Hall Ticket No | | | | | | | | | | | Question Paper Code: BCC004

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS (CAD/CAM)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain any SEVEN advantages of fluid power systems. **[7M]**
   (b) What is the basic law that is important in applying fluid power and what is its significance? **[7M]**

(OR)

2. (a) What are the basic systems of Hydraulic, Explain them in detail? **[7M]**
   (b) Explain different types of fluid used in hydraulic system. **[7M]**

UNIT – II

3. (a) Explain in brief about the working of external gear pump with the neat sketch? **[7M]**
   (b) The bent axis piston pump has following data: **[7M]**
   Speed, N = 1000rpm; Number of piston, n = 9; Piston diameter, d_p = 15mm; Diameter of piston circle, D = 125 mm; Offset angle, $\theta = 10°$; Volumetric efficiency, $\eta_v = 94\%$.
   Determine the actual flow rate.

(OR)

4. (a) With a neat explain the different parts of a double acting cylinder. **[7M]**
   (b) With a neat sketch, explain different mounting arrangement in cylinder. **[7M]**

UNIT – III

5. (a) Discuss the factors to be considered during the selection of a hydraulic pump. **[7M]**
   (b) Design a pilot operated pressure relief valve and discuss the advantages of this valve over a direct pressure relief valve. **[7M]**

(OR)

6. (a) Discuss about the different types of elements of the power pack, Explain any two elements in detail. **[7M]**
   (b) Describe about the safety systems adopted in hydraulics. **[7M]**

UNIT – IV

7. (a) What are accumulators? Explain the working of a spring loaded accumulator. **[7M]**

   (b) Draw a circuit using step counter method for the following sequence A+B+B-A-, where A and B stands for cylinders, (+) indicates extension and (–) indicates retraction of cylinders. **[7M]**

(OR)

8. (a) Design a hydraulic circuit with a 3/4 way direction control valve, regenerative centered DCV, solenoid actuated valve with neat sketches. **[7M]**

   (b) Design a hydraulic circuit with a needle valve integrated with a check valve. **[7M]**

UNIT – V

9. (a) Describe with a block diagram of a pneumatic system using Program logic Control. **[7M]**

   (b) Discuss in detail about the advantages of the Program logic Control over the other systems. **[7M]**

(OR)

10. (a) Discuss the importance of oil and filter changes in hydraulic system. **[7M]**

    (b) Enlist important problems and remedial measures in a pneumatic system. **[7M]**

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Hall Ticket No | | | | | | | | | | |

Question Paper Code: BCC005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

COMPUTER AIDED MANUFACTURING (CAD/CAM)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Write complete APT program to machine the profile of the part drawing shown in Figure 1. Assume suitable machining data and cutting tool. All dimensions are in mm. **[10M]**

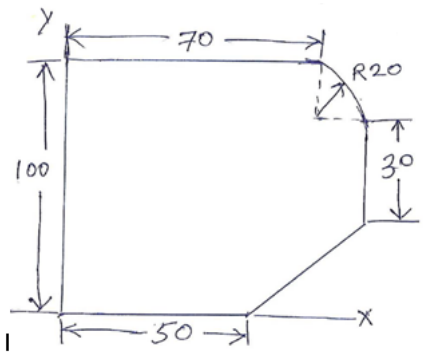

Figure 1

(b) Differentiate between GOTO and GO\TO statement using suitable example in detail with neat sketches. **[4M]**

2. (a) Explain about automatic tool path generation using CAD/CAM software with suitable examples. **[7M]**

(b) Explain the design of postprocessors in CAM systems. **[7M]**

UNIT – II

3. (a) Discuss about the different advantages of DNC system. **[7M]**

(b) Explain adaptive control system for grinding machine in detail. **[7M]**

4. (a) Discuss about adaptive control systems and its applications in CAM systems. **[7M]**

(b) Explain adaptive control with optimization for CNC milling machine. **[7M]**

UNIT – III

5. (a) Explain the general structure of a postprocessor with neat sketches. **[7M]**
   (b) Discuss about of a DAPP based postprocessor in detail. **[7M]**
6. (a) Explain about various functions of communication channels. **[7M]**
   (b) Explain major variables in DAPP based postprocessor. **[7M]**

UNIT – IV

7. (a) Explain about microcontroller and its applications using suitable examples. **[7M]**
   (b) Explain about the programming of microcontroller. **[7M]**
8. (a) Explain in detail about the ladder logic diagram. **[7M]**
   (b) Explain about various applications of PLC in CAM systems using suitable case study. **[7M]**

UNIT – V

9. (a) Explain about coordinate measuring machine and also discuss, briefly about any two types of coordinate measuring machine using suitable diagrams. **[8M]**
   (b) Explain about artificial neural networks and its applications. **[6M]**
10. (a) Explain in detail about the working principle of scanning laser system with neat sketches. **[7M]**
    (b) Explain about expert systems in CAM. Also discuss about the various parts of internal structure of expert systems . **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCC006

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

FLEXIBLE MANUFACTURING SYSTEMS (CAD/CAM)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain various modes of manufacturing in flexible manufacturing systems. **[7M]**
   (b) What are the different problems concerned in regular manufacturing process. **[7M]**
2. (a) Explain what is low volume manufacturing of small batch manufacturing and their applications. **[7M]**
   (b) What are the aims, technical performance, improve order development and objects of flexible manufacturing systems. **[7M]**

UNIT – II

3. (a) Explain backward scheduling approach in manufacturing, period of time and delivery with finite capacity loading. **[7M]**
   (b) Distinguish between Real time vs.- discrete event control. **[7M]**
4. (a) What is a dead lock in modeling. what are strategies used for dealing with dead locks. **[7M]**
   (b) Explain forward scheduling approaches with infinite capacity loading. **[7M]**

UNIT – III

5. (a) A 20 - station transfer line is being proposed to machine a certain component currently produced by conventional methods. The proposal received from the ma. chine tool builder states that the line will operate at a production rate of 50 pc/hr at 100% efficiency. From similar transfer lines, it is estimated that breakdowns of all types will occur with a frequency F = 0.10 breakdown per cycle and that the average downtime per line stop will be 8.0 min. The starting casting that is machined on the line costs $ 3.00 per part. The line operates at a cost of $ 75.00/hr. The 20 cutting tools (one tool per station) last for 50 parts each, and the average cost per tool = $ 2.00 per cutting edge Based on this data, compute the following: **[7M]**
      i. Production rate
      ii. Line efficiency
      iii. Cost per unit piece produced on the line
   (b) Write a short note on limitations of simulation and factors of level of realism. **[7M]**

6. (a) Write a brief note on Petrinets and places of transition of Perinet. **[7M]**

   (b) Explain in brief the concept Markov Chains and process with examples if necessary. **[7M]**

UNIT – IV

7. (a) Explain about tools, equipment, resource capabilities and optimizing manufacturing systems? **[7M]**

   (b) Explain the manufacturing system analysis in flexible manufacturing systems. **[7M]**

8. (a) Explain the heuristic oriented approach in flexible manufacturing systems. **[7M]**

   (b) Explain the transient analysis of manufacturing facilities in demand. **[7M]**

UNIT – V

9. (a) Write a note on acceptance sampling to develop inspection plan. **[7M]**

   (b) Explain the difficulties in implementation of flexible manufacturing systems. **[7M]**

10. (a) Explain the dual card system of KANBAN with diagram. **[7M]**

    (b) Explain the methods of Deburring in flexible manufacturing systems. **[7M]**

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Hall Ticket No | | | | | | | | | | |

Question Paper Code: BCC202

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

DESIGN FOR MANUFACTURING AND ASSEMBLY (CAD/CAM)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the various steps involved in systematic design process of a product. **[7M]**
   (b) Discuss the basic principles of design for economic production. **[7M]**
2. (a) What are process selection charts? Explain uses of process selection charts. **[7M]**
   (b) How the selection of materials effect on the quality and productivity? **[7M]**

UNIT – II

3. (a) Discuss the design recommendations for drilling and Boring . **[7M]**
   (b) Explain, with suitable examples, redesign of components from machining ease point of view. **[7M]**
4. (a) Discuss the design guidelines for sand casting. **[7M]**
   (b) Discuss the factors involved in the selection of a casting process. **[7M]**

UNIT – III

5. (a) Describe the need of pre welding and post welding operation and its impact on the performance of welded component. **[7M]**
   (b) Explain the design recommendations for drop forging die. **[7M]**
6. (a) Explain the design guidelines to be followed for extruded sections. **[7M]**
   (b) How Keeler - Goodman diagrams are helpful in selecting materials for forming operations. **[7M]**

UNIT – IV

7. (a) Discuss the design guidelines for automatic assembly. **[7M]**
   (b) Explain design guidelines for hand automation. **[7M]**
8. (a) Explain the use of mechanized and automated devices in automatic assembly. **[7M]**
   (b) Differentiate the intermittent Transfer and continuous Transfer in automatic assembly transfer systems. **[7M]**

UNIT – V

9. (a) Explain the compliance analysis for design of assembly. **[7M]**

   (b) What issues are effecting insertion time and how they are to be minimized? **[7M]**

10. (a) Discuss the design guidelines for automatic assembly. **[7M]**

    (b) Explain the effect of weight on handling time. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCC208

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

COMPUTER AIDED PROCESS PLANNING (CAD/CAM)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the requirement for process planning system. **[7M]**
   (b) Give out the merits and demerits of CAPP system. **[7M]**
2. (a) Explain the methods of automated process planning system. **[7M]**
   (b) Discuss the benefits of generative CAPP system. **[7M]**

UNIT – II

3. (a) Explain the quantitative methods for optimal selection of a manufacturing sequence with examples. **[7M]**
   (b) Explain the structure of group technology and its implementation procedure. **[7M]**
4. (a) Discuss the advantages and applications of group technology. **[7M]**
   (b) Explain the selection of manufacturing sequence. **[7M]**

UNIT – III

5. (a) Explain the reasons for optimal selection of machining parameters. **[7M]**
   (b) Explain different types of approaches with a case study. **[7M]**
6. (a) Explain solving of optimization models of machining parameters. **[7M]**
   (b) Differentiate between mathematical and conventional approach. **[7M]**

UNIT – IV

7. (a) Discuss the advantages and disadvantages of manufacturing tolerance. **[7M]**
   (b) Distinguish between sequential and integrated approach with an examples. **[7M]**
8. (a) Explain briefly the advantages of sequential and integrated approach. **[7M]**
   (b) Discuss the applications of integrated approach over sequential approach. **[7M]**

UNIT – V

9. (a) Explain the concept of NC tool path generation. **[7M]**

   (b) Explain the graphical implementation of machining process. **[7M]**

10. (a) Determine the optimal index position for executing fixed sequence in NC tool path generation. **[7M]**

    (b) Explain the criteria for selection of CAPP in MIPLAN system. **[7M]**

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Hall Ticket No | | | | | | | | | | |

Question Paper Code: BCS004

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

DISTRIBUTED OPERATED SYSTEM

(Computer Science and Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Give the comparison of three different ways of organising n CPUs in distributed systems. **[7M]**
   (b) Illustrate different steps in basic Remote Procedure call operations. **[7M]**

(OR)

2. (a) Briefly discuss the advantages of distributed systems over centralized systems. **[7M]**
   (b) Explain different addressing mechanism in client server communication model. **[7M]**

UNIT – II

3. (a) Explain the working of ring algorithm in electing a leader in election algorithm with an example. **[7M]**
   (b) Explain different approaches involved in handling distributed deadlock prevention. **[7M]**

(OR)

4. (a) Illustrate with an example how Lamport's algorithm synchronises the logical clocks in distributed systems. **[7M]**
   (b) What is Deadlocks in distributed systems? Explain various strategies used to handle deadlocks in distributed systems. **[7M]**

UNIT – III

5. (a) Illustrate the working of a registry-based algorithm for finding and using idle workstations. **[7M]**
   (b) Briefly discuss the advantages of stageful and stateless servers. **[7M]**

(OR)

6. (a) Briefly discuss different design Issues for Processor Allocation Algorithms. **[7M]**
   (b) What are the reasons for replication? Explain different techniques of replication in distributed file system. **[7M]**

UNIT – IV

7. (a) Briefly discuss different consistency models using synchronization operations and consistency models not using synchronization operations. **[7M]**

   (b) Explain the concept of usage of twin pages which are used in Munin release consistency. **[7M]**

(OR)

8. (a) Briefly explain the properties of weak consistency model in distributed synchronization operations. **[7M]**

   (b) Explain the events in write-through cache consistency protocol and the corresponding action taken by a cache in response to its own CPU's operation and remote CPU's operation. **[7M]**

UNIT – V

9. (a) List and briefly explain different principal message types that go from the kernel to the memory manager. **[7M]**

   (b) Write a brief note on conceptual model of memory that Mach user processes in a linear virtual address space. **[7M]**

(OR)

10. (a) Illustrate what are the different components involved in a mach process. **[7M]**

    (b) Explain different Process Management Primitives provided by Mach microkernel-based operating system. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCS005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

ADVANCED DATABASE MANAGEMENT SYSTEM

(Computer Science and Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Discuss the importance of a database system instead of simply storing data in operating system files? When would it make sense not to use a database system? **[7M]**

   (b) Consider the following information about a university database: **[7M]**

   - Professors have an SSN, a name, an age, a rank, and a research specialty.
   - Projects have a project number, a sponsor name (e.g, NSF), a starting date, an ending date, and a budget.
   - Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.).
   - Each project is managed by one professor (known as the project's principal inves- tigator).
   - Each project is worked on by one or more professors (known as the project's co-investigators).
   - Professors can manage and/or work on multiple projects.
   - Each project is worked on by one or more graduate students (known as the project's research assistants).
   - When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
   - Departments have a department number, a department name, and a main office.
   - Departments have a professor (known as the chairman) who runs the department.
   - Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
   - Graduate students have one major department in which they are working on their degree.
   - Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take.

   Design and draw an ER diagram that captures the information about the university. Use only the basic ER model here; that is, entities, relationships, and attributes. Be sure to indicate any key and participation constraints

2. (a) Discuss the following terms: relation schema, relational database schema, domain, attribute, attribute domain, relation instance, relation cardinality, and relation degree. **[7M]**

(b) Consider the employee database given below, where the primary keys are underlined. **[7M]**

employee (*employee name*, *street*, *city*)
works (*employee name*, company name, salary) company (*company name*, city)
manages (*employee name*, manager name)
Give an expression in SQL for each of the following queries:

i. Find the names of all employees who work for First Bank Corporation.
ii. Find all employees in the database who live in the same cities as the com- panies for which they work.
iii. Find all employees in the database who live in the same cities and on the same streets as do their managers.
iv. Find all employees who earn more than the average salary of all employees of their company.

UNIT – II

3. (a) Briefly describe different kinds of inter operation parallelism can be exploited within a query. **[7M]**
   (b) Discuss the implementation challenges of ORDBMS. **[7M]**
4. (a) Explain various operations can be implemented in parallel in a shared-nothing architecture. **[7M]**
   (b) Discuss the similarities and differences between OODBMS and ORDBMS. **[7M]**

UNIT – III

5. (a) Enumerate the concept of horizontal fragmentation in DDBMS and list the advantages of horizontal fragmentation. **[7M]**
   (b) Explain different components in reference architecture for distributed databases with the help of diagram. **[7M]**
6. (a) List and briefly discuss different levels of transparency supported in distributed database management systems. **[7M]**
   (b) What are the objectives of data distribution design in DDBMS. **[7M]**

UNIT – IV

7. (a) Briefly discuss different modeling constraints considered during Fragment allocation problem. **[7M]**
   (b) Explain different categories of equivalence transformations for relational algebra based on the type of operators involved. **[7M]**
8. (a) Briefly discuss different dimension for the analyzing the framework of distributed systems. **[7M]**
   (b) Discuss about a reasonable unit of distribution in fragmentation. Discuss the Relation or fragment of relation? **[7M]**

UNIT – V

9. (a) Discuss the difference between semijoin and bloom join operation in distributed databases. **[7M]**
   (b) Illustrate the inverted index data structure to enable fast retrial of all documents that contain query string. **[7M]**
10. (a) Write a brief note on cost-based query optimisation in distributed databases. **[7M]**
    (b) Illustrate the graph based data model for representing semistructured XML data. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCS006

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

CYBER SECURITY

(Computer Science and Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain in detail about various types of cyber crime and discuss briefly about Web Server. **[7M]**
   (b) Describe the architecture of Apache and IIS web servers, Database server and explain its functionality. **[7M]**
2. (a) Explain briefly about computer forensics. **[2M]**
   (b) Discuss about different types of **[12M]**
      i. Web languages
      ii. Web security
      iii. N-tier web applications.

UNIT – II

3. (a) Explain in brief about cryptography, its purpose and concept of virus. **[4M]**
   (b) Illustrate the application of RSA algorithm in real time with an example. **[10M]**
4. (a) Explain about public key cryptography, its applications and using example. **[7M]**
   (b) Explain in brief about how intrusion detection systems are being implemented. **[7M]**

UNIT – III

5. (a) Explain the concept of working of an e-mail preservation and investigation in cyber crime. **[7M]**
   (b) Explain briefly about cyber crime investigation tools and their implementation. **[7M]**
6. (a) Define firewall. And explain how the firewall can be applied to overcome the virus. **[6M]**
   (b) Describe how e-mail can be recovered. Explain the concept of e-mail preservation and investigation. **[8M]**

UNIT – IV

7. (a) Explain briefly about the various applications of digital forensics. **[4M]**

   (b) Explain briefly about working model of **[10M]**

   i. Linux system forensics

   ii. Network forensics

8. (a) Explain in detail about how forensics helps in face ,iris, fingerprint recognition, audio video analysis. **[7M]**

   (b) What are the various advanced tools used for implementation forensics software and hardware analysis? Briefly explain. **[7M]**

UNIT – V

9. (a) Assume you are developing a website of a software company. List all the JDBC APIs and JDBC drivers used and explain how proxy design pattern is used to design secure JDBC driver. Also explain how SSL tunneling is used in secure jdbc transmission. **[7M]**

   (b) List and explain all the sections of the electronic communication privacy act. Give example situation where a criminal is let free due to the drawbacks in electronic communication privacy act. **[7M]**

10. (a) Explain the procedure of JDBC connectivity in real time application with an example. **[7M]**

    (b) What are the basics of Indian Evidence Act IPC and CrPC. Explain in detail. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCS201

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

WEB INTELLIGENT AND ALGORITHMS

(Computer Science and Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Briefly explain the basic elements of intelligent applications. **[7M]**
   (b) What are the problems in page ranking algorithm and discuss the solution for these page ranking problems. **[7M]**
2. (a) Explain about the applications that are benefited from intelligent applications. **[7M]**
   (b) Briefly discuss the effect of teleportation between web pages. **[7M]**

UNIT – II

3. (a) Write the pseudocode for Predicting the rating of an item for a user. **[7M]**
   (b) Briefly discuss the key ideas behind content-based similarities. **[7M]**
4. (a) Explain different categories of recommendation engines. **[7M]**
   (b) Write a brief note on concepts of distance and similarity in recommender systems. **[7M]**

UNIT – III

5. (a) Give the distinction between content-based and collaborative-based sources of metadata. **[7M]**
   (b) Explain different Categories of Tags based on how they are generated. **[7M]**
6. (a) Illustrate basic strategy used to Combine the term vectors from a number of documents to form a tag cloud. **[7M]**
   (b) Illustrate different steps involved in building a tag cloud. **[7M]**

UNIT – IV

7. (a) Explain different method commonly used for neighbourhood-based computation. **[7M]**
   (b) What is hybrid recommendation system? Explain Seven hybridization techniques. **[7M]**
8. (a) What is constraint based recommendation system? discuss the applications of constraint based recommendation system. **[7M]**
   (b) Justify the statement "Product Search Engines *Are Not Good* Product Recommendation Engines". **[7M]**

UNIT – V

9. (a) What are decision trees? List the advantage of decision trees. **[7M]**

   (b) Briefly discuss about adwords problem with an example. **[7M]**

10. (a) Differentiate between online and offline algorithms, discuss the examples for each algorithms. **[7M]**

    (b) Briefly discuss some of the challenges for the Semantic Web. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCS208

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

SOFT COMPUTING

(Computer Science and Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain architecture of simple artificial neural network in contrast with biological neuron. **[8M]**
   (b) For the network calculate weights and net input to output neuron **[6M]**
   {x1, x2,x3}={0.3,0.5,0.6}, {w1,w2,w3}={0.2,0.1,-0.3}
2. (a) Explain perceptron learning rule with example. **[6M]**
   (b) Explain architecture of back propagation network with neat diagram. **[8M]**

UNIT – II

3. (a) Explain bidirectional associative memory with neat diagram. **[8M]**
   (b) Explain architecture of Hebb's network. **[6M]**
4. (a) Explain the ADALINE model with neat diagram. **[7M]**
   (b) Explain in brief counter propagation networks. **[7M]**

UNIT – III

5. (a) Explain the properties of fuzzy sets. **[8M]**
   (b) Explain in detail fuzzy equivalence relation. **[6M]**
6. (a) What are the various methods of membership value assignments? **[6M]**
   (b) What are the various operations on fuzzy relations. **[8M]**

UNIT – IV

7. (a) Explain in brief about the aggregation of fuzzy rules. **[8M]**
   (b) Discuss about Sugeno fuzzy model in detail. **[6M]**
8. (a) Explain multi person decision making in brief. **[6M]**
   (b) Explain architecture and operation of FLC system. **[8M]**

UNIT – V

9. (a) Explain the terms population and fitness. **[6M]**

   (b) What are the types of encoding in GA. **[8M]**

10. (a) Explain in brief about mutation and flipping. **[8M]**

    (b) How are parallel GA's classified.Explain them in detail. **[6M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BCS703

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

RESEARCH METHODOLOGY

(Common to CSE|(CAD/CAM)|PEED|ES|SE)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) What are different types of research? Clearly explain Applied vs Fundamental research. **[7M]**
   (b) Explain the terms **[7M]**
      i. Design of the research project
      ii. Objectives of research

2. (a) Explain techniques involved in defining a research problem. **[7M]**
   (b) Briefly explain different types of research design. **[7M]**

UNIT – II

3. (a) What is the classification of measurement scales? Explain with examples. **[7M]**
   (b) Explain the terms in detail **[7M]**
      i. Test of Validity
      ii. Test of Reliability

4. (a) Explain various forecasting methods. Explain expert opinion method in detail. **[7M]**
   (b) Exponential smoothing is used to forecast automobile battery sales. Two value of α are examined, $\alpha = 0.8$ and $\alpha = 0.5$. Evaluate the accuracy of each smoothing constant. Which is preferable? (Assume the forecast for January was 22 batteries). Actual sales are given in Table 1. **[7M]**

Table 1

Month	January	February	March	April	May	June
Actual Sales	20	21	15	14	13	16
Forecast	22	20	21	16	14	13

UNIT – III

5. (a) What are various sources of secondary data? Briefly explain. **[7M]**
   (b) Write a short note on collection of data by personal interview. **[7M]**
6. (a) Explain in detail about the term ethics in detail? **[7M]**
   (b) Explain the role of ethics in science and technology. **[7M]**

UNIT – IV

7. (a) Explain the precautions to be taken in interpretation? **[7M]**
   (b) Discuss the various types of reports in detail. **[7M]**
8. (a) Explain the terms **[7M]**
      i. footnote
      ii. document styles
   (b) Discuss about oral presentation in detail. **[7M]**

UNIT – V

9. (a) What are the different types of Intellectual property rights? **[7M]**
   (b) Discuss about legal definition of a copy right? **[7M]**
10. (a) According to the patent act 2005 what are various items which are not patentable? **[7M]**
   (b) Explain the importance of Trade Mark. Give the benefit of registering a Trade Mark. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BES004

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

EMBEDDED SYSTEM ARCHITECTURE

(Embedded Systems)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Illustrate different phases in embedded system design and development process. **[7M]**
   (b) Explain the organization of embedded system board based upon the von Neumann architecture model. **[7M]**

(OR)

2. (a) Explain different ISA Models for Instruction-Level Parallelism with an example for each. **[7M]**
   (b) Write short notes on how to power the embedded hardware. **[7M]**

UNIT – II

3. (a) Give the comparison among von Neumann and Harvard processor architectures. **[7M]**
   (b) Enumerate the concept of ripple-carry adder by taking an example. **[7M]**

(OR)

4. (a) Explain different types of on-chip program memory(ROM). **[7M]**
   (b) What is serial interface? Explain different schemes serial i/o communication. **[7M]**

UNIT – III

5. (a) Explain the most common cache selection and replacement schemes in board memory. **[7M]**
   (b) Briefly discuss the solutions for improving the bandwidth of main memory. **[7M]**

(OR)

6. (a) Illustrate different phases in PCI transactions showing how PCI signals are used for transmission of information. **[7M]**
   (b) Briefly discuss about the bus performance with some limitations. **[7M]**

UNIT – IV

7. (a) Explain different phases in point to point protocol highlighting connection states and events. **[7M]**

   (b) Write the SMTP pseudocode implemented in an e-mail application on a client device. **[7M]**

(OR)

8. (a) Give the comparison among TCP/IP, OSI Models and Embedded Systems Model with the help of diagram. **[7M]**

   (b) Write the pseudocode to demonstrates a sample UDP pseudocode algorithm for processing an incoming datagram. **[7M]**

UNIT – V

9. (a) Explain four base structural types of the "4+1" model. **[7M]**

   (b) Enumerate C example compilation/linking steps and object file results with the help of diagram. **[7M]**

(OR)

10. (a) Explain different varieties of quality-attribute and architecture-oriented approaches to Analyze and evaluate the Architecture. **[7M]**

    (b) Briefly discuss different stages of Creating an Embedded System Architecture. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BES005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

FPGA ACHITECTURE AND APPLICATIONS

(Embedded Systems)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the logic diagram of a typical sequential Programmable Array Logic, the 16R4. **[7M]**
   (b) Write a brief note on sharable expanders in CPLD. **[7M]**
2. (a) Explain the structure of Read-Only Memory consisting of n-input lines and m-output lines. **[7M]**
   (b) Explain the architecture of Xilinx cool runner XCR3064XL CPLD. **[7M]**

UNIT – II

3. (a) Briefly discuss the desirable properties of technological Programmable Elements in FPGAs. **[7M]**
   (b) Explain the general structure of FPGA chip consisting of a large number of programmable logic blocks surrounded by programmable I/O block. **[7M]**
4. (a) Give the comparison among different programmable connections in FPGA. **[7M]**
   (b) Briefly discuss different applications of FPGAs. **[7M]**

UNIT – III

5. (a) Briefly discuss the features of different families XC3000-series FPGAs. **[7M]**
   (b) Explain the architecture of XC4000-series FPGA highlighting different programmable logic blocks. **[7M]**
6. (a) Write a brief note on Static-RAM implementation of FPGA technology. **[7M]**
   (b) List the key features of XC2000-series FPGA architecture and explain different components of XC2000-series FPGA architecture. **[7M]**

UNIT – IV

7. (a) Explain the features of anti-fuse programmed FPGAs. **[7M]**
   (b) Explain the implementation of an ACT 1 logic module using pass transistors. **[7M]**
8. (a) Illustarte the routing architecture of an Actel ACT FPGA. **[7M]**
   (b) Briefly discuss the features of ACT-2 anti-fuse programmed FPGA. **[7M]**

UNIT – V

9. (a) Explain the architecture of a full page high-resolution display video controller. **[7M]**

   (b) Explain the design flow for Actel synthesis. **[7M]**

10. (a) Explain the concept of position tracking for a robot manipulator in controlling a high precision robot with 16 degrees of freedom. **[7M]**

    (b) With the help of diagram explain the architecture of high-speed DMA controller. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BES006

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

INTERNET OF THINGS
(Embedded Systems)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. Explain briefly about various security challenge issues in an IoT. **[14M]**

2. (a) List and explain the challenges and issues of IoT. **[7M]**
   (b) Differentiate betweenZigbee and Wifi communication technologies. **[7M]**

UNIT – II

3. (a) Discuss the buffer and timer management for IoT. **[7M]**
   (b) Explain about software partitioning in an IoT. **[7M]**

4. (a) Explain saving and restoring the configuration. **[7M]**
   (b) Discuss about debugging protocols in an IoT. **[7M]**

UNIT – III

5. (a) Compare the types of information exchange and the related time of synchronization for various types of network architectures. **[7M]**
   (b) What are the various communication scenarios that occur in a product lifecycle? Explain. **[7M]**

6. (a) Describe the ways of impact of IoT on to the system agility. **[7M]**
   (b) List out the requirements for an Internet of Things addressing scheme. Briefly explain any two properties that an addressing scheme for the Internet of Things devices should have. **[7M]**

UNIT – IV

7. (a) Give the three ways on how“making is connecting” in the context of DiY. **[7M]**
   (b) Draw the EURIDICE knowledge base conceptual model and explain. **[7M]**

8. (a) Draw and explain network architecture and middleware for Wireless Sensor and Actuator Networks in DiYSE. **[7M]**
   (b) Define multi-agent Systems in an IoT. What are its properties? **[7M]**

UNIT – V

9. (a) Draw the simplified component architecture of the social access controller (SAC) and explain its functionality. **[7M]**

   (b) Write short notes on future web of things, of an IoT **[7M]**

10. Discuss the case study on be close elderly monitoring of an IoT. **[14M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BES210

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

EMBEDDED WIRELESS SENSOR NETWORKS

(Embedded Systems)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) List and briefly discuss the characteristics that are shared among most of the WSN applications. **[7M]**

   (b) Briefly discuss the energy consumption behavior of radio transceivers during transmission and reception. **[7M]**

2. (a) Briefly describe different Programming paradigms and application programming interfaces in WSN. **[7M]**

   (b) Explain different hardware components in sensor node. **[7M]**

UNIT – II

3. (a) Illustrates the idea of aggregation by taking an example. **[7M]**

   (b) Explain how a wireless sensor network can be enabled to access the remote clients via the Internet. **[7M]**

4. (a) Briefly discuss different options for interfacing an application to a protocol stack in WSNs. **[7M]**

   (b) Explain different energy efficiency parameters considered in most of the WSN applications. **[7M]**

UNIT – III

5. (a) What is an atomic block in NesC and write a atomic statement to illustrate multiple invocation of the async command share the values of the variable x. **[7M]**

   (b) What is Beaconing in wireless sensor networks and write the pseudocode describing how beaconing works. **[7M]**

6. (a) Write a nesC program to Print MessageC illustrating how to implement send Done as a task. **[7M]**

   (b) Explain different layers in Sensor network stack architecture. **[7M]**

UNIT – IV

7. (a) Explain different components in the architecture of TinyCubus. **[7M]**

   (b) Briefly the discuss core and loaded programs in Contiki architecture. **[7M]**

8. (a) What is SensorWare? Explain different types of task classes in runtime environment of SensorWare. **[7M]**

   (b) Briefly discuss different algorithms supported in Magent OS for application component movements. **[7M]**

UNIT – V

9. (a) Briefly discuss pros and cons of different algorithms for navigation of autonomous robots in WSNs. **[7M]**

   (b) What is localization in adhoc and wireless sensor networks and explain different types of localization techniques? **[7M]**

10. (a) What is coordinated approach during path planning in multi-robot system? **[7M]**

    (b) Write a brief note on different medium access protocols of wireless sensor networks. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BES214

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

EMBEDDED REAL TIME OPERATING SYSTEMS

(Embedded Systems)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Write the syntax of lseek function and explain different values of the whence argument. **[7M]**

   (b) Write the program to illustrate the concept of race condition and further write the program to il-lustrate avoiding race condition. **[7M]**

2. (a) Write a program to create a file with a hole in it. **[7M]**

   (b) Illustrate the relationship among six exec functions. Explain each function in detail. **[7M]**

UNIT – II

3. (a) Explain High-level view of an RTOS, its kernel, and other components found in embedded systems. **[7M]**

   (b) Illustrate the usage of different types of semaphores to address common synchronization design requirements effectively. **[7M]**

4. (a) Explain different types of scheduling algorithms. **[7M]**

   (b) Illustrate a typical Finite State Machine for task execution states, with brief descriptions of state transitions. **[7M]**

UNIT – III

5. (a) Explain different Steps must take place to accomplish uniform I/O operations at the application-level. **[7M]**

   (b) Illustrate the process of servicing a write operation for a block-mode device. **[7M]**

6. (a) Describe the relationship between the I/O API set and driver internal function set. **[7M]**

   (b) Explain memory-mapped I/O device address space with the help of diagram. **[7M]**

UNIT – IV

7. (a) Illustrates a general priority framework observed in most embedded computing architectures. **[7M]**

   (b) Explain different steps in servicing the timer interrupt. **[7M]**

8. (a) What is a spurious interrupt ? Explain different types of triggering mechanisms to raise interrupts to the core processor. **[7M]**

   (b) List the issues are associated with the timing wheel approach and discuss the solutions for the same. **[7M]**

UNIT – V

9. (a) What is RT linux and list the functionalities of RT linux? **[7M]**

   (b) List and briefly discuss the features of the system user of μC/OS-II to control the tasks. **[7M]**

10. (a) What is V_x works and list the functionalities of Vx works? **[7M]**

    (b) Explain different components in software stack of different layers in android architecture. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BPE004

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

POWER ELECTRONIC CONTROL OF AC DRIVES

(Power Electronics and Electrical Drives)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain induction motor characteristics in constant torque and field weakening regions. **[7M]**

   (b) A 400 V, 50 HZ, 4-pole, 1370RPM, Y connected squirrel cage induction motor has following parameters **[7M]**
   R_s= 2Ω , R_r= 3Ω , $X_s = X_r = 3.5\Omega$ The motor is fed from a voltage source inverter, which maintains a constant v/f ratio. For an operating frequency of 10 HZ, calculate starting torque and current of this drive as a ratio of their values when motor is started at rated voltage and frequency.

(OR)

2. (a) Draw and explain the speed torque characteristics of induction motor at variable voltage and constant frequency operation. **[7M]**

   (b) Draw and explain the speed torque characteristics of induction motor at variable frequency and constant voltage operation. **[7M]**

UNIT – II

3. Explain in detail with necessary block-diagram the open loop volts/Hertz speed control with voltage fed inverter. Sketch and explain briefly the Torque-speed curves showing effect of frequency variation, load torque and supply voltage changes, the acceleration/deceleration characteristics with Volts/Hz control. **[14M]**

(OR)

4. (a) With block diagram explain current fed inverter control of induction motor drive with speed and flux control . **[7M]**

   (b) Explain efficiency optimization control by flux program. Show the efficiency improvement by flux program at variable torque but constant speeds. **[7M]**

UNIT – III

5. With neat schematic diagram explain static Kramer drive. Derive the torque expression and draw the torque speed curves at different inverter firing angle **[14M]**

(OR)

6. What is indirect vector control of induction motor? Draw the phasor diagram for indirect vector control. Derive equations for indirect vector control . Draw indirect vector control block diagram and describe its operation. **[14M]**

UNIT – IV

7. (a) Explain Constant torque angle control with its characteristics. **[7M]**
   (b) Explain Unity power factor control with its characteristics. **[7M]**

(OR)

8. (a) Explain Constant torque mode control with neat schematic diagram. **[7M]**
   (b) Explain Flux weakening controller with neat schematic diagram. **[7M]**

UNIT – V

9. Explain briefly variable reluctance motor operation and also derive its torque expression. **[14M]**

(OR)

10. Explain current regulated Brushless DC motor drive, along with its characteristics and also explain in detail about the operation of the drive. **[14M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BPE005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

DC TO AC CONVERTERS

(Power Electronics and Electrical Drives)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the principle of operation of a single phase full bridge inverter circuit with the help of a neat circuit diagram and necessary waveforms. **[7M]**

   (b) A single phase half bridge inverter is operated from a 48V battery and is supplying power to a pure resistive load of 2.4Ω. Determine **[7M]**

   i. The RMS voltage a fundamental frequency
   ii. Output power
   iii. Average and peak currents of each transistor

2. (a) Discuss any two methods of voltage control for single phase inverters. **[7M]**

   (b) Explain trapezoidal and staircase modulation techniques for single phase inverters. **[7M]**

UNIT – II

3. (a) What are resonant pulse inverters. Explain the principle of operation of series resonant inverters with unidirectional switches with a neat circuit diagram and waveforms. **[7M]**

   (b) The half-bridge resonant inverter is operated at an output frequency of 7 kHz. If $C_1 = C_2 = C = 3\mu F$ and $L_1 = L_2 = L = 50\mu H$, R = 2Ω and supply voltage Vs = 200V. Determine **[7M]**

   i. the peak supply current
   ii. average thyristor current
   iii. rms thyristor current

4. (a) Explain about voltage control of resonant inverters with a neat circuit diagram and waveforms. **[7M]**

   (b) Compare ZCS and ZVS resonant converters and state their limitations. **[7M]**

UNIT – III

5. (a) Draw a general topology of multilevel inverters. Explain the operation with a a typical output voltage waveform. **[7M]**

   (b) What are the various topologies of Multilevel inverters. Explain the advantage of each type. **[7M]**

6. (a) Explain the principle of operation of a cascaded Multilevel Inverter with a neat circuit diagram. **[7M]**

   (b) Consider the output phase voltage waveform for m= 6 (including 0-level) cascaded MLI, find the generalized Fourier series of the phase voltage waveform obtained. **[7M]**

UNIT – IV

7. (a) What are Switched-Mode DC power supplies. Explain the operation of a fly back converter with a neat circuit diagram. **[7M]**

   (b) Draw the Full-bridge converter and derive the expression for the voltage transfer ratio. **[7M]**

8. (a) Discuss about bidirectional power supplies and resonant DC power supplies. **[7M]**

   (b) Explain the operation of a push pull converter with the help of a neat circuit diagram. **[7M]**

UNIT – V

9. (a) Draw the schematic diagram of Switched-Mode AC power supplies and explain. **[7M]**

   (b) What are the types of power line disturbances. Explain about Power Conditioners with a neat diagram. **[7M]**

10. (a) Draw the block diagram of an UPS. Explain the function of each block. **[7M]**

    (b) Draw a circuit of a multistage conversion and explain. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BPE006

INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

FLEXIBLE AC TRANSMISSION SYSTEMS
(Power Electronics and Electrical Drives)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) What are the benefits of FACTS controllers. **[7M]**
   (b) Explain the power flow in parallel paths and meshed networks. Also explain the inter connections in power flows? **[7M]**
2. (a) What are the different FACTS controllers used and briefly explain them? **[7M]**
   (b) What is the importance of controllable parameters in FACTS devices. **[7M]**

UNIT – II

3. Explain the principle of operation of single phase full wave bridge converter in detail. Draw the necessary waveforms of various AC and DC quantities? **[14M]**
4. (a) Explain the transformer connections for 12 and 24 pulse converter. **[7M]**
   (b) Compare current source converter with voltage source converter. **[7M]**

UNIT – III

5. (a) Why transmission line require reactive power compensation? Justify. **[7M]**
   (b) Explain the midpoint compensation technique for stability improvement. **[7M]**
6. Explain the TCR and TSC type of VAR generators in detail? Derive the necessary equations.**[14M]**

UNIT – IV

7. (a) Explain the operation and characteristics of SVC. **[7M]**
   (b) Explain the transient stability enhancement using SVC. **[7M]**
8. Explain the comparision of SVC and STATCOM. Discuss the operational and performance characteristics of SVC and STATCOM. **[14M]**

UNIT – V

9. (a) Why series compensation is used? Justify. **[7M]**
   (b) How series compensation improves transient stability? **[7M]**
10. Explain the various control schemes of GSC, TSSC and TCSC. **[14M]**

Hall Ticket No | | | | | | | | | | | Question Paper Code: BPE210

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

POWER QUALITY

(Power Electronics and Electrical Drives)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain various power quality problems and their causes? **[7M]**
   (b) Explain the effect of DC offset current in a distribution network? **[7M]**
2. (a) Describe various power quality standards of IEC and IEEE? **[7M]**
   (b) Define the following power quality problems: **[7M]**
      i. Transient
      ii. Total Harmonic Distortion and write the expression of current THD
      iii. Power frequency variations

UNIT – II

3. (a) Explain the contribution following Industrial non-linear loads to power quality issues. **[7M]**
      i. Three-Phase power converters
      ii. Arcing devices
   (b) Explain voltage fed type of non-linear loads? **[7M]**
4. (a) What are the various classifications of AC/DC converter type non-linear loads? **[7M]**
   (b) Describe various power quality problems caused by Non-linear loads? **[7M]**

UNIT – III

5. (a) Explain the Walsh transform technique for analysis of power quality measurement? **[7M]**
   (b) Discuss the merits and demerits of using Fourier and wavelet transforms in power quality analysis? **[7M]**
6. (a) Explain the Hartley transform technique for analysis of power quality measurement? **[7M]**
   (b) Write in brief the historical perspective of power quality measuring instruments? **[7M]**

UNIT – IV

7. (a) Define any three reliability indices for the response of the system to the power outages? **[7M]**

   (b) Describe the procedure for online extraction of fundamental sequential components from measured samples? **[7M]**

8. (a) What is voltage flicker and its causes? Also draw a waveform - graph of the voltage flicker due to time varying, non-linear loads? **[7M]**

   (b) Explain the effect of Voltage Sag on customers due to: **[7M]**

      i. Different Source impedance topology

      ii. Single line to ground fault in distribution system

UNIT – V

9. (a) What is meant by Custom Power Device (CPD) and list out the different types of CPD's? **[7M]**

   (b) Explain how a sensitive load will be protected by a DVR with a neat schematic diagram? **[7M]**

10. (a) Briefly describe the following with schematic diagram: **[7M]**

      i. Solid State Current limiter

      ii. Static Transfer Switch

   (b) Describe the status of application of custom power devices? **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BPE214

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

INTELLIGENT CONTROLLERS

(Power Electronics and Electrical Drives)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) What are the various activation functions? Explain them schematically? **[7M]**
   (b) What are the major aspects of parallel distributed model? **[7M]**
2. (a) Derive the convergence theorem for perceptron learning rule? **[7M]**
   (b) What are the deficiencies of back propagation algorithm? Explain various methods employed to overcome the deficiencies of back propagation algorithm. **[7M]**

UNIT – II

3. (a) Retrieve the associated pair for X3 using Kosko's BAM?. **[7M]**
   X_1=(1 -1 -1 -1 -1 1) Y_1=(1 1 -1 -1 -1)
   X_2=(-1 1 1 -1 -1 -1) Y_2=(1 -1 1 -1 -1)
   X_3=(-1 -1 1 -1 1 1) Y_3=(-1 1 1 1 -1)
   (b) Explain the generalized delta rule in recurrent networks. **[7M]**
4. (a) Describe the vector quantization scheme. **[7M]**
   (b) What is Kohonen network? Explain? **[7M]**

UNIT – III

5. (a) What are the operations on fuzzy set? Explain. **[7M]**
   (b) What are fuzzy relations? Explain them?. **[7M]**
6. (a) Explain Mamdani inference mechanism. **[7M]**
   (b) What are various defuzification methods? Explain any two? **[7M]**

UNIT – IV

7. (a) Compare and contrast Genetic algorithm with other optimization techniques. **[7M]**
   (b) Mention different types of mutation process. **[7M]**

8. (a) Differentiate between Roulette wheel selection and tournament selection. **[7M]**

   (b) Compare and contrast multilevel optimization and combinatorial optimization. **[7M]**

UNIT – V

9. (a) Explain the application of neural network for robot arm dynamics. **[7M]**

   (b) Explain how fault is diagnosed using fuzzy logic control. **[7M]**

10. (a) Give a short description on GA based transportation problems?. **[7M]**

    (b) Maximize the function f(x) = X^2 over the range of integers from 0 to 31 using genetic algorithm. **[7M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BST004

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

STRUCTURAL DYNAMICS

(Structural Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Classify the different types of vibrations in structural system. Explain with neat sketches. **[10M]**
   (b) Define the degrees of freedom and explain the types with example of singly storey and multi storey shear buildings. **[4M]**

(OR)

2. (a) Explain Simple Harmonic motion with vectorial representation. Also explain the examples of Simple Harmonic Motion. **[7M]**
   (b) Find the amplitude of the sum of the two harmonic motions, **[7M]**
   $x_1 = 3\cos(2t + 1^o)$; $x_2 = 4\cos(2t + 1.5^o)$;

UNIT – II

3. Determine the differential equation of a classical spring-mass system and its natural frequency by using **[14M]**
   i. D'Alembert's principle
   ii. Energy method
   iii. Rayleigh's method.

(OR)

4. A machine of 20 kg mass is mounted on a spring and dashpot (SDOF). The total spring stiffness is 10N/mm and the total damping is 0.15N/mm/s. If the system is initially at rest and a velocity of 100 mm/s is imparted to the mass, then determine **[14M]**
   i. Displacement and velocity of the mass as function of time
   ii. Displacement and velocity at time equal to one second.

UNIT – III

5. An undamped two DOF system shown in Figure 1 has mass m_1= m_2= m and stiffness k_1= k_2= k. Determine its frequencies and mode shapes. **[14M]**

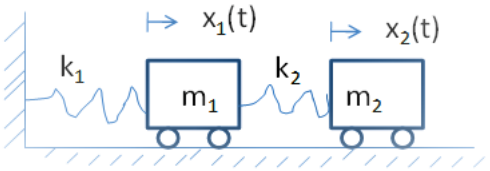

Figure 1

(OR)

6. (a) Explain the mode superposition methods to combine the modes in response spectra method of analysis. **[7M]**

   (b) Explain the orthogonality condition of mode shapes for multi degree freedom system.What is its significance in dynamic analysis. **[7M]**

UNIT – IV

7. Explain the iterative method of frequency of vibration of Multi-degree of freedom spring mass system using Holtzer method. **[14M]**

(OR)

8. Derive the first three natural frequency and mode shapes for cantilever beam by solving the governing differential equation of flexural vibrations for continuous systems. **[14M]**

UNIT – V

9. Derive the response of a Single-degree of freedom system due to base excitation by solving the governing differential equation of motion. **[14M]**

(OR)

10. Explain the IS code procedure for response of multi storey building to earthquake excitation using Response spectra method.

[14M]

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BST005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

FINITE ELEMENT METHOD

(Structural Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the concept of FEM briefly and outline the procedure. **[6M]**
   (b) Find out deflection at centre of a simply supported beam of length (L) subjected to a concentrated load W. Use Rayleigh Ritz method. Take EI is constant. **[8M]**
2. (a) Derive the equations of equilibrium in case of a three dimensional stress system. **[7M]**
   (b) State and explain the principle of minimum potential energy. **[7M]**

UNIT – II

3. (a) State and explain the convergence requirements of polynomial shape functions. **[7M]**
   (b) Derive the expression for shape function for a two noded bar element taking natural coordinate as varying from -1 to 1. **[7M]**
4. The thin plate of uniform thickness 20 mm, is as shown in Figure 1. In addition to the self-weight, the plate is subjected to a point load of 400N at mid-depth. The Young's modulus E = $2 \times 10^5 N/mm^2$ and unit weight $\rho = 0.8 \times 10^{-4} N/mm^2$. Analyse the plate after modelling it with two elements and find the stresses in each element. Determine the support reactions also. **[14M]**

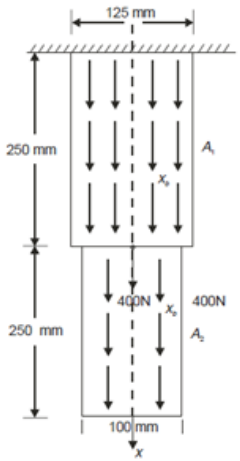

Figure 1

UNIT – III

5. (a) Explain the terms isoparametric, subparametric and superparametric elements. **[9M]**

   (b) Write short notes on serendipity elements with necessary figure. **[5M]**

6. Assemble Jacobian matrix and strain displacement matrix corresponding to the Gauss point (0.57735, 0.57735) for the element shown in Figure 2. Then indicate how you proceed to assemble element stiffness matrix. **[14M]**

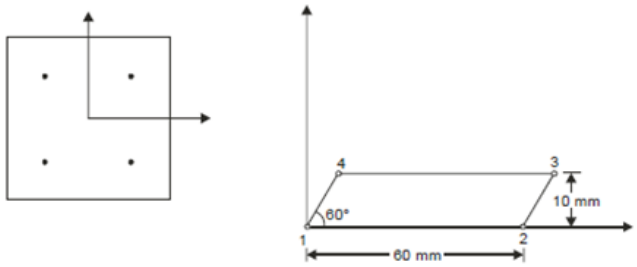

Figure 2

UNIT – IV

7. Describe briefly about basic theory of plate bending with neat sketch and derive flexural rigidity equation. **[14M]**

8. Explain the term Mindlin's C0-continuity plate element and briefly explain stiffness matrix formulation for such elements. **[14M]**

UNIT – V

9. Explain the different types of non-linearities encountered in structural analysis. **[14M]**

10. Explain mid-point Runge-Kutta incremental scheme and discuss its advantages and disadvantages over the incremental procedure. **[14M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BST006

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

ADVANCED STEEL DESIGN

(Structural Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) What are types of defects in welded connection? Explain any three defects in weld with sketches. **[4M]**

   (b) Two plates of thickness 16 mm each are joined by a triple bolted lap joint.Use ordinary bolts of property class 5.6. Design the joint and calculate the efficiency.Grade of steel is Fe 490. Sketch the details. Can the joint be made economical? Justify with numerical **[10M]**

2. (a) Discuss the assumptions in the design of HSFG bolted connections as a non slip joint. **[4M]**

   (b) Design a fillet weld (Three sides and site weld) to join a tension member consisting of 2 ISA 100 X 75 X 10 mm to a 12 mm thick gusset plate. The service tensile load is 410 kN. Use Fe 540 Grade steels. **[10M]**

UNIT – II

3. A double plate bracket is provided using 12mm thick plates connected to flanges of a steel column having flange thickness of 12.7 mm and transmit a factored load of 600 kN at an eccentricity of 225 mm to induce torsion in the bolt. Design the bracket using M24 grade 5.8 bolts. The load is included at 80° w.r.t horizontal acting outwards. **[14M]**

4. An ISMB 500 @ 86.9kg/m is connected to the flange of a column ISHB 400 @ 82.2kg/m carrying a vertical service load of 200kN at a distance of 300mm from the flange of the column and a horizontal service load of 50kN at the top of the flange acting outwards. Assume flange welds and web welds of same size. Adopt shop welds and Fe410 grade steel. Design the connection using fillet welds and sketch the details. **[14M]**

UNIT – III

5. Design the following members of a roof truss and the forces are shown in Figure 1. Design the connection also and sketch the details. All the forces indicated are service load. **[14M]**

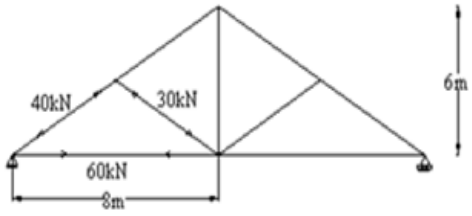

Figure 1

6. Design members AB, AC and joint A of a roof truss, $25°44'$ apart for the following data as shown in Table 1. **[14M]**

Table 1

Member	Length	Compressive force	Tensile force
AB	2.4 m	80kN	65kN
AC	1.85 m	62kN	82kN

Also design the welded connections at joint A. Use tubes of grade Y_{st} 210.

UNIT – IV

7. (a) Write the procedure followed in the design of tension member in truss. **[7M]**
   (b) Discuss wind loads and wind effects on truss girder bridges. **[7M]**

8. Analyse and design of portal bracing of a through type truss girder bridge subjected to load Q = 70 kN, shown in Figure 2. **[14M]**

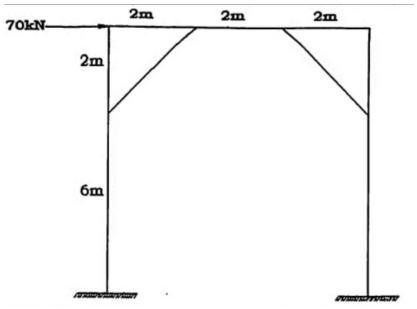

Figure 2

UNIT – V

9. (a) Explain the different failure modes of steel bins. **[7M]**
   (b) Write the procedure followed in the design of Silos. **[7M]**

10. Explain with neat sketch the design of bunker by Jansen theory. **[14M]**

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BST210

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

EARTHQUAKE RESISTANT DESIGN OF BUILDINGS

(Structural Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only
Note: Use of IS 1893:2002 (Part II), IS 1390 is Permitted

UNIT – I

1. (a) Explain the dynamics of MDOF systems. **[7M]**
   (b) How is the magnitude of an earthquake defined? Is it a true measure of damage potential? Why? **[7M]**

2. (a) What is intensity of an Earthquake? How is it indicated? **[7M]**
   (b) What is seismic hazard analysis? How it is useful? **[7M]**

UNIT – II

3. (a) Explain the principles and design philosophies involved in design of earthquake resistant design of structures? **[7M]**
   (b) Simplicity and symmetry are the key to making a building earthquake resistant. Explain the concept with the help of examples. **[7M]**

4. Irregularities of mass, stiffness and strength are not desirable in buildings situated in earthquake prone areas. Describe using diagrams how these occur and affect the building. **[14M]**

UNIT – III

5. The Plan and elevation of a three storey RCC school building is shown in Figure 1. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment-resisting frame. The intensity of DL is 10 kN/m^2 and the floors are to cater to an IL of 3 kN/m^2. Determine the design seismic loads on the structure by static analysis. **[14M]**

6. Explain the factors involved in seismic coefficient method of analysis in detail. **[14M]**

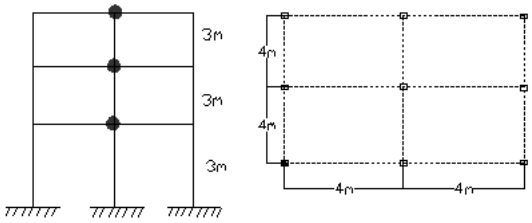

Figure 1

UNIT – IV

7. Define Shear walls? How they are classified. Discuss the various factors which influence the structural performance of shear walls. **[14M]**

8. Design a Rectangular beam for 8 m span to support a dead load of 14 kN/m and a live load of 22 kN/m inclusive of its own weight. Moment due to Earthquake load is 110 kN-m and Shear force is 70 kN. Use M20 grade concrete and Fe 415 steel. **[14M]**

UNIT – V

9. (a) Give the seismic design procedure of a two storey masonry building with example? **[7M]**
   (b) Sketch and explain the different types of bands used in masonry buildings. **[7M]**

10. Determine the lateral forces on a two storey unreinforced brick masonry building as shown in Figure 2 situated in Allahabad (zone III) for the following data : Weight of Roof = 2.5 kN/m^2, weight of wall = 5.0 kN/m^2, Live load on roof = 0 and Live load on floor is 1.0 kN/m^2. I = 1.0 and R = 1.5. Type of soil is medium soil. **[14M]**

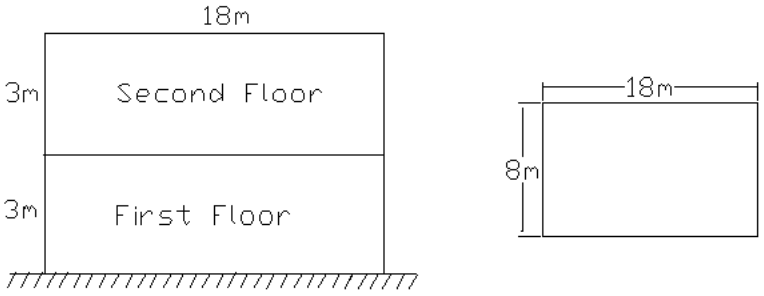

Figure 2

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Hall Ticket No | | | | | | | | | | | Question Paper Code: BST214

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

REHABILITATION AND RETROFITTING OF STRUCTURES

(Structural Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Define repair, renovation, restoration, rehabilitation and retrofitting. Explain in detail the difference between them. **[7M]**
   (b) What are the uses of repair, rehabilitation and retrofitting? **[7M]**
2. (a) Define distress. Explain different types of distress in concrete structures. **[7M]**
   (b) What do you mean by deterioration? Mention the various causes of deterioration. **[7M]**

UNIT – II

3. (a) Briefly explain **[7M]**
      i. corrosion inhibitors
      ii. cathodic protection
   (b) Discuss in detail the factors effecting corrosion. **[7M]**
4. (a) Explain in detail the mechanisms of damage in fresh state of concrete. Explain various factors effecting hardened concrete. **[7M]**
   (b) Explain the cracking phenomena in plastic concrete. Give the remedial measures. **[7M]**

UNIT – III

5. (a) How do you achieve accelerated strength gain in concrete? **[7M]**
   (b) Explain in detail various NDT tests for assessing corrosion potential of concrete. **[7M]**
6. (a) What are the checks you will make on the day of concreting to ensure quality? **[7M]**
   (b) Explain the need for evaluation of structures. **[7M]**

UNIT – IV

7. (a) Explain the strengthening and stiffening of beams and girders. **[7M]**
   (b) Discuss the method of underpinning in detail. **[7M]**
8. (a) What are the types of repair in concrete structures? Explain in detail. **[7M]**
   (b) What is gunite? Explain its process in detail. **[7M]**

UNIT – V

9. (a) Explain the methodology of health monitoring of structures and how is it monitored. **[7M]**
   (b) Explain the use of smart sensor for monitoring civil engineering infra structures **[7M]**
10. (a) Explain active and passive structural health monitoring of structures and differentiate them. **[7M]**
   (b) Explain various smart materials and its applications in structural health monitoring system. **[7M]**

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