 2$.
27. If the minimum distance between two codewords is 3, 4 and 5, how many errors can be detected and how many can be corrected?
28. Find the codewords generated by the encoding function $e: B^2 \rightarrow B^5$ with respect

to the parity check matrix $H = \begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

29. Find a formula for the general term F_n of the Fibonacci sequence $0, 1, 1, 2, 3, 5, 8, 13, \dots$
30. Construct the truth table for the compound proposition $((p \rightarrow (q \rightarrow r)) \rightarrow ((p \rightarrow q) \rightarrow (p \rightarrow r)))$.
31. Verify whether the lattice given by the following Hasse diagram is distributive.



(6 × 4 = 24 Marks)

SECTION – IV

Answer any **two** questions. These questions carry **15** marks each.

32. (a) If $\{L, \geq\}$ is a lattice in which \vee and \wedge denote join and meet respectively, then for $a, b \in L, a \leq b \Leftrightarrow a \vee b = b \Leftrightarrow a \wedge b = a$.

(b) For any $a, b, c \in L$,

(i) $a \wedge (b \vee c) \geq (a \wedge b) \vee (a \wedge c)$

(ii) $a \vee (b \wedge c) \geq (a \vee b) \wedge (a \vee c)$

33. Show that the set Q^+ of all positive rational numbers form an abelian group under the operation $*$ defined by $a * b = \frac{ab}{2}, a, b \in Q^+$.

34. Construct the decoding table for the group code given by the generator matrix $G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 0 \end{bmatrix}$. Use the decoding table to decode the received words 000110, 000011, 000101, 110001, 101001, 011111.

35. Solve the recurrence relation $a_{n+1} - a_n = 3n^2 - n; n \geq 0, a_0 = 3$.

(2 × 15 = 30 Marks)