# FACULTY OF ENGINEERING

B.E. (CIVIL) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject – Profession Elective - IV:
Design of Concrete Structures – II
(IS: 456-2000, IRC-Charts and Piegaurds Curves are allowed)

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A

**Note: Answer all questions.**   **(10 x 2 = 20 Marks)**

1 What is the purpose of a water tank? Give the classification of water tanks according to their shape.
2 Define deep beam as per IS: 456.
3 Give the classification of shear walls.
4 Differentiate shallow bin and deep bin.
5 How do you calculate the effective width for solid slabs spanning in one direction for single concentrated load?
6 Explain about IRC loadings classes.
7 Why Pigeaud's theory is preferred over Westergaurd's theory?
8 Write advantages of Intze tank over Circular tank.
9 Give the codal provision for the design Bunkers & Silos.
10 Explain briefly the concept of Elastic design.

PART – B

**Note: Answer any five questions.**   **(5 x 10 = 50 Marks)**

11 Calculate the hoop tension and bending moment in a circular tank with fixed base for capacity of 400,000 litres. The depth of water tank is to be 4 m, including a free water board of 0.25 m. Use M20 grade concrete and Fe-415 grade steel reinforcement. The tank is free at the top and rests on the ground. Take unit weight of water as 9.8 kN/m^3.

12 Determine the thickness and reinforcements for a simply supported transfer girder of length 5.25 m loaded from two columns at 1.75 m from each end with 3750 kN (Fig. 1). The total depth of the beam is 4.2 m and the width of supports is 520 mm. Assume grade 40 concrete and Fe-415 steel.
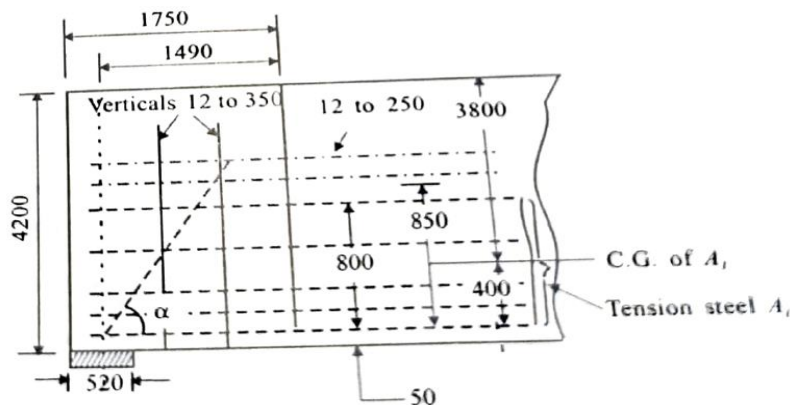
Fig. 1

13 A bar bell type shear wall with central part 3600 mm X 150 mm and two 400 mm X 400 mm strong bands at each end is supported on a footing 8 m X 4 m, which rests on soil whose modulus is 30,000 kN/m^3 (Fig. 2). Determine the lateral stiffness of the wall. Assume
f_{ck} = 20 N/mm^2 and the height of the wall as 14 m. use Fe500 grade steel.
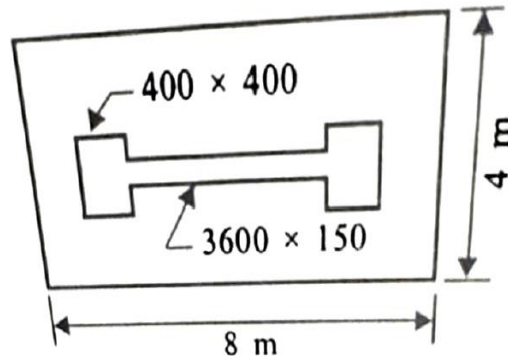
Fig. 2

14 Determine the horizontal pressure in the shallow portion and in deep portion of a silo to store wheat, with the overall dimensions as shown in Fig. 3. The conical dome has central opening of 50 cm diameter. Use Airy's theory. For wheat take γ = 7850 N/m^3, μ = 0.466 and μ' = 0.444. Use M20 grade concrete and Fe-415 grade steel.
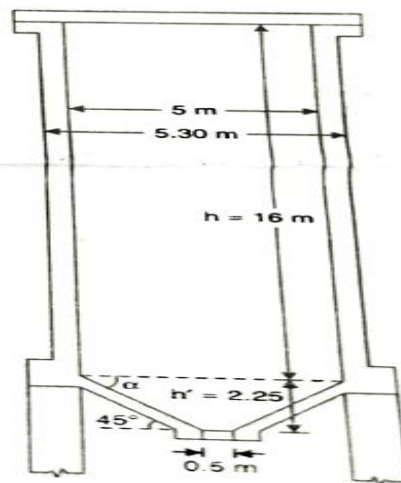
Fig. 3

15 Design a solid slab bridge for the data: Clear span = 5 m; Clear width of roadway = 6.8 m; Live load = IRC Class A loading; Concrete Grade = M30; Average thickness of wearing coat = 8 cm.

16 Explain the procedure for design and detailing of a RCC T beam bridge.

17 Design the inner panel of a T-beam bridge for a clear carriage way width of 7m, effective span 16m for double line class-A loading. Use M20 grade concrete and Fe415 grade steel make suitable assumption for centre-centre distance for longitudinal girders, transverse girders, width of main and cross girders and other secondary components.

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FACULTY OF ENGINEERING
B.E. (CIVIL) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Profession Elective – IV :
Urban Transportation Planning

Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1 Define External Cordon Lines.
2 What are home based trips?
3 Explain trip distribution models.
4 List and explain any two types of movement considered to analyze survey data.
5 Explain briefly about Production Attraction Matrix.
6 List the different Growth factor trip distribution methods.
7 What are diurnal trips?
8 What is trip end modal split model?
9 Explain all or nothing trip assignment technique.
10 List the drawbacks of all or nothing trip assignment technique.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 List major stages of Transportation Planning process and briefly explain the first stage.

12 Briefly explain Road-Side Interview method and Home Interview method in detail.

13 For the O-D matrix shown below, find the future trip distribution using Fratar method upto 2 iterations.

O D	A	B	C	D	Future Productions
A	-	310	295	105	1000
B	310	-	280	260	1600
C	295	280	-	315	1100
D	105	260	315	-	1400
Future Attractions	1000	1600	1100	1400	**5100**

14 Assign a traffic volume of 7000 PCU/hr between nodes 1 and 21 by Multiple Route Assignment technique and comment on the link capacity.

Link	Travel Time (minutes)	Practical Capacity in PCU/hr
1 – 11	4	8000
11 – 15	3	7000
11 – 12	2	6000
12 – 16	3	8000
15 – 18	2	9000
16 – 20	3	8000
18 – 20	2	7000
20 – 21	4	5000

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15 Explain Garin-Lowry model with an example.

16 Define Diurnal trips. Name different traffic assignment types and explain in detail.

17 (a) Write short notes on classification of trips and categorization of Households.
  (b) A large suburban zone on the outskirts of a city is likely to have the following activities and housing development in the next 10 years. Calculate the total trip attractions.

Name of DU	- 3500
High school students	- 750
Elementary School students	- 2000
Shopping center retail employees	- 400
Other retail employees	- 200
Nonretail employees	- 100

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FACULTY OF ENGINEERING
B.E. (Civil) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Profession Elective – IV : Disaster Mitigation & Mgt.

Time: 3 Hours　　　　　　　　　　　　　　　　**Max. Marks: 70**

(Missing data, if any, may be suitably assumed)
PART – A
Note: **Answer all questions**.　　　　　　　　　**(10 x 2 = 20 Marks)**

1　Differentiate between hazard and vulnerability.
2　What factors define disaster risk?
3　How Disaster Management Act 2005 bring a paradigm shift in disaster management in India?
4　What do you mean by hazard zonation?
5　What is capacity development in disaster management?
6　Discuss the role of cyclone warning systems in disaster risk management.
7　List various disasters which struck your locality/village/city in recent years.
8　How can NGOs help in disaster management?
9　Discuss various structural measures, which may help in reducing the flood risk to a city.
10　How Remote Sensing and GIS can help in disaster risk mitigation?

PART – B
Note: **Answer any five questions**.　　　　　　　**(5 x 10 = 50 Marks)**

11　Discuss the fundamental determinants of the natural hazards with relevant examples.

12　What makes the urban areas disaster-prone? How do urban disasters impact the socio-economic status of the neo-urban class?

13　Appraise the four phases of the disaster management cycle.

14 a)　Elaborate on the objectives of National Policy on Disaster Management.
　　 b)　Write a note on the disaster profile of India.

15　Appraise the importance of Disaster Safe Designs and Constructions in disaster risk reduction.

16　What is the global trend in disasters? Why do trends of disasters increase over time?

17 a)　Deliberate on the need of constructing earthquake-resistant buildings following the BIS codes in reducing the disaster risk.
　　 b)　Discuss the role of NDRF, SDRF, and DDRF in relief and rescue operations.

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FACULTY OF ENGINEERING
B.E. (EEE) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Power Electronic Applications to Power Systems

Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1 Define FACTS Controllers.
2 What are conventional reactive power compensators?
3 List the objectives of series compensation.
4 Define the term Static VAR Compensator.
5 Explain the useful ness of UPFC in power industry.
6 What is an active power filtering?
7 Give the applications of DC transmission.
8 Deduce the equivalent circuit of an inverter.
9 State the applications of MTDC systems.
10 Draw a typical series MTDC system.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 (a) Discuss power flow in Meshed AC power systems.
    (b) Explain different categories of FACTS controllers.

12 (a) Compare SVC and STATCOM.
    (b) Discuss power angle characteristics of SSSC.

13 (a) Explain in detail about Interline Power Flow Controller.
    (b) Explain about various concepts related to reactive power compensation.

14 (a) Draw and explain the different types of HVDC links.
    (b) Explain the operation of a HVDC converter as an inverter.

15 (a) Give the comparison between series and parallel MTDC systems.
    (b) Explain about the ignition angle control.

16 (a) Describe working principles of TCSC.
    (b) Explain about various equipment used in the HVDC converter station.

17 (a) Explain in detail about operating principle of UPFC.
    (b) Explain different types of Harmonics introduced by HVDC converters.

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FACULTY OF ENGINEERING
B. E. (EIE) VII – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Analytical Instrumentation

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Give the basic components of AI?
2. Define electrochemical cell?
3. Define resolution of mass spectrometer?
4. What is a Explain Quadrapole mass spectrometer?
5. Write application of chromatography?
6. What is the principle of NMR?
7. Write a short note on calomel electrode?
8. What is a BIO sensor?
9. Enlist any two-air pollutants with their sources?
10. Write about water pollution monitoring instrument?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Discuss the interference filters and explain how diffraction grating can be used as Monochromator?

12 Explain in detail magnetic deflection mass spectrometer?

13 Explain Quadrapole mass spectrometer?

14 Explain in detail gas chromatograph?

15 Describe chemically sensitive semiconductor devices?

16 Explain in detail about Thermal conductivity meter?

17 Explain how CO in air is estimated using IR gas analyzers?

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FACULTY OF ENGINEERING
B.E. (ECE) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Microwave Techniques

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Define velocity modulation and bunching.
2. List the applications of cavity resonator.
3. What are guided waves? Give examples.
4. Define wave impedence.
5. Classify solid state microwave devices.
6. State the characteristics of an IMPATT diode.
7. Define phase velocity and group velocity.
8. What are the properties of a S-Matrix?
9. What are the applications of varactor diode?
10. Define cut-off frequency.

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. Explain parallel plane wave guide and derive its field expressions for TE modes.

12. Explain a rectangular wave guide and derive its field expressions for TM modes.

13. Explain the principle and operation of a TWT with the help of an Applegate diagram explain its working.

14. (a) Derive the S-Matrix for an H-plane –Tee.
    (b) What are the limitations of high frequency conventional tubes?

15. Explain the principle and operation of GUNN diode with the necessary diagrams.

16. (a) Derive the expressions for the resonant frequency of a rectangular cavity resonator.
    (b) Explain about the isolator.

17. Write a short notes on the following:
    (a) Microstrip lines
    (b) Slot lines.

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FACULTY OF ENGINEEERING
B.E. (MECH/AE) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – III
Industrial Engineering

Time: 3 Hours   Max marks: 70
(Missing data, if any, may be suitably assumed)
PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1   Explain in brief about various levels of management.
2   Define Decision making and write its characteristics.
3   Explain the objectives of Production Planning and control in brief.
4   What are the different types of scheduling?
5   What is Economic order quantity?
6   What is the importance of inventory control?
7   Explain the objectives of Quality control.
8   What is control chart and Explain its importance.
9   What are the different types of decision making environments?
10 Explain Expected monetary value.

PART – B

Note: **Answer any five questions**.   **(5 x 10 = 50 Marks)**

11 (a) Explain the scientific management approach by F.W. Taylor
   (b) Explain various types of training.

12 (a) Discuss the importance of Production planning and control.
   (b) Define Routing and Explain its objectives.

13 (a) A company requires 16000 units of raw material costing Rs.2 Per unit. The
        cost of placing in order is Rs.45 and the carrying cost are 10% per year.
        Determine EOQ and Cycle time.
   (b) Explain about various types of inventory models.

14 (a) What is quality control and discuss the evolution of quality control.
   (b) Explain the concept of P chart and C chart

15 (a) Explain the steps in decision making process.
   (b) Explain the criterion of optimism and criterion of pessimism.

16 (a) How the decision tree are employed for decision making?
   (b) Explain the objectives of management by objectives

17 (a) Explain the types of Inventory models
   (b) Explain the decision making under certainty.

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FACULTY OF ENGINEERING
B.E. (MECH) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – III
Electric and Hybrid Vehicles Technology

Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Define an electric vehicle.
2. What are the energy storage requirements of electric vehicles?
3. Draw a schematic diagram of EV layout.
4. Draw a neat sketch of series hybrid and label its parts.
5. List the specifications of GM EV1.
6. Differentiate between boost, buck and boost- buck converters.
7. List the requirements of electric motors in EV's.
8. Define specific power and ampere hour capacity.
9. State the principle of fuel cell.
10. What are hybrid energy storage devices?

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. Explain how environmental impact is reduced by EV and HEV.

12. (a) Describe the construction and working of a fuel cell.
    (b) Describe the working of Ni Mh batteries.

13. (a) Explain the principle of induction motor.
    (b) Explain the working of series DC motor.

14. Explain a parallel hybrid working system.

15. Explain with a neat sketch the three main sub systems of an electric vehicle.

16. (a) Explain different drive train configurations used in electric vehicles.
    (b) Why is fly wheel used as power storage device?

17. Write short notes on:
    (a) DC/DC converter
    (b) Regenerative braking
    (c) Mild hybrid
    (d) Ultracapacitors.

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FACULTY OF ENGINEERING

B. E. (PROD) VII – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – III
Product Design & Process Planning

Time: 3 hours   Max. Marks: 70
(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Explain Design by Evolution?
2. Explain the reasons for product failure?
3. What is Risk?
4. Explain in brief about design of control?
5. Explain in brief about Copyright?
6. Explain about idea screening?
7. Explain about product strategies?
8. What are the main aspects of marketing?
9. Explain about concurrent engineering?
10. Explain about group technology and their benefits?

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Explain product design functions and essential factor that affects the product design?

12 Explain Man-Machine interaction with neat sketch?

13 Explain about product life cycle in new product development?

14 Explain design for manufacturing and Design for assembly?

15 Explain about Variant types and generative type CAPP?

16 Explain about the areas need to be examine before launching product into the market?

17 Write short notes on

(a) Patent

(b) Erogonomics

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FACULTY OF ENGINEERING
B. E. (A.E) VII – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – III
Transport Management

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Differentiate between Industrial psychology and personnel management.
2. What are the methods of training?
3. What is vehicle utilization?
4. What is maintenance time?
5. Define Route Schedule.
6. Explain advantages of motor transport.
7. What is the necessity of Permit?
8. State the importance of Traffic signs.
9. What is preventive maintenance?
10. What is the purpose of maintenance?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 (a) Explain characteristics of a good personnel policy.
   (b) Explain the procedure of conducting interview.
12 (a) Explain the requirements of a good fare system.
   (b) Explain Transport department organization structure.
13 Explain in detail Management Information System (MIS) in goods transport operation.
14 (a) What are the different types of Traffic signs? Show them with two examples of each sign.
   (b) Classify the Permits based on validity period.
15 Explain in detail two tier and three tier maintenance.
16 Schedule the Bus between A to B using following data
   Distance between A to B = 100 km,
   Running time = 2 hours 30 min,
   Stand time = 30 min,
   Frequency = 1 and
   Traffic timings = 5 am to 9 pm.
17 Write short notes on
   (a) Psychological tests
   (b) Training for drivers & conductors.

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FACULTY OF ENGINEERING
B.E. (CSE) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Distributed Systems

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)
PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Define Distributed System and Middle ware technology.
2. What is the difference between layered and object based architectural styles.
3. How a multithreaded server is organized in dispatcher/worker model?
4. What is mutual exclusion? Name any two mutual exclusion algorithms.
5. Why replication is necessary in Distributed Systems?
6. Write about fault tolerance.
7. What is multicast communication?
8. What are the characteristics of distributed file system?
9. Give the overall organization of a traditional web site.
10. Define confidentiality in distributed coordination based system.

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. Explain Transaction Processing System. What is the role of TP monitor in distributed systems?

12. What are client and server stubs in RPC. Explain in detail the steps involved in doing a remote computation through RPC.

13. (a) Explain the concept of Lamports totally ordered logical clocks.

    (b) Explain Berkeley Algorithm for clock synchronization in detail.

14. Write short notes on

    (a) Primary based protocols for consistency.

    (b) Replicated write protocols for consistency.

15. Write short notes on

    (a) CORBA object references.

    (b) Globe object references.

16. What is distributed file system? Explain about CODA file system.

17. Explain the concept of decoupling publisher from subscribers using an additional trusted service in distributed coordination system.

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FACULTY OF ENGINEERING
BE (I.T) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – V
Wireless and Mobile Communication

Time: 3 Hours   Max marks: 70
(Missing data, if any, may be suitably assumed)
PART – A
Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. What is a microcell?
2. Define HIPERLAN?
3. Write 3 basic services of GSM.
4. What is adjacent channel interference?
5. What is reverse tunneling?
6. Define encapsulation?
7. Define paging systems.
8. Define WAP.
9. Write some properties of MANETS?
10. What are the goals of mobile ip?

PART - B
Note: Answer any five questions   **(5 x 10 = 50 Marks)**

11. Explain with block diagrams of DS-SS system.

12. a) Explain frequency reuse? Mention its advantages?
    b) Explain the trunking efficiency in detail?

13. Explain about protocol architecture based IEEE 802.11?

14. a) Describe ip packet delivery?
    b) Write the advantages of mobile tcp?

15. Explain traditional tcp and snooping tcp. And compare them.

16. Explain dynamic host configuration protocol?

17. a) Explain DSDV routing protocol with an example?
    b) Explain AODV protocol in detail?

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FACULTY OF ENGINEERING
B.E. (IT) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – V
Cloud Computing

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. List out the Cloud Deployment Models.
2. Define the Characteristics of Cloud.
3. Mention the benefits of Cloud Load Balancing.
4. Describe the role of SLA in Cloud.
5. What is Multi-Tenancy and it's advantage?
6. What is the importance of Privacy Policy?
7. Enlist the services that are provided by Amazon.
8. What is Amazon S3?
9. What is SOA?
10. List out few standards for Application Development on Cloud.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Write a detailed note on the Service Models in the Cloud.
    (b) Mention the benefits of Cloud Computing.

12. (a) Explain the model of Content Delivery Network.

    (b) List out the Advantages & Disadvantages of Content Delivery Network.

13. Explain Enterprise Cloud Computing Eco-system with a Neat diagram.

14. What is meant by hypervisors? How does cloud model provide virtualization?

15. Describe the architecture of Google File System for performing Map-Reduce with a neat sketch.

16. Explain the requirements for a Warehouse Data Scale Data Centre Construction and mention it's advantages.

17. Discuss identity management and access control that are needed for secure cloud computing.

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FACULTY OF ENGINEERING
B.E. (IT) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – V
Human Computer Interaction

Time: 3 hours   Max. Marks: 70
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions   **(10 x 2 = 20 Marks)**

1 Define Analyzing Interaction Paradigms
2 What is Internal Consistency?
3 State Hicks law.
4 What is Due?
5 What is Story Boarding? Give Example.
6 What is Pane with Example?
7 What is 5W+H?
8 What is an Aggregate Symbol?
9 Define "User Centered Approach".
10 Write about Deconstructing Icons.

PART – B
Note: Answer any five questions   **(5 x 10 = 50 Marks)**

11 a) What are different Navigation aids in Web Systems?
   b) Explain about Interactive Design.

12 a) What are the different types of Interaction Styles?
   b) List out different types of Computing Environments.

13 a) Explain in details about the Framework for Design Principles.
   b) What are the advantages and disadvantages of MDI window Interface?

14 a) List the main principles of DSDM frame work.
   b) Explain the usage of wire frames in Physical Design.

15 a) Describe the different components of GOMS Model.
   b) What is Usability? What are different phase of Usability test.

16 a) What are the different types of windows test? Explain with Diagrams.
   b) Distinguish between scrolling & Paging.

17   Write short notes on
   a) Writing Scripts
   b) Running a Pilot Test.

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FACULTY OF ENGINEERING
BE IV / IV (MECH/PROD/AE) I - Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Metrology and Instrumentation

Time: 3 Hours   Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   (25 Marks)

1   State the specification of Plug gage.
2   Sketch lapping operation on slip gage part.
3   Sketch principle of dial gage for sector dial tolerance measurement.
4   State the types of screen gages used with optical profile projector.
5   State the mechanism used for surface roughness measurement.
6   Why testing is conducted on the new machine tool?
7   Define the accuracy of measurement of system.
8   What is the purpose lead resistance compensation?
9   What is critical damping?
10 State the instruments used to measure vibrations of machine elements.

PART – B
Note: Answer any five questions.   (5 x 10 = 50 Marks)

11 (a) Sketch various types of gage standard geometrics used in dimensional
       measurement.
   (b) Sketch eight different geometric removable anvils used in micrometer.

12 (a) Sketch how straightness is measured using pneumatic back pressure
       comparator single jet.
   (b) Sketch and explain the working of roundness measuring machine.

13 (a) Explain and sketch the Taylor Hobson surface roughness measurement.
   (b) Discuss and sketch the working of Parkinson two flank gear tester.

14 (a) Sketch the strain gage arrangement to measure torsion on the shaft only.
   (b) Explain how resistance strain calibrate with neat sketch and corresponding
       derivation.

15 (a) State five different thermocouple materials with temperature range and
       accuracy of measurement.
   (b) Explain the setup to measure the vibration using seismic transducer.

16 (a) Explain the setup to measure loads using strain gage load cells.
   (b) Derive the measurement error for ramp signal with first order instrument.

17 (a) Explain the Taylor's principle of plain limit gages with sketch.
   (b) What are the errors obtained in roundness measurement machine?

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FACULTY OF ENGINEERING

B.E. IV / IV (CSE) I - Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Artificial Intelligence

Time: 3 hours   Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(25 Marks)**

1 Briefly explain iterative deepening search and its advantages.
2 Define skolemization.
3 Explain unification in Predicate calculus.
4 Bayes Networks are called causal networks. Give reasons with help of a diagram.
5 What is speech act? List down the categories of speech acts.
6 Distinguish between un-informed search and hernistic search.
7 How is common sense knowledge represented?
8 What is acoustic model?
9 List out the applications where neural networks are used.
10 What are the limitations of an expert system?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Write A*algorithm. Explain with an example of 8 tile puzzle.

12 (a) Explain how actions are described using various axioms and the corresponding problems because of such description in Situation Calculus.
   (b) Explain about recursive STRIPS.

13 (a) Write and explain acoustic model for speech recognition with example.
   (b) What are different forms of knowledge used in natural language understanding?

14 Write short notes on :
   (a) DECISION TREES based learning
   (b) Back propagation in multilayer feed forward neural network.

15 (a) Explain MIN-MAX algorithm with an suitable example.
   (b) What is an activation function? Explain it.

16 Explain the different phases in natural language processing.

17 Write short notes on
   (a) Linguistics hedges in fuzzy logic
   (b) Neuro Fuzzy systems

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FACULTY OF ENGINEERING
B.E. IV / IV (IT) I - Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Very Large-Scale Integration Design (VLSI Design)

Time: 3 Hours   Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(25 Marks)**

1. What are the logic levels for CMOS logic circuits?
2. What is meant by bubble pushing?
3. Why is CMOS important?
4. What are MOSFETs used for?
5. What are FET transistors used for?
6. What is propagation delay in CMOS?
7. How does a DRAM cell work?
8. Explain the Read operation of Dynamic RAM cell.
9. Draw the diagram of half adder and also write its truth table.
10. What is RTL in VLSI?

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Derive current equation an nMOS transistor in saturation region.

    (b) Implement the logic function $f = \overline{a.(b + c)}$ using CMOS logic and explain with the help of its truth table.

12. (a) Illustrate bubble pushing using De Morgan's Law.
    (b) Draw the CMOS diagram of XOR and XNOR logic gate and explain with a truth table.

13. Explain the fabrication of CMOS process.

14. (a) Draw the block diagram of differential cascade voltage switch logic. Design a two input XOR & XNOR logic gate using above model.
    (b) Explain Read & Write operation of 6T SRAM cell.

15. Explain (a) Complementary Pass transistor logic
            (b) Testing of VLSI circuits.

16. (a) With the help of neat sketch, explain cell concepts and cell-based design.
    (b) Explain about Floor planning and routing.

17. Discuss signal delay as a function of line length, interconnect delay and crosstalk issues in VLSI design.

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FACULTY OF ENGINEERING
B.E. (Civil) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Finite Element Techniques

Time: 3 hours　　　　　　　　　　　　　　　　　　**Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.　　　　　　　　　　　**(10 x 2 = 20 Marks)**

1　Write the steps involved in FEM of analysis.

2　Define Shape functions, list out their properties.

3　Differentiate between linear elements, 2D elements and Axi-symmetric elements.

4　List out the types of loading which may act on a body.

5　Write the shape function for a 3-noded triangular element in terms of area co-ordinates.

6　What is meant by geometric invariance, explain in brief?

7　List out the conditions to be satisfied by a 3-D solid to be considered as Axi-symmetric solid.

8　Differentiate between global co-ord system, Local co-ord, system and Natural co-ord system.

9　Distinguish between iso-parametric, sub-parametric and super-parametric elements.

10　Differentiate a Langrangian element from a serendipity element.

PART – B

Note: Answer any five questions.　　　　　　　　**(5 x 10 = 50 Marks)**

11 (a)　Derive shape functions for 2-Noded bar element.

(b)　A simply supported beam of span "L" is subjected to a central point load "W". Find the deflection under the load applying Rayleigh Ritz method. Consider only three Ritz parameters. Take modulus of elasticity as "E" and MI and "I".

12   A rigid frame is shown in figure 1. Determine stiffness matrix "K" for element 1 with respect to local coordinate system and transform it into global coordinate system using transformation matrix.
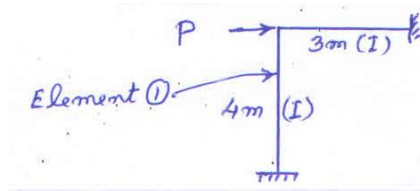

Fig.1

13(a)   State the criteria for convergence for a displacement model. Describe what are conforming and non-conforming elements.

  (b)   Derive shape function in terms of area coordinates. For a constant strain triangle (CST).

14(a)   Define Jacobian matrix. Derive Jacobian matrix for a four noded quadrilateral element.

  (b)   Determine Cartecian coordinates (x, y) of a point 'P' whose natural coordinates are $\varepsilon_1 = 0.45$, $\eta = 0.55$.

15   Derive strain displacement matrix for axi-symmetric triangular element.

16   A compound stepped bar is shown in figure 2 it is subjected to an axial force
P = 200KN. Determine
(a) Nodal displacements
(b) The reaction forces
(c) Stresses in the members
Apply FEM technique
Given $A_1 = 2400$ mm^2 ; $A_2 = 600$mm^2, $E_1 = 0.7 \times 10^5$ MPa ; $E_2 = 2 \times 10^5$ MPa.
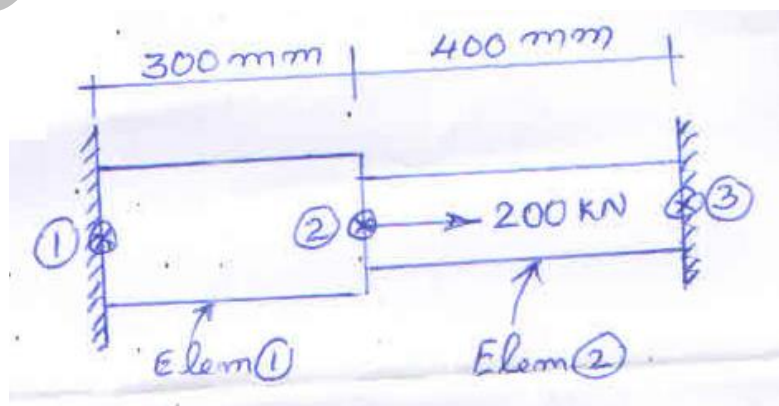

Fig.2

..3

17 Write short notes on:
  (a) What are higher order element, give any two examples of 2-D higher order elements?
  (b) Distinguish between the problem of plane stress and plane strain.
  (c) Derive strain-displacement matrix for a bar element with two nodes.

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FACULTY OF ENGINEERING
B.E. (EEE) VII – Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Electrical Machine Design

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. Classify electrical engineering materials based on electrical conductivity, magnetic permeability and temperature understand capability.
2. What do you understand by real and apparent magnetic flux density?
3. What are the assumptions made during the derivation of heating time constant?
4. How is the required quantity of coolant calculated for a rotating electric machine?
5. What is the significance of electrical loading and specific magnetic loading in a dc machine?
6. Sketch a three phase core type of transformer showing the window dimensions, overall core dimensions and tank dimensions.
7. Name the parts of a dc machine and an AC induction motor and mention the type of material used for each of them.
8. Classify the types of cooling used for a power transformer.
9. Express the output equation for a DC machine and a 3 phase Transformer.
10. What do you understand by Analysis and synthesis in electrical machine design?

PART – B

Note: **Answer any five questions**.   **(5 x 10 = 50 Marks)**

11 a) What are the various physical, chemical and engineering properties to be studied while selecting an electrical engineering material for machine design?
   b) Write about super conductors and high resistance alloy giving their properties.

12 a) Derive an expression for "Carter's coefficient" and the apparent flux density in an electrical machine.
   b) Write in detail about the various classes of duty for an electrical machine.

13 Derive the expression from fundamentals to estimate the temperature rise in an electric machine, the heating time constant and the cooling time constant. State the assumptions made.

14 Calculate the main dissension of a 15KW, 220V, 4 pole, 1500rpm dc machine having a specific electric loading of 18000, B(Avg) of 0.5 Wb/Sq.m a full load efficiency of 0.9, with a ratio of pole arc to pole putch of 0.70. Assume length of pole arc is equal to length of armature core. Mention the assumption made.

15 A 1500 kVA, 6.6/0.440 KV, 50 HZ, 3 phase core type, oil immersed transformer has centre to centre of limbs a distance of 0.50 m, outer dia. of HV winding 0.46 m, height of frame 1.30 m, core loss of 4.0 kw, copper loss of 12 kW; with temperature rise being limited to 40ºC, Clearance along width, length and height being 80 mm, 100 mm and 100 mm respectively, check the need for providing additional cooling area through tubes and estimate their number. Sketch the probable placement of tubes on tank walls.

16 a) What are the different approaches in computer aided electric machine design?
   b) Develop the general design procedure using a flow chart.

17 Write short notes on
   (i) Comparison of solid and laminated cores,(ii) Calculation of quantity of cooling medium required for a rotating machine, (iii) types of turbo alternators,
   (iv) Advantages of digital computers in electric machine design.

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FACULTY OF ENGINEERING

B. E. (EIE) VII – Semester (CBCS) (Main) Examination, March / April 2022

Subject: Analytical Instrumentation

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Define electrochemical cell.

2. What are the limitations of Beer Lambert's law?

3. Define resolution of mass spectrometer.

4. Define spectrophotometer.

5. Discuss about sources of errors in spectrophotometer.

6. What are the various detectors used in Gas chromatography?

7. Write different types of NMR spectrometers.

8. Discuss about the electrodes for P^H measurement.

9. Discuss selective ion electrode.

10. How CO in air is estimated using IR gas analyzers?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. What is electromagnetic radiation? Explain basic components of Analytical Instrumentation.

12. Discuss interference filters and explain how diffraction grating can be used as monochromator.

13. With the help of a block diagram, explain the double beam spectrophotometer and Quadrapole mass spectrometer.

14. Explain NMR principle and draw the block diagram of NMR and explain it in detail.

15. What is selection ion electrode? Explain the operation of P^H meter with schematic diagram?

16. Explain about Bio-sensors and discuss about dropping mercury electrode.

17. Name the various types of gas analyzers. With the help of diagram explain magnetic wind instrument.

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FACULTY OF ENGINEERING
B.E. (ECE) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Microwave Techniques

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. What is cut off wavelength, guide wavelength and free space wavelength?
2. Find the resonant frequency of a cavity of size 5 λx2.25 λx3λ at dominant mode.
3. Draw a neat sketch of H plane and explain its power flow.
4. What is a re-enterant cavity? What are its advantages?
5. Draw the equivalent circuit of PIN diode.
6. What is wave impedance? How does it vary with frequency?
7. What is electronic tuning of reflex klystron?
8. What are Avalanche Transit time device?
9. What are ferrites? Why are they useful in microwave frequencies?
10. What is π mode in magnetron?

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. Derive the E field and H field expression for TE wave propagating through parallel planes.

12. (a) Why TEM wave cannot be propagated through rectangular waveguide?
    (b) Is rectangular waveguide a high pass filter? Justify your answer.
    (c) Find the operating frequency of a rectangular waveguide of dimension 2.28cmx1.1cm for dominant mode.

13. What is a directional coupler? Derive its S matrix and state its applications.

14. (a) What are the high frequency limitations of conventional tubes? Explain how it can be Overcome?
    (b) With a neat diagram explain the construction and working of TWT.

15. (a) What are cross fields devices?
    (b) Explain the working of 8 cavity magnetron and list its applications.

16. (a) Describe the working of the various types of microwave attenuators with neat diagram.
    (b) Construct a 4 port circulator using magic Tee.

17. Write short notes on any two:
    (a) Gunn diode
    (b) Magic Tee
    (c) Microstripline.

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FACULTY OF ENGINEERING
B.E. (MECH/PROD) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Industrial Engineering

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. What is Scientific Management?
2. What are off-shore training programs?
3. What is collective bargaining?
4. Describe Routing in production control.
5. What is the definition of production planning and control?
6. Define "Quality". How it differs from Inspection?
7. What are Attributes Control Charts?
8. What are Confidence Limits in Quality Indices?
9. Write the role of labour participation in management.
10. Define Process Capabilities.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Write the benefits of Scientific Management to the Industry.
    (b) Describe the functions of Personnel Management.

12. Explain in detail about the importance and functions of Production Planning and Control.

13. (a) Derive an Algebraic Expression for Economic Order Quantity (EOQ).
    (b) Write the importance of Inventory Control.

14. (a) Discuss the characteristics of operating curve in Double Sampling Plan.
    (b) Explain about Fixed order quality system in detail.

15. (a) Explain the steps involved in Decision making.
    (b) Explain the types of Decision making environment.

16. (a) Explain briefly Expected Monetary Value (EMV) Criterion.
    (b) Explain briefly about the Follow-up in Production control.

17. Write short notes on the following:
    (a) Dispatching in production control.
    (b) Minimax decision criteria.

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FACULTY OF ENGINEERING

BE (CSE) VII – Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Information Security

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed.)

PART – A

Note: Answer all questions   **(10 x 2 = 20 Marks)**

1. List Critical Characteristics of Information.
2. Differentiate between Policy and Law.
3. What is Security? What are the different layers of Security?
4. What is Risk Appetite?
5. What are Proxy Servers?
6. What is tunnel mode?
7. What is Log File Monitors?
8. What is Packet Sniffer?
9. What is Man-in-the-Middle Attack?
10. What is Vulnerability Assessment?

PART – B

Note: Answer any five questions   **(5 x 10 = 50 Marks)**

11. (a) Explain Risk Control Strategies.

    (b) Write about different Threats and differentiate between Attacks and threats.

12. (a) Write the differences between Quantitative and qualitative risk Assessment.

    (b) List any two difference between ethics and law in Information Security? What is computer ethics?

13. Explain in detail about different types of Firewall with Architectures.

14. What are the tools required for Cryptography? Explain.

15. Explain symmetric and asymmetric encryption with examples.

16. Explain Security Maintenance Model with neat sketch.

17. What is Digital Forensics? Explain the different purposes & approaches of it.

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FACULTY OF ENGINEERING
B.E. IV / IV (I.T) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Wireless Mobile Communications

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1   What is trunking?
2   Differentiate 2G Vs 3G.
3   Explain Hidden and Exposed terminals
4   Explain DHCP.
5   What is Handoff?
6   What is the Motivation for a Specialized MAC?
7   Explain the concept of CDMA technology.
8   Bluetooth MAC layer.
9   What are the Goals of Mobile IP?
10 What is WAP?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Explain the following:
    (a) Frequency Reuse Techniques.
    (b) Handoff Strategies.

12 What is Spread Spectrum Modulation? Explain DSSS and FHSS with Transmitter and Receiver diagrams.

13 (a) Explain GSM architecture with neat diagram.
    (b) Discuss about the mobile services and data services in GSM.

14 (a) Explain about IPv6 and Types of IPv6 addresses.
    (b) What is DHCP protocol? Explain role/ importance of the various DHCP messages.

15 (a) WAP protocol architecture.
    (b) Explain AODV, DSDV Routing Algorithms in MANETs.

16 (a) Write about various methods of wireless network connection using TCP.
    (b) Explain TDMA, FDMA, CDMA with diagrams.

17 Write short notes on the following:
    (a) Hiper LAN
    (b) What is Tunneling and Reverse Tunneling?
    (c) J2ME

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