

# CBCS SCHEME

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21CD51

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

## Object Oriented Modelling and Design

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Compare the following terms with appropriate example :  
i) Aggregation versus association (10 Marks)  
ii) Aggregation versus composition (10 Marks)  
b. Define Association End. List and explain the properties of associated end. (10 Marks)

OR

- 2 a. Explain the following terms with example i) Metadata ii) Rectification. (10 Marks)  
b. Define Event. Explain different kinds of event with example. (10 Marks)

### Module-2

- 3 a. List and explain the rules for developing state charts. (10 Marks)  
b. Define SSD. What are steps to develop SSD based on activity diagram? (10 Marks)

OR

- 4 a. Define use case diagram, explain notations used in usecase diagram with example. (10 Marks)  
b. Explain the process of developing ORDERITEM statechart with the help of state diagram. (10 Marks)

### Module-3

- 5 a. List and explain stages of software development processes. (10 Marks)  
b. Explain the system concept for an automated Teller machine with the help of problem statement. (10 Marks)

OR

- 6 a. List and explain the criteria's to eliminate unnecessary and incurrent attributes. (10 Marks)  
b. List and explain the steps to construct a domain state model. (10 Marks)

### Module-4

- 7 a. Explain the primary responsibility of view layer. (10 Marks)  
b. Explain Encapsulation information hiding and cohesion. (10 Marks)

OR

- 8 a. Explain the steps to be involved in developing first cut sequence diagram. (10 Marks)  
b. Explain the process of designing with communication diagrams. (10 Marks)

### Module-5

- 9 a. Explain the applicability, structure benefits and liabilities of abstract factory pattern. (10 Marks)  
b. Explain process of how design pattern solve design problem. (10 Marks)

OR

- 10 Write short notes on :  
a. Structural pattern  
b. Creational pattern  
c. Adopter design pattern  
d. Proxy pattern (20 Marks)

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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.

## Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 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. Discuss OSI Reference model with a neat diagram. (10 Marks)
- b. Explain Unicast, Multicast and broadcast in computer networks. (10 Marks)

OR

- 2 a. Discuss the following transmission medium with diagram,  
(i) Co-axial cable. (10 Marks)  
(ii) Fibre optic cable. (10 Marks)
- b. Explain the design issues in computer networks. (10 Marks)

### Module-2

- 3 a. Explain error detecting codes and obtain the CRC code for the frame given polynomial 1101011111 using the generator  $G(x) = x^4 + x + 1$ . (10 Marks)
- b. Explain framing with Byte Count and Flag bits with bit stuffing. (10 Marks)

OR

- 4 a. Illustrate the Hamming code method with an example. (10 Marks)
- b. Explain the following with examples:  
(i) Binary convolution code. (10 Marks)  
(ii) Reed Solomen code. (10 Marks)

### Module-3

- 5 a. Discuss Store and Forward packet switching. (10 Marks)
- b. Explain the services provided by Network layer to Transport layer. (10 Marks)

OR

- 6 a. Discuss shortest path algorithm. (10 Marks)
- b. Explain the approaches to congestion control in Network layer. (10 Marks)

### Module-4

- 7 a. Explain Berkeley Sockets in detail. (10 Marks)
- b. Explain socket programming with an example. (10 Marks)

OR

- 8 a. Explain TCP protocol with TCP segment header. (10 Marks)  
b. Explain TCP connection establishment and TCP connection release with code snippet. (10 Marks)

**Module-5**

- 9 a. Explain the process communication in the Application layer. (10 Marks)  
b. Discuss the Transport services provided by the Internet. (10 Marks)

OR

- 10 a. Explain the web and HTTP with Request response behaviour. (10 Marks)  
b. Discuss the Electronic Mail in the Internet. (10 Marks)

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21CS53

## Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 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. Explain in detail the characteristics of database approach. (08 Marks)
- b. Define the following terms and also give example :  
i) Database ii) DBMS (04 Marks)
- c. List and explain the advantages of using DBMS Approach. (08 Marks)

OR

- 2 a. Explain cardinality ratio and participation constraints along with an example. (06 Marks)
- b. With a neat diagram explain the three schema architecture. (06 Marks)
- c. Draw an ER diagram for library database by considering at least 5 entities. (08 Marks)

### Module-2

- 3 a. Explain in detail characteristics of Relations. (06 Marks)
- b. Discuss different types of update operations on relational database. Also give an example. (06 Marks)
- c. Write a note on Natural join and division operation. (08 Marks)

OR

- 4 a. Consider the 2 tables. Show the result of the following :

R <sub>1</sub>		
a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>
20	L	15
15	m	18
25	L	16

R <sub>2</sub>		
b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>
20	L	6
25	n	8
28	l	4

(i)  $R_1 \bowtie R_2$   
( $R_1 \cdot a_1 = R_2 \cdot b_1$ )

(ii)  $R_1 \Join R_2$   
( $R_1 \cdot a_1 = R_2 \cdot b_1$ )

(iii)  $R_1 \bowtie R_2$   
( $R_1 \cdot a_1 = R_2 \cdot b_1$ )

(iv)  $R_1 \Join R_2$   
( $R_1 \cdot a_1 = R_2 \cdot b_1$ )

- b. With an example explain steps of ER to Relational Mapping algorithm.

(08 Marks)

(12 Marks)

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**Module-3**

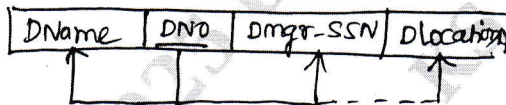
- 5 a. For the following Database schema.  
 Employee (Fname, Minit, Lname, SSN, Bdate, Address, Salary, SuperSSN, DNo)  
 Department(DName, Dno, Mgr\_SSN, Mgr\_Startdate)  
 Dept\_Locations(Dno, Dlocation)  
 Project(PName, Prj\_no, Plocation, Dnum)  
 Works\_on(ESSN, Prj\_no, Hours)  
 Dependent(ESSN, DependentName, Sex, Bdate, Relationship)  
 Write SQL Queries for the following :
- Find sum\_of\_salaries of all employees who work in Dept No 10, average salaries of all employees who work in Dept No 10.
  - List all employees who do not have any dependent.
  - For each project, retrieve the project number and the number of employees who work on that project.
  - Make list of all project numbers for projects that involve an employee whose last name is 'Kumar'.
- b. Write command that is used for table creation. Explain how primary key, foreign key are specified in SQL during table creation with suitable example. (06 Marks)
- c. Explain view in SQL, with suitable example. (06 Marks)

**OR**

- 6 a. Explain stored procedures in SQL with example. (06 Marks)
- b. How triggers are defined in SQL? Explain with an example. (06 Marks)
- c. Write a note on : (i) Cursor (ii) Assertions (08 Marks)

**Module-4**

- 7 a. List and explain the informal Design guidelines for relation schemas. (08 Marks)
- b. Define the following :  
 (i) Functional dependency (ii) Key (iii) Superkey (iv) Prime attribute (06 Marks)
- c. For the given schema, discuss the 3 main techniques to achieve first normal form.



(06 Marks)

**OR**

- 8 a. Explain in detail 2<sup>nd</sup> Normal form and 3<sup>rd</sup> Normal form along with example. (08 Marks)
- b. Write an algorithm for determining  $X^+$ , the closure of X under F. Give an example. (06 Marks)
- c. Write a note on 4<sup>th</sup> Normal form. (06 Marks)

**Module-5**

- 9 a. Define Transaction. Discuss ACID properties. (06 Marks)
- b. With neat diagram explain transition diagram of a transaction. (06 Marks)
- c. Explain the Lost Update problem and Temporary update problem with respect to concurrent transaction execution. (08 Marks)

**OR**

- 10 a. Briefly discuss 2-phase locking techniques for concurrency control. (10 Marks)
- b. Write a note on :  
 i) Deadlock prevention protocols ii) Basic Timestamp ordering algorithm (10 Marks)

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21CS54

## Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 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. What is AI? Explain the terms:  
(i) Acting humanly  
(ii) Thinking rationally (12 Marks)  
b. What is problem solving agent? Formulate a simple problem solving agent. (08 Marks)

OR

- 2 a. Explain different types of problems. (06 Marks)  
b. Explain well defined problem. (08 Marks)  
c. What is 8 puzzle problem? Discuss. (06 Marks)

### Module-2

- 3 a. List and define the criteria used to evaluate search strategies. (04 Marks)  
b. Explain BFS and DFS search strategies. (12 Marks)  
c. What are the need for machine learning? (04 Marks)

OR

- 4 a. Give a detail explanation on types of machine learning. (08 Marks)  
b. Define the following:  
(i) Hypothesis testing  
(ii) P-value  
(iii) Confidence Intervals  
(iv) Z – test  
(v) t – test and paired t- test (10 Marks)  
c. What do you mean by bivariate data and multivariate data? (02 Marks)

### Module-3

- 5 a. Explain different types of learning. (05 Marks)  
b. Explain concept learning with example. (05 Marks)  
c. Define bias and variance. (02 Marks)  
d. Differentiate instance based learning and model based learning. (08 Marks)

OR

- 6 a. Explain Nearest Neighbor Learning. Write the algorithm for the same. (06 Marks)  
b. Consider the student performance training dataset of 8 data instances shown in Table.Q6(b) which describes the performance of individual students in a course and their CGPA obtained in the previous semesters. The independent attributes are CGPA, Assessment and Project. The target variable is 'Result' which is a discrete valued variable that takes two values 'Pass' or 'Fail'. Based on the performance of a student, classify whether a student will pass or fail in that course.

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I. 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

Table.Q6(b) Training Dataset

(08 Marks)

- c. Explain Locally Weighted Regression and solve the following problem. Consider the following Table.Q6(c) with four instances and apply locally weighted regression.

SL. No.	X = Salary (in Lakhs)	Y = Expenditure (in thousands)
1	5	25
2	1	5
3	2	7
4	1	8

Table.Q6(c)

(06 Marks)

#### Module-4

- 7 a. Using the decision tree, assess a student's performance during his course of study and predict whether a student will get a job offer or not in his final year of the course. The training data set T consists of 10 data instances with attributes such as 'CGPA', 'Interactiveness', 'Practical Knowledge' and 'Communication Skills' as shown in Table.Q7(a). The target class attribute is the 'Job offer'.

SL. No.	CGPA	Interactiveness	Practical Knowledge	Communication Skills	Job Offer
1	$\geq 9$	Yes	Very good	Good	Yes
2	$\geq 8$	No	Good	Moderate	Yes
3	$\geq 9$	No	Average	Poor	No
4	$< 8$	No	Average	Good	No
5	$\geq 8$	Yes	Good	Moderate	Yes
6	$\geq 9$	Yes	Good	Moderate	Yes
7	$< 8$	Yes	Good	Poor	No
8	$\geq 9$	No	Very good	Good	Yes
9	$\geq 8$	Yes	Good	Good	Yes
10	$\geq 8$	Yes	Average	Good	Yes

Table.Q7(a)

(12 Marks)

- b. Define Bayes theorem. Explain the classification using Bayes model. Write an expression for MAP hypothesis and ML hypothesis.

(08 Marks)

#### OR

- 8 a. Assess a student performance using Naïve Bayes algorithm with the data set given in Table.Q7(a). Predict whether a student gets a job offer or not in his final year of the course.

(08 Marks)

- b. Construct a regression tree using the following Table.Q8(b) which consists of 10 data instances and 3 attributes 'Assessment', 'Assignment' and 'Project'. The target attribute is 'Result' which is a continuous attribute.

SL. No.	Assessment	Assignment	Project	Result (%)
1	Good	Yes	Yes	95
2	Average	Yes	No	70
3	Good	No	Yes	75
4	Poor	No	No	45
5	Good	Yes	Yes	98
6	Average	No	Yes	80
7	Good	No	No	75
8	Poor	Yes	Yes	65
9	Average	No	No	58
10	Good	Yes	Yes	89

Table.Q8(b)

(12 Marks)

**Module-5**

- 9 a. Explain the simple model of Artificial Neuron. (06 Marks)  
 b. Explain the types of Artificial Neural Network. (08 Marks)  
 c. Explain the partitional clustering algorithm. List the advantages and disadvantages. How to choose the value of K? (06 Marks)

**OR**

- 10 a. Explain clustering. List the applications of clustering. (08 Marks)  
 b. Write an algorithm for learning in a multilayer perceptron. (06 Marks)  
 c. Consider learning in a multi-layer perceptron. The given MLP consists of an input layer, one hidden layer and an output layer. The input layer has 4 neurons, the hidden layer has 2 neurons and the output layer has a single neuron. Train the MLP by updating the weights and biases in the network.

$x_1$	$x_2$	$x_3$	$x_4$	0 desired
1	1	0	1	1

Learning rate = 0.8.

(06 Marks)

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**Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025**  
**Research Methodology and 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. Give various definitions of research explaining its meaning and scope. Explain the objective and motivation in Engineering research. (08 Marks)
- b. Describe the steps involved in research process with neat diagram. (06 Marks)
- c. What is ethics in Engineering research? Why it is important. (06 Marks)

**OR**

- 2 a. What is research problem? Define the main issues which should receive the attention of the research in formulating the research problem. (08 Marks)
- b. Discuss in detail various types of research. (06 Marks)
- c. Describe different types of research misconduct. (06 Marks)

**Module-2**

- 3 a. Discuss the importance of critical literature review and its uses in planning innovation research. (06 Marks)
- b. Explain the concept of knowledge flow through citation. How collaborations certainly impact citation counts? Explain. (08 Marks)
- c. Write short notes on : (06 Marks)
  - i) Google and Google scholar
  - ii) Acknowledgment and Attributions

**OR**

- 4 a. Analyze the following terms which do not fulfill the actual goal of citations and acknowledgements. i) Spurious citations ii) Biased citations iii) Self citations iv) Coercive citations. (08 Marks)
- b. What are the things author should acknowledge? (06 Marks)
- c. Elaborate on the following : (06 Marks)
  - i) Technical reading
  - ii) Critical and creative reading.

**Module-3**

- 5 a. What are Intellectual Property Rights? Explain the necessity of it. (06 Marks)
- b. Differentiate between invention and Innovation. What is a Patent? What are the criteria of patentability? (08 Marks)
- c. Enumerate the procedure for application preparation filing and grant of patents. (06 Marks)

**OR**

- 6 a. List and explain in detail about various types of Intellectual property rights. (08 Marks)
- b. Explain in detail about the infringement of patents. (06 Marks)
- c. What types of invention are not patentable in India? (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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**Module-4**

- 7 a. What is Copyright? Explain classes, criteria and ownership of copyright. (08 Marks)  
b. Discuss about the copyright ownership issues. (06 Marks)  
c. Describe the process involved in the registration of a trademark. (06 Marks)

**OR**

- 8 a. Enumerate the procedure for registration of copyright. (08 Marks)  
b. Explain about the Trademark and rights from trademarks registration. (06 Marks)  
c. Explain about types of Trademarks registered in India. (06 Marks)

**Module-5**

- 9 a. How can industrial designs be protected? (06 Marks)  
b. What is a geographical indication? Explain the following with respect to GI.  
i) Ownership and right granted to the GI holders  
ii) Registered GI in India (08 Marks)

- c. Explain the following :  
i) Famous Industrial Designs  
ii) Generic GI and Homonymous GI (06 Marks)

**OR**

- 10 a. Explain the classification of Industrial Designs. (06 Marks)  
b. Explain the procedure for GI registration. (08 Marks)  
c. Explain about the enforcement of IPR in India. (06 Marks)

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# CBCS SCHEME

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Question Paper Version : A

## Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Environmental Studies

Time: 1 hrs.]

[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. Environment means
    - a) A beautiful landscape
    - b) Industrial production
    - c) Sum total of all condition
    - d) None of these
  2. The term ecosystem was introduced by
    - a) Hackel
    - b) Odum
    - c) Tansley
    - d) All of these
  3. The ecological pyramid that is always upright.
    - a) Pyramid of energy
    - b) Pyramid of biomass
    - c) Pyramid of number
    - d) None of these
  4. 5<sup>th</sup> June is observed as
    - a) World Forest Day
    - b) World Environment Day
    - c) World Wildlife Day
    - d) World Population Day
  5. MoEF means
    - a) Ministry of Forest and Energy
    - b) Ministry of Environment and Forests
    - c) Ministry of Fuel and Energy
    - d) Management of Environment and Forestry
  6. In Aquatic Ecosystem Phytoplankton can be considered as a
    - a) Consumer
    - b) Producer
    - c) Macro consumer
    - d) Micro consumer
  7. \_\_\_\_\_ has Maximum Genetic Diversity in India.
    - a) Potato
    - b) Tea
    - c) Mango
    - d) Teak

8. Chipko movement was started to conserve
  - a) Forests
  - b) Grasslands
  - c) Deserts
  - d) Soil
9. The sequence of eating and being eaten in an eco-system is called
  - a) Food chain
  - b) Carbon cycle
  - c) Hydrological cycle
  - d) Anthroposystem
10. Which of the following is a biotic component of an eco system?
  - a) Fungi
  - b) Solar Light
  - c) Temperature
  - d) Humidity
11. Hydroelectric Power plant is \_\_\_\_\_
  - a) Non-renewable source of energy
  - b) Conventional source of energy
  - c) Non-conventional source of energy
  - d) Continuous source of energy
12. Which isotope of uranium is used for the nuclear fission reaction?
  - a) U-234
  - b) U-235
  - c) U-238
  - d) U-233
13. A solar cell is an electrical device that converts the energy of light directly into electricity by the
  - a) Photovoltaic effect
  - b) Chemical effect
  - c) Atmospheric effect
  - d) Physical effect
14. Bhopal gas tragedy occurred in the year
  - a) 1986
  - b) 1990
  - c) 1984
  - d) 1991
15. Wind is beneficial resource of energy as it does not cause
  - a) Pollution
  - b) Echo
  - c) Noise
  - d) Sound
16. Which of the following is not a renewable source of energy?
  - a) Wind energy
  - b) Tidal wave energy
  - c) Solar energy
  - d) Fossil fuels
17. Nuclear Power Plant in Karnataka is located at
  - a) Bhadravathi
  - b) Kaiga
  - c) Sandur
  - d) Raichur
18. In Hydro Power Plants, power is generated by
  - a) Hot Springs
  - b) Wind
  - c) Water
  - d) Solar Energy
19. Which is not natural disaster?
  - a) Cyclone
  - b) Nuclear explosion
  - c) Earthquake
  - d) Volcano
20. Radiation is a health hazard because it leads to
  - a) Typhoid
  - b) Cancer
  - c) Colour blindness
  - d) Pneumonia
21. Water pollution is caused by
  - a) Sewage
  - b) Industrial effluents
  - c) Discharge from farms
  - d) All of these
22. Which of the following are non-biodegradable?
  - a) Plastics
  - b) Domestic sewage
  - c) Detergents
  - d) Both a and c



23. Chlorine can be used  
a) To kill pathogenic micro organisms      b) To increase the pH  
c) To clear the turbidity      d) All of these
24. What does E-waste stand for?  
a) Environment waste      b) Electronic waste  
c) Equipment waste      d) None of these
25. The noise is measured in  
a) Decibels      b) Joules      c) PPM      d) NTU
26. Maximum dissolved oxygen is required by  
a) Fish      b) Bacteria      c) Vegetables      d) All of these
27. Colorless, odorless and non corrosive air pollutant is  
a) Sulphur dioxide      b) Carbon monoxide  
c) Carbon dioxide      d) Ozone
28. Which of the following is not a greenhouse gas?  
a)  $\text{CO}_2$       b)  $\text{CH}_4$       c) CFC      d)  $\text{H}_2$
29. For the survival of fish in a river stream, the minimum DO is prescribed  
a) 3 PPM      b) 4 PPM      c) 5 PPM      d) 10 PPM
30. Water pollution can be minimized by  
a) Releasing sewage to ocean      b) Releasing effluent to wasteland  
c) Treating wastewater      d) None of these
31. Global warming could effect  
a) Climate      b) Increase in sea level  
c) Melting of glaciers      d) All of these
32. The primary cause of acid rain around the world is  
a) Carbon dioxide      b) Sulphur dioxide  
c) Carbon monoxide      d) Ozone
33. Acid rain effects on  
a) Materials      b) Plants      c) Soil      d) All of these
34. Ozone layer is present in  
a) Troposphere      b) Stratosphere  
c) Mesosphere      d) Thermosphere
35. Ozone layer absorbs  
a) UV rays      b) Infrared rays      c) Cosmic rays      d) CO
36. The Fluoride concentration for prevention of dental caries is  
a) 3 mg/L      b) 2 mg/L      c) 1 mg/L      d) 4 mg/L
37. D.D.T is a  
a) Fungicide      b) Pesticide      c) Fertilizer      d) Disinfectant

38. When trees are cut, amount of oxygen  
 a) decreases                      b) increases                      c) both a and b                      d) remains same
39. World ozone day is being celebrated on  
 a) September 5<sup>th</sup>                      b) October 15<sup>th</sup>                      c) September 16<sup>th</sup>                      d) September 11<sup>th</sup>
40. The effect of acid rain  
 a) Reduces soil fertility                      b) Increases atmospheric temperature  
 c) Skin cancer                      d) Causing respiratory problems
41. Which among the following is not related to GIS software?  
 a) CAD                      b) ARC GIS                      c) RC VIEW                      d) STAAD PRO
42. GIS stands for  
 a) Geographic Information System                      b) Generic Information System  
 c) Geological Information System                      d) Geographic Information System
43. Among the following \_\_\_\_\_ can be expressed as an example of hardware component?  
 a) Keyboard                      b) Arc GIS                      c) Autocad                      d) Digitalization
44. The basic requirement of any sensor system is  
 a) Spatial resolution                      b) Spectral Resolution  
 c) Radiometric Resolution                      d) All of these
45. IS 14000 standards are for the  
 a) Quality Management System                      b) Environmental Management System  
 c) Administration                      d) Supply Chain
46. What is the main objective of secondary treatment of sewage plants?  
 a) To remove the suspended particles  
 b) To remove the contaminants  
 c) To remove the BOD  
 d) To remove the organic material
47. Which of the following is the un agency on health?  
 a) WHO                      b) FAO                      c) UNESCO                      d) WTO
48. What is the full form of NGO's?  
 a) Non-governmental Organizations                      b) Non Governance Organizations  
 c) No Governance Organizations                      d) Null Governmental Organizations
49. When did green peace founded?  
 a) 1965                      b) 1967                      c) 1968                      d) 1971
50. When did the Bombay Natural History Society (BNHS) founded?  
 a) 1857                      b) 1868                      c) 1883                      d) 1897

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