

# CBCS SCHEME

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21CS51

## Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Automata Theory and Compiler Design

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define the following terms :
  - i) String      ii) Language      iii) Alphabet      iv) Length of string (04 Marks)
- b. Explain the various phases of compiler with neat diagram. (08 Marks)
- c. Define DFA and design a DFA to accept the following language:
  - i) To accept strings having even number of a's and odd number of b's. (08 Marks)
  - ii) To accept strings of a's and b's not having the substring aab. (08 Marks)

**OR**

- 2 a. Design the equivalent DFA to the following  $\epsilon$ -NFA.



(05 Marks)

- b. Minimize the following DFA by identifying distinguishable and non-distinguishable states.

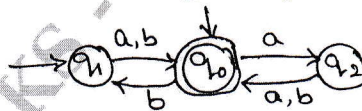
$\delta$	0	1
→ A	B	F
B	G	C
* C	A	C
D	C	G
E	H	F
F	C	G
G	G	H
H	G	C

(10 Marks)

- c. With neat diagram explain the components of language processing system in detail. (05 Marks)

### Module-2

- 3 a. Define Regular Expressions. Write a regular expressions for the following :
  - i)  $L = \{a^n b^m \mid n+m \text{ is even}\}$
  - ii) The set of all strings whose 3<sup>rd</sup> symbol from right end is 0
  - iii)  $L = \{a^{2n} b^{2m} \mid n \geq 0, m \geq 0\}$  (10 Marks)
- b. Convert the following automata to a regular expression.



(04 Marks)

- c. Explain the concept of input buffering in the Lexical Analysis along with sentinels. (06 Marks)

**OR**

- 4 a. State and prove Pumping Lemma for regular languages and also prove the language  $L = \{a^n b^n \mid n \geq 0\}$  is not a regular. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- b. Construct  $\epsilon$ -NFA for the following regular expression  
 $(0 + 11)0^*1$  (04 Marks)
- c. Define Token, Lexeme and Pattern with example. (06 Marks)

**Module-3**

- 5 a. Define CFG. Write a CFG to the following languages.  
 i) All strings over  $\{a, b\}$  that are even and odd Palindromes.  
 ii)  $L = \{a^n \mid n \geq 0\}$  (10 Marks)
- b. Define ambiguity. Consider the grammar  $E \rightarrow E + E \mid E * E \mid (E) \mid id$   
 Construct the leftmost and rightmost derivation, parse tree for the string  $id + id * id$ .  
 Also show that the grammar is ambiguous. (10 Marks)

**OR**

- 6 a. Consider the CFG given below with the production set, compute the following for the same.  
 (i) First() and Follow() set (ii) Predictive Parsing table  
 Grammar is,  
 $E \rightarrow TE'$   
 $E' \rightarrow +TE' \mid E$   
 $T \rightarrow FT'$   
 $T' \rightarrow *FT' \mid E$   
 $F \rightarrow (E) \mid id$  (14 Marks)
- b. Write an algorithm to eliminate left recursion from a grammar. Also eliminate left recursion from the grammar  
 $S \rightarrow Aa \mid b$   
 $A \rightarrow Ac \mid Sd \mid \epsilon$  (06 Marks)

**Module-4**

- 7 a. Define PDA. Design PDA for the language  $L = \{WCW^R \mid W \in (a, b)^*\}$  and also show the Instantaneous Description (ID) for the input  $aabCbaa$ . (10 Marks)
- b. Construct LR(0) automata for the grammar given below.  
 $S \rightarrow L = R \mid R$   
 $L \rightarrow *R \mid id$   
 $R \rightarrow L$  (10 Marks)

**OR**

- 8 a. Define shift reduce Parser and Handle. Also list and explain the different actions operations available in Bottom up parser. (10 Marks)
- b. Construct the LR(1) automata for the given grammar.  
 $S \rightarrow AA$   
 $A \rightarrow aA \mid b$  (10 Marks)

**Module-5**

- 9 a. Design a Turing machine to accept the language  $L = \{0^n 1^n 2^n \mid n \geq 1\}$  (10 Marks)
- b. Write a short note on the following :  
 (i) Post correspondence problem (ii) Design issues in code generation (10 Marks)

**OR**

- 10 a. Translate the arithmetic expression  $a = b * -c + b * -c$  into  
 (i) Three address code (ii) Quadruple (iii) Triple (10 Marks)
- b. Write a short note on :  
 (i) Decidable language (ii) Halting problems in Turing machines. (10 Marks)

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21CS52

## Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Computer Networks

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define Computer Networks. Explain local area network in detail with a neat diagram. (06 Marks)  
b. Explain MAN with a neat labelled diagram. (06 Marks)  
c. List and explain design issues for layer. (08 Marks)

OR

- 2 a. What are guided transmission media? Explain twisted pair cable in detail. (06 Marks)  
b. Explain TCP/IP reference model with a neat labelled diagram. (10 Marks)  
c. Briefly discuss virtual private networks. (04 Marks)

### Module-2

- 3 a. List and explain any two data link layer design issues. (10 Marks)  
b. A bit stream transmitted using standard CRC method. The generator polynomial is  $X^3 + 1$ .  
i) What is actual bit string transmitted  
ii) Suppose 3<sup>rd</sup> bit from the left is inverted during transmission, how will receiver detect this error? (10 Marks)

OR

- 4 a. Explain Go-Back-N protocol working. (10 Marks)  
b. Briefly explain static channel and dynamic channel allocation problem. (10 Marks)

### Module-3

- 5 a. Write an Dijkstra's algorithm to compute shortest path through graph. Explain with example. (10 Marks)  
b. Illustrate working of OSPF and BGP. (10 Marks)

OR

- 6 a. What is congestion control? List and explain various approaches to congestion control. (12 Marks)  
b. What is packet scheduling algorithm? Explain FIFO algorithm. (08 Marks)

### Module-4

- 7 a. Write a program for congestion control using leaky bucket algorithm. (10 Marks)  
b. Briefly explain about transport service primitives. (10 Marks)

OR

- 8 a. With a neat labelled diagram, explain TCP segment structure. (10 Marks)  
b. Explain TCP connection management with TCP connection management FSM diagram. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-5

- 9 a. Explain client/server and P-P architecture with a neat labelled diagram. (10 Marks)
- b. Explain use and server interaction with a neat diagram. (10 Marks)

OR

- 10 a. Explain persistent and non persistent http in details. (10 Marks)
- b. Write notes on:
  - (i) E-mail in the internet
  - (ii) Distributed DNS architecture (10 Marks)

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21CS53

**Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024**

## Database Management Systems

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define DBMS. Explain all the basic operations that can be performed by DBMS on a database. (05 Marks)
- b. Explain the different users of a database system. (10 Marks)
- c. Describe the 3-Schema Architecture. (05 Marks)

OR

- 2 a. Define the following terms:
  - i) Data model
  - ii) Schema
  - iii) Insurance
  - iv) Canned transaction(04 Marks)
- b. Describe the structural constraints of a database system with suitable example. (10 Marks)
- c. Explain all the E-R diagram notations. (06 Marks)

### Module-2

- 3 a. Explain the four relational model constraints. (06 Marks)
- b. Explain all the steps of Relational database design using E-R to relational schema with a suitable example. (06 Marks)
- c. Discuss the DIVISION operation of relational algebra. Find the Quotient for the following :

A =

SNO	DNO
S <sub>1</sub>	P <sub>1</sub>
S <sub>1</sub>	P <sub>2</sub>
S <sub>1</sub>	P <sub>3</sub>
S <sub>1</sub>	P <sub>4</sub>
S <sub>2</sub>	P <sub>1</sub>
S <sub>2</sub>	P <sub>2</sub>
S <sub>3</sub>	P <sub>2</sub>
S <sub>4</sub>	P <sub>2</sub>
S <sub>4</sub>	P <sub>4</sub>

B<sub>1</sub> =

PNO
P <sub>2</sub>

B<sub>2</sub> =

PNO
P <sub>2</sub>
P <sub>4</sub>

B<sub>3</sub> =

PNO
P <sub>1</sub>
P <sub>2</sub>
P <sub>4</sub>

Find i) A/B<sub>1</sub>      ii) A/B<sub>2</sub>      iii) A/B<sub>3</sub> (08 Marks)

OR

- 4 a. Explain the characteristics of a relational model. (06 Marks)
- b. Explain all types of outer join operations in relational algebra. Demonstrate the advantage of outer join operation over the inner join operation. (06 Marks)
- c. Considering the following schema  
 Sailors (sid, sname, rating, age)  
 Boats (bid, bname, color)  
 Reserves (sid, bid, day)  
 Write a relational algebra queries for the following :
  - i) Find the names of sailors who have reserved boat#103.
  - ii) Find the names of sailors who have reserved a red boat.
  - iii) Find the names of sailors who have reserved a red or green boat.
  - iv) Find the names of sailors who have reserved all boats. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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**Module-3**

- 5 a. Explain the basic data types available for attributes in SQL. (05 Marks)  
 b. Demonstrate the following constraints in SQL with suitable example:  
 i) NOT NULL ii) Primary key iii) Foreign key iv) Default v) Check. (10 Marks)  
 c. What are triggers? Explain with syntax and suitable example. (05 Marks)

**OR**

- 6 a. Explain the basic definition of a cursor and its usage with the help of a suitable example. (05 Marks)  
 b. What are Assertions? Assuming suitable company schema write an Assertion for the condition.

“The salary of an Employee must not be greater than the salary of the manager of the department that the employee works for”. (05 Marks)

- c. Referring to the below mentioned company schema. Write the SQL queries for the following:  
 Employee

Fname	Lname	Minit	Ssn	Bdate	Address	Sex	Salary	SuperSsn	Dno
-------	-------	-------	-----	-------	---------	-----	--------	----------	-----

Department

Dname	Dnumber	Mgr_Ssn	Mgr_start_date
-------	---------	---------	----------------

Department location

Dnumber	Dlocation
---------	-----------

Project

Pname	Pnumber	Plocation	Dnum
-------	---------	-----------	------

Work\_on

Essn	DNo	HRS
------	-----	-----

Defendant

Essn	Dependentname	Sex	Bdate
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- i) For each department retrieve the department number, the number of employees in the department and their average salary.  
 ii) For each project on which more than 2 employees work, retrieve the project number, the project name and the number of employees who work on the project.  
 iii) For each project, retrieve the project number, the project name and the number of employees from department no. 5 who work on that project.  
 iv) For each department that has more than 5 employees, retrieve the department number and the number of its employees who are making more than \$40,000 salary.  
 v) Retrieve the names of an employees who have two or more dependents. (10 Marks)

**Module-4**

- 7 a. Explain the types of update anomalies with examples. (05 Marks)  
 b. Explain Armstrong's rules of inference. (05 Marks)  
 c. What is the need for normalization? Explain 1NF, 2NF and 3NF with examples. (10 Marks)

**OR**

- 8 a. Explain the informal design guidelines of a database. (06 Marks)  
 b. What is equivalence of sets of functional dependencies? Check whether the following sets of F.D's are equivalent or not.

$$FD_1 = \{A \rightarrow B, B \rightarrow C, AB \rightarrow D\}$$

$$FD_2 = \{A \rightarrow B, B \rightarrow C, A \rightarrow C, A \rightarrow D\}$$

- c. Write an algorithm to find the closure of functional dependency 'F'. (06 Marks)

**Module-5**

- 9 a. Explain the desirable properties of a transaction. (06 Marks)  
 b. Explain with a neat diagram, the state transition diagram of a transaction. (06 Marks)  
 c. Explain two phase locking mechanism with suitable example. (08 Marks)

**OR**

- 10 a. Discuss on the database inconsistency problem. (10 Marks)  
 b. Explain Binary locks and shared locks with algorithms. (10 Marks)



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21CS54

## Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

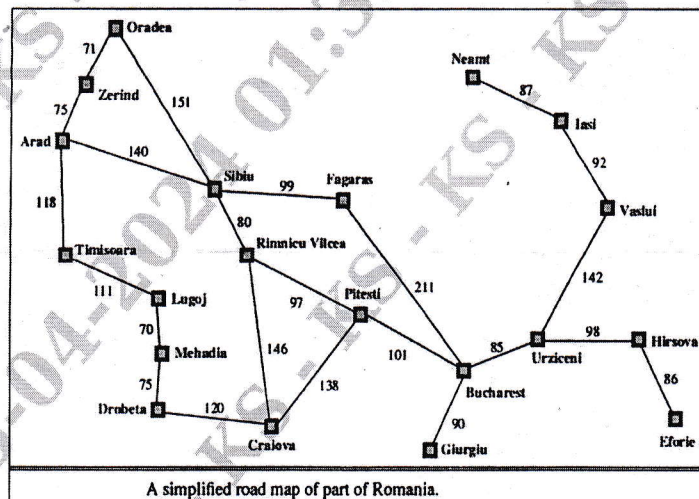
- 1 a. Identify the Turing test approach to provide a satisfactory operational definition of Intelligence. (04 Marks)
- b. Make use of the state space of the vacuum world and define the components to solve this problem. (06 Marks)
- c. Illustrate the properties and the algorithm for Breadth-first search technique. (10 Marks)

OR

- 2 a. Explain the concepts of thinking rationally and acting rationally. (04 Marks)
- b. Explain the tree search and graph search algorithms. (06 Marks)
- c. Explain problem solving agents alongwith the algorithm and illustrate the incremental formulation of 8-Queens problem. (10 Marks)

### Module-2

- 3 a. Identify the differences between supervised and unsupervised learning. (04 Marks)
- b. Explain the types of Big data. (06 Marks)
- c. Apply A\* algorithm to find the best path from Arad to Bucharest. [Refer Fig.Q3(c)].



A simplified road map of part of Romania.

Arad	366	Mehadia	241
Bucharest	0	Neamt	234
Craiova	160	Oradea	380
Drobeta	242	Pitesti	100
Eforie	161	Rimnicu Vilcea	193
Fagaras	176	Sibiu	253
Giurgiu	77	Timisoara	329
Hirsova	151	Urziceni	80
Iasi	226	Vaslui	199
Lugoj	244	Zerind	374

Values of  $h_{SLD}$ —straight-line distances to Bucharest.

Fig.Q3(c)

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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OR

- 4 a. Explain the machine learning process model along with diagram. (06 Marks)  
 b. Consider the table given below which contains the machine learning course registration done by both boys and girls. There are 50 boys and 50 girls in the class and the registration of the course is given in the table. Apply Chi-square test and find out whether any differences exist between boys and girls for course registration.

Table 4(b)

Gender	Registered	Not Registered	Total
Boys	35	15	50
Girls	25	25	50
Total	60	40	100

(06 Marks)

- c. Apply the heuristic search algorithm on the given 8 puzzle problem to reach the goal state from the given initial state.

Initial State			Final State		
1	2	3	1	2	3
	4	6	4	5	6
7	5	8	7	8	

Fig.Q4(c)

(08 Marks)

**Module-3**

- 5 a. Consider the training dataset of 4 instances shown in the table below. Apply Find-S algorithm to find the final hypothesis.

Table 5(a)

CGPA	Interactiveness	Practical Knowledge	Communication Skills	Logical Thinking	Interest	Job Offer
29	Yes	Excellent	Good	Fast	Yes	Yes
29	Yes	Good	Good	Fast	Yes	Yes
28	No	Good	Good	Fast	No	No
29	Yes	Good	Good	Slow	No	Yes

(08 Marks)

- b. Explain why Instance based learners are called lazy learners and compare instance based learning and model based learning. (06 Marks)  
 c. Explain the types of Regression methods with diagram. (06 Marks)

OR

- 6 a. Consider the student performance training dataset of 8 data instances in the below table. Based on the performance of a student, classify the test instance (6.1, 40, 5) to check whether the student will pass or fail in that course using KNN approach (K = 3).

Table 6(a)

S.No.	CGPA	Assessment	Project Submitted	Result
1	9.2	85	8	Pass
2	8	80	7	Pass
3	8.5	81	8	Pass
4	6	45	5	Fail
5	6.5	50	4	Fail
6	8.2	72	7	Pass
7	5.8	38	5	Fail
8	8.9	91	9	Pass

(12 Marks)

- b. Explain version space and the candidate elimination algorithm explaining the algorithm steps. (08 Marks)



**Module-4**

- 7 a. Explain the advantages and disadvantages of decision trees. (06 Marks)  
 b. Explain validating and pruning of decision trees. (06 Marks)  
 c. Explain Bayes optimal classifier and solve to find whether a patient is diagnosed as COVID positive or COVID negative using the table given below.

Table 7(c)

P( $h_i/T$ )	P(COVID positive)	P(COVID negative/ $h_i$ )
0.3	0	1
0.1	1	0
0.2	1	0
0.1	1	0

(08 Marks)

**OR**

- 8 a. Explain the procedure to construct a decision tree using ID3 algorithm. (06 Marks)  
 b. Explain Bayes theorem, Maximum A Posteriori (MAP) Hypothesis ( $h_{MAP}$ ) and Maximum Likelihood (ML) Hypothesis ( $h_{ML}$ ). (06 Marks)  
 c. Illustrate the algorithm of Naïve Bayes and explain the popular variants of Bayesian classifier. (08 Marks)

**Module-5**

- 9 a. Explain the different activation functions used in ANN. (06 Marks)  
 b. Illustrate the various types of Artificial Neural Networks. (08 Marks)  
 c. Illustrate the applications and challenges of Clustering algorithms. (06 Marks)

**OR**

- 10 a. Explain the perceptron model and the algorithm. (08 Marks)  
 b. Consider the following set of data given in the below table. Cluster it using K-means algorithm with the initial value of objects 2 and 5 with the coordinate values (4, 6) and (12, 4) as initial seeds.

Table 10(b)

Objects	X-coordinate	Y-coordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

(12 Marks)

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**Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024**  
**Research Methodology & Intellectual Property Rights**

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

**Module-1**

- 1 a. What is Engineering Research? What are the primary objectives of conducting research in engineering? (10 Marks)  
b. What are the various types of engineering research? Explain. (10 Marks)

**OR**

- 2 a. Explain Fabrication, Falsification and Plagiarism related to Engineering research. (10 Marks)  
b. What ethical considerations and responsibilities should be taken into account when determining authorship in Engineering research? (10 Marks)

**Module-2**

- 3 a. How do researchers distinguish between new and existing knowledge during a literature review? (10 Marks)  
b. How can researchers effectively use search engines to find relevant literature in their fields? (10 Marks)

**OR**

- 4 a. What challenges do researchers commonly face when reading mathematical content or algorithm? (10 Marks)  
b. What is impact of Title and Keywords on Citations? Explain Citation based knowledge flow. (10 Marks)

**Module-3**

- 5 a. What is definition of Intellectual Property (IP)? In what way does Intellectual Property contribute to economic growth and cultural development in a society? (10 Marks)  
b. Discuss the history of Intellectual property in India. (10 Marks)

**OR**

- 6 a. Explain the step by step process of obtaining a patent. From the initial idea to the grant of the patent. (10 Marks)  
b. What are the commonly used terms in the field of patenting and how do they contribute to effective communication in this domain. (10 Marks)

**Module-4**

- 7 a. Explain the criteria that an original work must meet to qualify for copyright protection. (10 Marks)  
b. Explain the process of copyright registration? What are the benefits for the copy right holders? (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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OR

- 8 a. Explain the process of Trademark registration. (10 Marks)  
b. Explain the classification system for trademarks and its role in categorizing different types of marks. (10 Marks)

Module-5

- 9 a. Explain the process of Industrial design registration. (10 Marks)  
b. Explain the famous case law between Apple Inc Vs Samsung Electronics Co. related with Industrial Design rights. (10 Marks)

OR

- 10 a. Which specific acts, laws and rules govern geographical indications in India? Give some examples of well known geographical indications registered in India. (10 Marks)  
b. How would you describe the overall ecosystem and significance of geographical indications in India? (10 Marks)

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Question Paper Version : D

**Fifth Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan. 2024**  
**Environmental Studies**

Time: 1 hr.]

[Max. Marks: 50

### INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

- 
- 1 GIS uses the information from which of the following sources  
a) Non-Spatial Information System  
b) Spatial Information System  
c) Global Information System  
d) Position Information System
  - 2 EIA can be expanded as  
a) Environment and Industrial Act  
b) Environmental and Impact Activities  
c) Environmental Impact Assessment  
d) Environmental Impact Activity
  - 3 ISO 14000 standards deals with  
a) Pollution management  
b) Risk management  
c) Environmental management  
d) None of these
  - 4 Which of the following represents India in ISO  
a) PFRDA  
b) FSSAI  
c) BIS  
d) BCCI
  - 5 Which of the following is having high population density  
a) India  
b) China  
c) USA  
d) Western Europe
  - 6 Environment education is targeted to  
a) General public  
b) Professional social groups  
c) Technical and Scientists  
d) All of the above



- 7 Discharge of municipal waste cause  
a) Depletion of dissolved oxygen  
b) Destroy aquatic life  
c) Impair biological activity  
d) All of the above
- 8 \_\_\_\_\_ is are referred to a Earth's lungs  
a) Forests                      b) Carbon cycle                      c) Water sources                      d) Miner
- 9 Solid waste is best managed through  
a) Incineration                      b) Open dumping                      c) Sanitary landfill                      d) Composting
- 10 Love canal tragedy is attributed to  
a) Soil pollution                      b) Hazardous waste                      c) Air pollution                      d) None of these
- 11 Disaster management includes \_\_\_\_\_  
a) Mitigation                      b) Reconstruction                      c) Rehabilitation                      d) All of these
- 12 What is the health effects of fluoride in drinking waster  
a) Arthritis                      b) Diarrhea                      c) Anemia                      d) All of these
- 13 What is the permissible range of pH for drinking water as per Indian standards  
a) 6 – 9                      b) 6 – 8.5                      c) 6.5 – 8.5                      d) 6.5 – 7.5
- 14 The infiltration of water into the subsurface is the  
a) Influent                      b) Effluent                      c) Discharge                      d) Recharge
- 15 Environmental (Protection Act) was enacted in the year  
a) 1986                      b) 1992                      c) 1984                      d) 1974
- 16 What is the full form of NGO  
a) Non-Governmental Organization  
b) Non-Governance Organizations  
c) No- Governance Organizations  
d) Null – Governmental organizations
- 17 The primary cause of acid rain around the world is  
a) CFC                      b) SO<sub>2</sub>                      c) CO                      d) O<sub>3</sub>
- 18 Bhopal Gas Tragedy caused due to leakage of  
a) Methyl ISO Cyanate (MIC)                      b) Sulphur dioxide  
c) Mustered gas                      d) Methane
- 19 Deforestation can  
a) Increase the rainfall  
b) Increase soil fertility  
c) Introduce silt in the river  
d) None of the above
- 20 The word Environment is derived from  
a) Greek                      b) French                      c) Spanish                      d) English
- 21 According to Biomedical Waste (Management and Handling) Rules 1998, waste should not be stored beyond \_\_\_\_\_  
a) 12 hours                      b) 48 hours                      c) 72 hours                      d) 96 hours

- 22 Pyrolysis is an \_\_\_\_\_ process  
a) Exothermic                      b) Endothermic                      c) Both a and b                      d) Neither a and b
- 23 Chlorofluorocarbons are  
a) Nontoxic                      b) Flammable                      c) Corrosive                      d) Odorous
- 24 Which of the following is an air pollutant  
a) Carbon dioxide                      b) Oxygen                      c) Nitrogen                      d) Particulate matter
- 25 Urbanization is  
a) Local environmental issue  
b) Nation environmental issue  
c) Both a and b  
d) Not at all an issue
- 26 Earth day is held every year on :  
a) June 5<sup>th</sup>                      b) November 23<sup>rd</sup>                      c) April 22<sup>nd</sup>                      d) January 26<sup>th</sup>
- 27 The term hotspot was introduced by –  
a) Norman Myere                      b) Jacob Von Verkul  
c) A.G. Transley                      d) Ernst Haeckel
- 28 In an Ecosyste, the energy flow is always  
a) Always unidirectional  
b) Always bidirectional  
c) In any direction  
d) Always down directional
- 29 Which of the following is considered as an alternate fuel  
a) CNG                      b) Kerosene                      c) Coal                      d) Petrol
- 30 Nuclear power plant in Karnataka is located at  
a) Bhadravati                      b) Sandur                      c) Raichur                      d) Kaiga
- 31 The main cause of damage to Taj Mahal is \_\_\_\_\_  
a) Water pollution                      b) Soil pollution                      c) Acid rain                      d) Fog
- 32 Reducing the amount of future climate change is called.  
a) Mitigation                      b) Geo-engineering                      c) Adaptation                      d) None of these
- 33 Ozone layer is at a height of \_\_\_\_\_ above the Earth's surface  
a) 19 to 48m                      b) 19 to 480m                      c) 19 to 48km                      d) 190 to 480km
- 34 Which ministry is mainly responsible for research and development in renewable energy sources such as wind, power small hydro, biogas and solar power  
a) Human Resource Development  
b) Agriculture and Famous welfare  
c) Ministry of new and Renewable energy  
d) Health and Family welfare
- 35 The OTEC is an energy technology that converts  
a) Energy in large fides of ocean to generate electricity  
b) Energy in ocean waves to generate electricity  
c) Energy in ocean due to thermal gradient to generate electricity  
d) Energy in the fast moving ocean currents to generate electricity



- 36 In a Lake, phytoplankton grow in abundance in  
a) Littoral zone                      b) Limnetic zone                      c) Profundal zone                      d) Benthic region
- 37 The prescribed limits of noise in residential area during day is  
a) 55dB                                      b) 45dB                                      c) 60dB                                      d) 50dB
- 38 The maximum allowable concentration of fluorides in drinking water  
a) 3mg/L                                      b) 2mg/L                                      c) 2.5mg/L                                      d) 1.5mg/L
- 39 The color code of plastic bag for disposing microbial laboratory culture waste  
a) Red    b) Black    c) Blue    d) White
- 40 The hazardous pollutant released from batteries is  
a) Arsenic                                      b) Cobalt                                      c) Barium                                      d) Cadmium
- 41 Biodiversity is a measure of variation at the \_\_\_\_\_ level  
a) Genetic                                      b) Species                                      c) Ecosystem                                      d) All of these
- 42 World Environment Day is celebrated on \_\_\_\_\_  
a) 5<sup>th</sup> May                                      b) 5<sup>th</sup> June                                      c) 18<sup>th</sup> June                                      d) 16<sup>th</sup> August
- 43 Mining means  
a) To conserve minerals                                      b) To check pollution  
c) To extract minerals and ores                                      d) None of these
- 44 Direct conversion of solar energy is attained by  
a) Solar Photo volcanic system  
b) Solar diesel hybrid system  
c) Solar thermal system  
d) Solar air heater
- 45 What % of its geographical area of a country should be under forest cover  
a) 23%                                      b) 43%                                      c) 13%                                      d) 33%
- 46 Hazardous Waste Management Act was enacted in India in the year  
a) 1988                                      b) 1989                                      c) 1990                                      d) 1991
- 47 Which of these following elements is the case of e-waste?  
a) Cadmium                                      b) Beryllium                                      c) Lead                                      d) All of these
- 48 Remote sensing techniques make use of the properties of \_\_\_\_\_ emitted, reflected or diffracted by the sensed objects  
a) Electric waves                                      b) Sound waves  
c) Electromagnetic waves                                      d) Wind waves
- 49 The altitudinal distance of a geostationary satellite from the earth is about  
a) 26,000km                                      b) 30,000km                                      c) 36,000km                                      d) 44,000km
- 50 Montreal protocol is related to the  
a) Food security                                      b) Global warming  
c) Sustainable development                                      d) Ozone layer depletion

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