

**FACULTY OF ENGINEERING**  
**M.E(Civil – SE) III Semester AICTE, (Main) Examination, March 2021**

**Subject: Advanced Reinforced Concrete Design**

**Time: 2 Hours**

**Max. Marks: 70**

- Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.**  
**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**  
**iii) Missing data, if any, may suitably be assumed.**

- 1 Answer any four questions from the following. (4 x 4 = 16 Marks)**
- (a) Define curved beams.
  - (b) Give IS specifications for deep beams
  - (c) List out different stresses developed in domes.
  - (d) Define meridional thrust.
  - (e) Give any two differences between silo and bunkers.
  - (f) What is the need for the design of raft foundation?
  - (g) Give any two design principles of machine foundations.
- 2 A circular girder of a water tank has a mean diameter of 10m and it is supported on 12 symmetrically placed columns. The uniformly distributed load on the girder is 350 kN/m. Design the critical section of the circular girder using M 30 grade concrete and Fe 500 grade steel. Sketch the reinforcement details.**  
 Take  $K_1 = 0.0037$ ,  $K_2 = 0.0014$ ,  $K_3 = 0.0017$ ,  $W = 7^\circ 15'$  angular distance. (18)
- 3 Design and detail an interior span of a deep beam using the following data:**  
 Span of beam = 12m  
 Overall depth = 5m  
 Width of support = 0.9m  
 Width of beam = 0.5m  
 u.d.l. (including self weight) = 260 kN/m  
 Use M35 grade concrete and Fe550 grade steel. (18)
- 4 Design an Intze type water tank of 2.5 million liters of capacity, supported on an elevated tower comprising of 10 columns. The base of the tank is 3m above the ground level. Depth of foundations 3.5m below ground level. Adopt M30 grade concrete and Fe550 grade steel. (18)**
- 5 Design a cylindrical silo of internal diameter 9m and 32m deep with a conical hopper bottom to store wheat. The density of wheat is  $18.5 \text{ kN/m}^3$  and angle of repose is  $31^\circ$ . Use M35 grade concrete and Fe500 grade steel. (18)**
- 6 Design a pile for transmitting an axial design load of 1800kN. The pile is to be embedded in hard strata up to a depth of 6m. Assume  $\sigma_{cc} = 5\text{N/mm}^2$ ,  $\sigma_{sc} = 130 \text{ N/mm}^2$  and M50 grade concrete Fe550 steel. (18)**
- 7 (a) Explain the design procedures and principles of bunkers. (9)**  
**(b) Discuss the stepwise procedure for design of domes. (9)**

**FACULTY OF ENGINEERING****M.E. (Civil-SE) III Semester (AICTE) (Main) Examination, March 2021****Subject: Retrofitting and Rehabilitation of Structures****Time: 2 Hours****Max. Marks: 70**

**Note i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1. Answer any four questions from the following. (4 x 4 = 16 Marks)**

- (a) Describe at least two causes of distress in concrete.
- (b) What are the quality assurance parameters to be evaluated for concrete during construction?
- (c) Differentiate between Guniting and shotcrete.
- (d) List some of the methods for corrosion protection of embedded steel.
- (e) Explain the term health monitoring of structures.
- (f) List the various facets of maintenance of buildings.
- (g) What are the conductive thermal properties for concrete durability?
- 2 (a) Explain in detail the various maintenance strategies of buildings. (8)  
 (b) Describe the various stages of Condition assessment of structures. (10)
- 3 (a) Describe the effects of cover thickness of the reinforcing bars in concrete. (8)  
 (b) Describe the tests to evaluate the strength, permeability and thermal properties of concrete. (10)
- 4 (a) What are the procedures used for removing rust from reinforced concrete? (8)  
 (b) What are the applications of sulphur infiltrated concrete and fiber reinforced concrete in repair of structures. (10)
- 5 (a) Explain the method of Jacketing for retrofitting of distressed structures. (8)  
 (b) Explain the process of shoring and underpinning in repair of sub-structures. (10)
- 6 (a) Describe the repair methodologies to overcome low member strength and deflections. (8)  
 (b) Write short notes on corrosion inhibitors and corrosion resistant steels. (10)
- 7 (a) Write short notes on role of building instrumentation in effective maintenance and repair of buildings and structures. (8)  
 (b) Describe techniques of engineered demolition of dilapidated structures. (10)

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**FACULTY OF ENGINEERING****M.E (Civil-SE) III-Semester (AICTE) (Main) Examination, March 2021****Subject : Design of Prestressed Concrete Structures****Time : 2 Hours****Max. Marks: 70**

**Note i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1. Answer any Four question from the following****(4 x 4 = 16 Marks)**

- a) Distinguish between pretensioned and post-tensioned members.
  - b) What is the effect of torsion on prestressed concrete sections?
  - c) Distinguish between spalling tension and bursting tension.
  - d) Write short note on circular prestressing
  - e) Sketch the typical cross sections of prestressed concrete floor panels generally employed in building and bridge construction.
2. a) How do you compute the loss of stress due to elastic deformation of concrete in post-tensioned members with several cables which are successively tensioned? 7
- b) A prestressed concrete beam, 250mm wide and 350mm deep, is prestressed with wires (area = 330mm<sup>2</sup>) located at a constant eccentricity of 60 mm and carrying an initial stress of 1100N/mm<sup>2</sup>. The span of the beam is 12m. Calculate the percentage loss of stress in wires if (a) the beam is pretensioned, and (b) the beam is post-tensioned, using the following data: (E<sub>s</sub>=210 kN/mm<sup>2</sup> and E<sub>c</sub>=35kN/mm<sup>2</sup>, Relaxation of steel stress = 5 percent of the Initial stress shrinkage strain of concrete = 3x10<sup>-4</sup> for pretensioning and 2x10<sup>-4</sup> for post-tensioning. Creep coefficient = 1.6, Slip at anchorage = 1.4mm, Frictional coefficient for wave effect = 0.0016 per m) 11
3. a) Distinguish between web-shear, flexural and flexure-shear cracks in concrete Beams with sketches. 7
- b) A post-tensioned roof girder spanning over 33, has an unsymmetrical I-section with a second moment of area of section of (72890x 10<sup>6</sup>) mm<sup>4</sup> and an overall depth of 1350 mm. The effective eccentricity of the group of parabolic cables at the centre of span is 585 mm towards the soffit and 180 mm towards the top of beam at supports. The cables carry an initial prestressing force of 3200kN. The self-weight of the girder is 11.2kN/m and the live load on the girder is 9 kN/m. The modulus of elasticity of concrete is 34kN./mm<sup>2</sup>. If the creep coefficient is 1.6, and the total loss of prestress is 13 percent, estimate the deflections at the following stages and compare them with the permissible values according to the Indian Standard Code (IS: 1343-2012) limits: ..2

- (a) Instantaneous deflection due to (prestress + self-weight)  
 (b) resultant maximum long-term deflection allowing for loss of prestress and creep of concrete. 11
4. a) Discuss in detail about the Concordant cable profile 7  
 b) The end block of a prestressed concrete girder is 220 mm wide and 350 mm deep. The beam is post-tensioned by two Freyssinet anchorages each of 120 mm diameter with their centres located at 80 mm from the top and bottom of the beam. The force transmitted by each anchorage being 2200 kN. Compute the bursting force and design suitable reinforcements according to the Indian Standard Code IS: 1343 provisions. 11
5. a) Briefly outline the salient design features of cylinder and non-cylinder pipes. 8  
 b) What is the effect of circumferential wire winding on longitudinal stresses? How do you compute these stresses and design longitudinal prestressing in circular pipes? 10
6. a) What are grid or coffered floors? What is the advantage of prestressing such floors? 7  
 b) A simple flat slab 12m by 9 m is supported by four columns so placed as to form a symmetrical rectangular grid, 7m by 5m. The cantilevers formed are 2.5 and 2m in the long and short directions of the slab. The live load on the slab is 1.5 kN/m<sup>2</sup>. Prestressing cables consisting of four wires of 6mm carrying an effective force of 120 kN are available for use. Design the number of cables required and indicate their arrangements in two principal directions. 11
7. A two-span continuous concrete beam ABC (AB – BC-12m) has a rectangular section, 300mm wide and 800 mm deep. The beam is prestressed by a cable carrying an effective force of 700kN. The cable has a linear profile in the span AB and parabolic profile in span BC. The eccentricities of the cable are +50 mm at A, - 100 mm at a distance of 7 m from A and +200mm at support B and -200 mm at mid span of BC (-below and + above centroidal axis) 18  
 (a) Evaluate the resultant moment developed at B due to the prestressing force.  
 (b) Sketch the line of thrust in the beam if it supports, a uniformly distributed load of 5 kN/m which includes the self-weight of the beam.  
 (c) Find the resultant stress distribution at the mid-support section for condition (b).

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## FACULTY OF ENGINEERING

M.E (Civil-TE) III-Semester (Main) (AICTE) Examination, March 2021

**Subject : GIS and GPS Application to Transportation Engg.**

**Time : 2 Hours**

**Max. Marks: 70**

**Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1. Answer any Four question from the following (4 x 4 = 16 Marks)**

- |  |    |
|--|----|
| a) What are the five main components of GIS?   | 9  |
| b) What is use of Remote Sensing data in GIS   | 9  |
| c) How data acquisition can be done remote sensing?  | 9  |
| d) List the various functions of GIS   | 9  |
| e) Differentiate between radiometric and geometric corrections   | 9  |
| f) What is a raster data model?  | 9  |
| g) Write the uses of GIS in Highway alignment  | 9  |
| 2. a) Discuss in detail how GIS can be useful to improve the road network planning   | 9  |
| b) Define GIS. explain about spatial and non-spatial data types with their advantages & disadvantages.   | 9  |
| 3. a) Explain micro level & macro level components of GIS  | 9  |
| b) Explain detail about the data models of GIS   | 9  |
| 4. a) Explain the decision support systems for land use planning   | 8  |
| b) Explain the maintenance and analysis of the non-spatial attribute data  | 10 |
| 5. a) What are the sources of error while acquiring remote sensing data?   | 9  |
| b) What are sensors. Discuss the uses sensors in Indian remote sensing satellites.   | 9  |
| 6. a) Discuss overlay analysis & network analysis in detail  | 10 |
| b) How do you use GIS in Environment impact assessment?  | 8  |
| 7. a) What are the various applications of GIS in transportation Engineering write the merits and demerits of manual digitizing method. suitable for use of remote sensing data. | 9  |
| b) How accident investigations can be performed by using GIS?  | 9  |

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**FACULTY OF ENGINEERING****M.E (Civil-CEM) III-Semester (AICTE) (Main) Examination, March 2021****Subject : Construction Planning Equipments and methods****Time : 2 Hours****Max. Marks: 70****Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.****ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.****iii) Missing data, if any, may suitably be assumed.****1 Answer any Four question from the following****(4 x 4 = 16 Marks)**

- a) Classify different types of prefabrication?
  - b) What is the role of module in construction industry?
  - c) State the importance of hoisting operation along with its applications
  - d) Explain the role of sling along with its schematic representation?
  - e) Define conveying operation? Further list out various applications of the same?
  - f) Under what circumstances the equipments needed to be taken on rent rather buying?
  - g) Differentiate between drum type and pan type mixers?
2. a) Describe various design principles of prefabrication? 9
  - b) Explain the importance of prefabrication in construction industry? 9
3. a) Explain the construction features of a modular kitchen? 9
  - b) Explain various reference systems for positioning of components and spaces in modular construction? 9
4. a) List out various types of crane? Explain the mechanical features and operating procedure of each type? 9
  - b) Describe various safety precautions considered while working with cranes in hoisting operation? 9
5. a) Explain the significance of belt in conveying equipments? Further, discuss about the damages occurred to belt during conveying operation? 9
  - b) In what way bucket conveyors are better in storing loose gravel material than screw conveyor? 9
6. a) Describe the features of different type of concrete placing equipments used to place concrete in inaccessible locations? 9
  - b) State the significance of vibrators in concrete preparation? Describe various features of different type of vibrators? 9
7. a) Explain about various type of connectors used in prefabrication construction? 9
  - b) Describe various methods of calculating Depreciation in calculating the cost of equipments? 9

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**FACULTY OF ENGINEERING****M.E. (EEE - PE) III Semester (AICTE)(Main) Examination, March 2021****Subject: Power Electronic Applications to Power Systems****Time: 2 Hours****Max. Marks: 70****Note: i) First question is compulsory and answer any three questions from the remaining six questions.****ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.****iii) Missing data, if any, may suitable be assumed.**

- 1. Answer any four questions from the following. (4 x 4 = 16 Marks)**
- Name the three components that regulate power flow through AC parallel paths.
  - Mention the objectives of shunt compensation.
  - Draw the loss versus VAR output characteristics of FC-TCR types VAR generator.
  - Draw the complete equivalent circuit of two terminal HVDC link.
  - Compare series and parallel MTDC systems.
  - Mention the reasons for generation of non-characteristic harmonics in six pulse converter.
2. a) Explain the four basic functions of controller in the FC-TCR type VAR Generator. (9)
- b) Explain various conventional methods of reactive power control in electrical power transmission system. (9)
3. a) Explain the basic operating principle of STATCOM with the help of line and vector diagrams. (9)
- b) What is SVC? Mention the application of SVC for transmission line. (9)
4. a) With phasor diagram, explain different modes of operation of STATCOM. (9)
- b) Explain the operation of TSSC along with VI characteristics. (9)
5. a) With a block diagram, explain the basic operating principle of UPFC. (9)
- b) Derive the expression for average DC voltage out put of a twelve pulse converter. (9)
6. a) Draw the complete layout of HVDC Converter Station and explain the features of major subsystems. (9)
- b) Draw the complete converter control characteristics and explain the principle of power control in a HVDC link. (9)
7. a) Explain the operation of AC filter and DC filter. (9)
- b) Derive the expression for output DC voltage of Greatz Bridge without overlap. Draw the output voltage wave form and voltage across valve 3 for firing angle zero and overlap angle zero. (9)

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## FACULTY OF ENGINEERING

M.E (EEE - PES) III-Semester (AICTE) (Main) Examination, March 2021

Subject : Power Electronic Applications to Renewable Energy

Time : 2 Hours

Max. Marks: 70

Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.

ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

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

**1. Answer any Four question from the following (4 x 4 = 16 Marks)**

- a) What is the effect of diurnal variation and temperature on I-V and P-V characteristics of PV cell?
  - b) A PV module is made up of 36 identical cells, all wired in series. With 1-sun insolation ( $1\text{KW}/\text{m}^2$ ), each cell has short-circuit current  $I_{SC} = 3.4\text{A}$  and at  $25^\circ\text{C}$  its reverse saturation current is  $I_0 = 6 \times 10^{-10}\text{A}$ . Parallel resistance  $R_p = 6.6\ \Omega$  and series resistance  $R_s = 0.005\ \Omega$ . Find the current, voltage, and power delivered when the junction voltage of each cell is  $0.50\text{V}$ .
  - c) Draw the typical ideal charging characteristics for a battery?
  - d) Briefly explain about multi input converter?
  - e) What is meant by interleaved converter?
  - f) Write down the potential benefits of a Micro Grid?
2. a) Explain the equivalent circuit of a PV cell and derive the expression for PV cell current? 9  
b) What is MPPT? Give the flow chart of a P&O MPPT algorithm? 9
  3. Derive the equation for input side reflected impedance of Buck, Boost and Buck-Boost converter? 18
  4. a) Explain about single phase PLL and how it can track phase of the grid voltage. 9  
b) Explain control Philosophy of a standalone PV system. 9
  5. a) Explain the principle of operation of DFIG generator for wind power applications? 9  
b) Explain the control philosophy of a battery charge controller? 9
  6. a) How P-V and I-V characteristics change with wind speed and blade pitch angle changes? 9  
b) Explain the operation of Synchronous generator with back to back controlled/uncontrolled converter for wind Power Generation.. 9
  7. Write short notes on the following
    - a) A.C and D.C micro grids 9
    - b) HERIC and H6-II topology 9

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**FACULTY OF ENGINEERING****M.E (Mech-CAD/CAM) III-Semester (AICTE) (Main) Examination, March 2021****Subject : Design for Manufacture****Time : 2 Hours****Max. Marks: 70****Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.****ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.****iii) Missing data, if any, may suitably be assumed.****1. Answer any Four question from the following****(4 x 4 = 16 Marks)**

- |   |   |
|---|---|
| a) Define geometric tolerance and tolerance control.                              |   |
| b) Distinguish between punching and blanking.                                     |   |
| c) List out of some specialized forming methods.                                  |   |
| d) Design considerations for brazing operation.                                   |   |
| e) What is the importance for NC Machining?                                       |   |
| f) Advantages of DFM.   |   |
| g) Design recommendations for Assembling.   |   |
| 2. a) Design consideration for materials which are used in regular manufacturing. | 9 |
| b) Explain the Properties of materials and compositions for steels and copper.    | 9 |
| 3. a) Design recommendations for Extruding parts.                                 | 9 |
| b) Design considerations for turned parts of Lathe machine.                       | 9 |
| 4. a) Explain the design procedure for investment casting process.                | 9 |
| b) Explain with a neat sketch of EDM process.                                     | 9 |
| 5. a) Design considerations for welding process.                                  | 9 |
| b) Explain with a neat sketch of Blow moulding process.                           | 9 |
| 6. a) Explain the concept of Low cost automation.                                 | 9 |
| b) Explain the concept of Group Technology.                                       | 9 |
| 7. a) CAM (Computer Aided manufacturing).   | 9 |
| b) Advantages and applications of CAD.  | 9 |

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## FACULTY OF ENGINEERING

**M.E (Mech.-CAD/CAM) III-Semester (AICTE) (Main) Examination, March 2021**

**Subject : Additive Manufacturing Technologies and Applications**

**Time : 2 Hours**

**Max. Marks: 70**

**Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1. Answer any Four question from the following (4 x 4 = 16 Marks)**

- a) Mention the need for time compression in product development
  - b) List out few commonly used terms for Additive Manufacturing
  - c) Mention the applications of FDM process
  - d) Mention various steps involve in LOM Process
  - e) What is Rapid Tooling and classify various Rapid Tooling Processes
  - f) What are the three types of non-manifold conditions?
  - g) Mention the applications of AM in Art & Architecture.
2. a) With the neat diagram, explain four primary aspects of AM Wheel 9
  - b) Explain the direct & indirect benefits of AM system, also mention its limitations 9
  3. a) Describe the process flow of Cubital's Solid Ground Curing System and mention its advantages 9
  - b) Discuss the working principle of SLA AM process with the neat sketch and mention its advantages and limitations 9
  4. a) Compare and contrast the laser based SLS and 3DP systems. 9
  - b) Explain with neat sketch the Arc spray metal deposition process. 9
  5. a) With neat sketches, explain various types of STL file problems. 9
  - b) What are the consequences of building a valid and invalid tessellated model? 9
  6. a) Briefly explain the features of 3D view software 9
  - b) Discuss the impact of AM in design and production of medical devices. 9
  7. Write short notes on any two of the following: 9+9
    - a) Benefits of AM
    - b) 3D keltool process
    - c) Features of Mimic's software

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## FACULTY OF ENGINEERING

M.E (Mech-CAD/CAM) III-Semester (Main) (AICTE) Examination, March 2021

Subject : Mechanics of Composite Materials

Time : 2 Hours

Max. Marks: 70

Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.

ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

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

1 Answer any Four question from the following (4 x 4 = 16 Marks)

- Discuss the roles served by matrix and reinforcement in composite material
- Write down the difference between micro-mechanics and macro-mechanics
- What is the limitation of a unidirectional lamina? How it can be overcome by Laminate? Explain with neat sketch?
- State the "Maximum stress failure theory" applied in composites
- Identify the types of laminate given below.

i)  $[0/30/60]$ , ii)  $[0/90_2/0/90]$ , iii)  $[-40/40/-40/40]$

- Carry out the comparison of composite material with metals in detail. 9
  - Mention the advantages and disadvantages of ceramic matrix composites 9

- Derive the expressions to  $E_1$ ,  $E_2$  in terms of constituent properties using micromechanics principles. 10
  - Explain about Halpin – Tsai equation. 8

- Reduced stiffness matrix of an orthotropic lamina is given by 9

$$[Q] = \begin{bmatrix} 150 & .81 & 4.027 & 0 \\ 4.027 & 20 & .11 & 0 \\ 0 & 0 & 0 & 5 \end{bmatrix} \text{ GPa}$$

Determine  $E_1$ ,  $E_2$ ,  $G_{12}$  and  $\nu_{12}$ .

- Anisotropic lamina has  $E=100 \text{ kN/mm}^2$ ,  $\nu=0.25$ . Determine reduced stiffness matrix and reduced compliance matrix. 9

- Explain any two failure theories of composite laminate. 9

- Find the maximum value of  $S > 0$  if a stress of  $\sigma_x = 2S$ ,  $\sigma_y = -3S$ , and  $\tau_{xy} = 4S$  is applied to the  $60^\circ$  lamina of graphite / epoxy. Use maximum stress failure theory. Assume the properties of a unidirectional graphite / epoxy lamina as 9

$E_1 = 181 \text{ GPa}$ ,  $E_2 = 10.3 \text{ GPa}$ ,  $\nu_{12} = 0.28$ ,  $G_{12} = 7.17 \text{ GPa}$ ,

$(\sigma_1^T)_{ult} = 1500 \text{ MPa}$ ,  $(\sigma_1^C)_{ult} = 1500 \text{ MPa}$ ,  $(\sigma_2^T)_{ult} = 40 \text{ MPa}$ ,  $(\sigma_2^C)_{ult} = 246 \text{ MPa}$ ,  $(\tau_{12})_{ult} = 68 \text{ MPa}$

- Find the three stiffness matrices [A], [B], and [D] for a three – ply  $[0/30/-45]$  graphite/ epoxy laminate, with the following Lamina Properties:

$E_1 = 181 \text{ GPa}$ ,  $E_2 = 10.3 \text{ GPa}$ ,  $\nu_{12} = 0.28$ ,  $G_{12} = 7.17 \text{ GPa}$  Assume that each lamina has a thickness of 5 mm. 18

- Differentiate Levy and Navier solutions of bending of a composite plate. 9
  - Explain state of stress in a cylindrical shell. 9

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**FACULTY OF ENGINEERING**  
**M.E. (Mech-HVAC) III Semester AICTE (Main) Examination, March 2021**

**Subject: Design of Air Distribution System**

**Time: 2 Hours**

**Max. Marks: 70**

- Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.**
- ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**
- iii) Missing data, if any, may suitably be assumed.**

**Answer any four questions from the following (4 x 4 = 16 Marks)**

- 1 (a) What are the factors to be consider during Cooling load requirement?  
(b) Write the advantages and disadvantages for All water system?  
(c) Mention the name of the different materials used for duct design?  
(d) What are the different types of insulating materials used for air conditioned buildings?  
(e) Write the selection criteria for Air-Conditioning system?  
(f) Explain coil equipment and spray equipment.  
(g) Discuss the Fan Law.
- 2 (a) Explain the procedure of head load calculations applied to a building system. (9)  
(b) Classify Air-Conditioning system and explain the concept of all water air conditioning system. (9)
- 3 (a) With the help of schematic layout explain the elements of air distribution system. (9)  
(b) Explain in details Duct design procedure? (9)
- 4 (a) Explain the method of insulation applied to Cooled Building. (9)  
(b) Explain economic thickness of insulation. (9)
- 5 (a) Write a note on design of the Grill? (9)  
(b) Mentions the type of Fans and their operating characteristics. (9)
- 6 (a) Explain about Air-Conditioning system used for ships. (9)  
(b) Discuss about Marine Air-Conditioning. (9)
- 7 (a) What is Fan arrangements? Discuss Fans in parallel. (9)  
(b) Discuss about Air-Craft Air-Conditioning system. (9)

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**FACULTY OF ENGINEERING****M.E (ECE-DS) III-Semester (Main) (AICTE) Examination, March 2021****Subject : GNSS Signals and Receiver Technology****Time : 2 Hours****Max. Marks: 70****Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.****ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.****iii) Missing data, if any, may suitably be assumed.****1. Answer any Four question from the following (4 x 4 = 16 Marks)**

- a) Why was FDMA adapted for GLONASS? What is the main disadvantage of FDMA over CDMA? 9
- b) What types of antennas are preferred for GNSS? 9
- c) Define code bin & Doppler bin in the context of serial search. 9
- d) What is amplitude fading? How it can be avoided in GPS receiver? 9
- e) Define pseudo-symbol and symbol in the context of GPS 9
2. a) Explain the signal structure of GLONASS. What are antipodal frequencies? 9
- b) Explain the architecture of GPS with the help of diagram. 9
3. a) Write important features of multichannel GPS receivers 9
- b) Explain the functions of front end components of GPS receiver 9
4. a) Why and where integration and squaring process is required in GPS. Explain With the help of block diagrams. 9
- b) Explain serial search acquisition method used for GPS signals. 9
5. a) Explain code tracking with the help of a block diagram 9
- b) Explain carrier tracking with the help of a block diagram 9
6. a) What is block interleaving? Explain with the help of a numerical example 9
- b) Explain Least Square method used to compute GPS user position. 9
7. a) Explain generation of C/A code of GPS with the help of a diagram 9
- b) What are the features of CRPA antennas used for GPS? 9

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**FACULTY OF ENGINEERING**  
**M.E. (ECE-DS) III Semester AICTE (Main) Examination, March 2021**

**Subject: Speech Signal Processing**

**Time: 2 Hours**

**Max. Marks: 70**

- Note:** i) **First Question is compulsory. Answer any three questions from the remaining six questions.**  
 ii) **Answer to each question must be written at one place only and in the same order as they occur in the question paper.**  
 iii) **Missing data, if any, may suitably be assumed.**

**1 Answer any four questions from the following. (4 x 4 = 16 Marks)**

- (a) Give the digital model for speech signal.  
 (b) Explain sub band coding.  
 (c) Define Loudness and bark scale  
 (d) What are Nasals, unvoiced fricative and voiced fricative?  
 (e) What is Delta modulation?  
 (f) What is speech enhancement?  
 (g) What is vocoder?
- 2 (a) Explain in detail the mechanism of speech production. (9)  
 (b) Explain anatomy and physiology of speech organs with suitable illustration. (9)
- 3 (a) What is the principle of LPC analysis? (9)  
 (b) Explain the Durbin's recursive solution for LPC analysis. (9)
- 4 State the functions for (18)  
 (i) Short time energy computation  
 (ii) Short time zero crossing rate  
 (iii) Short time function.
- 5 (a) Define complex cepstrum. What are its properties? (9)  
 (b) Define Short time auto correlation function what are its applications. (9)
- 6 (a) With a block diagram explain the following speech enhancement techniques. (9)  
 (a) Spectral subtraction (b) Enhancement by Resynthesis. (9)  
 (b) Explain in detail speaker recognition system. (9)
- 7 (a) Explain in an abstract manner, the stages involved in hmm based speech recognition. (9)  
 (b) Explain principle enhancement by resynthesis. Explain in detail. (9)

## FACULTY OF ENGINEERING

M.E (ECE-DS) III-Semester Main (AICTE) Examination, March 2021

Subject : Image and Video Processing

Time : 2 Hours

Max. Marks: 70

Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.

ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

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

1. Answer any Four question from the following

(4 x 4 = 16 Marks)

- a) Explain neighbor pixel relationship. Mention four applications of Digital Image processing.
- b) Explain Discrete Cosine Transform (DCT).
- c) Write the steps involved in frequency domain filtering with help of block diagram.
- d) Explain about Image negative point processing operation in spatial domain with a simple binary image.
- e) Define Redundancy and Compression Ratio.
- f) What are the motion representations?
- g) Explain briefly about H.26X standards.

2. a) Let  $V = \{0, 1\}$ , compute the length of the shortest 4,8, m-path between p and q, If a particular path doesn't exist between these points, explain why?

9

3	1	2	1(q)
2	2	0	2
1	2	1	1
(p)1	0	1	2

b) Compare CWT and DWT, List the advantages of Wavelet transform.

9

3. a) Derive an equation for Histogram equalization. Give its algorithm.

9

b) Distinguish between Image Smoothing and Image Sharpening filters.

9

4. a) Explain Binary Huffman coding. Obtain Huffman code and determine its efficiency for the word "COMMITTEE".

10

b) How Coding Redundancy, Spatial Redundancy, Temporal Redundancy are used in image compression?

8

5. a) Explain about Photometric and Geometric Image formation.

10

b) Explain how a video signal can be sampled.

8

6. a) Derive optical flow equation and explain optical flow estimation using it.

9

b) Explain Block matching motion estimation.

9

7. a) Explain the process/steps of Arithmetic Coding with an example

9

b) Write short notes on Wavelet based compression.

9

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**FACULTY OF ENGINEERING**  
**M.E. (ECE-ES & VLSI, / ES & VLSI Design) III Semester AICTE (Main) Examination,**  
**March 2021**

**Subject: Communication Buses and Interfaces**

**Time: 2 Hours**

**Max. Marks: 70**

**Note : i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1 Answer any four questions from the following. (4 x 4 = 16 Marks)**

- (a) Types of Buses with on word statement.
  - (b) Applications of Rs232
  - (c) What is internal bus?
  - (d) Define address multiplexing
  - (e) Define hardware protocol
  - (f) Give advantage of USB
  - (g) Define data streaming serial communicating protocol
- 2 (a) Explain about the CAN standard with example. (9)  
(b) Explain about the CAN Bus. (9)
- 3 (a) Where the data transmission layers are used and explain them. (9)  
(b) Describe Hardware protocols and its applications. (9)
- 4 (a) Describe USB – Transfer types. (9)  
(b) Define Rs232, Rs485, I2C, SPI. (9)
- 5 (a) Explain data streaming serial communication protocol. (9)  
(b) Write about serial front panel data port (SFPDP). (9)
- 6 (a) What are the hardware protocols? (9)  
(b) Write about descriptor types and contents. (9)
- 7 (a) Explain configuration space. (9)  
(b) Distinguish fiber optic and copper cable. (9)

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**FACULTY OF ENGINEERING****M.E (ECE - ES & VLSI, / ES & VLSID & SID) III-Semester (AICTE) (Main)****Examination, March 2021****Subject : Field Programmable Gate Arrays****Time : 2 Hours****Max. Marks: 70**

**Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.**

**ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any may suitably be assumed.**

**1. Answer any Four question from the following (4 x 4 = 16 Marks)**

- |   |    |
|---|----|
| a) Write any two differences between channeled and channel less Gate Array?   |    |
| b) State 3 significant advantages of standard cell based ASIC   |    |
| c) What is CLB and slice in FPGA?   |    |
| d) Specify different Cad tools for ASIC/FPGA design?  |    |
| e) What is routing? Classify types of routing?  |    |
| f) List out various FPGA delays present after placement?  |    |
| g) What are the objectives of logic simulation  |    |
| 2. a) Write the differences between CPLD and FPGA in terms of architecture, interconnection, density, speed and programming technology? | 8  |
| b) What are the advantages of ant fuse technology over fused technology? Explain anti fuse programming technology?                      | 10 |
| 3. a) Describe the structure of ACT1, ACT2, and ACT3 logic modules?   | 10 |
| b) What is the significance of Elmore's time constant? Explain it?  | 8  |
| 4. a) Describe physical design of FPGA with a neat flow chart?  | 8  |
| b) Explain power and clock planning of FPGA with neat sketch?   | 10 |
| 5. a) What are the objectives of placement? Explain Min-cut based algorithm with an example?  | 10 |
| b) What is channel density? Explain segmented channel routing in FPGA?  | 8  |
| 6. a) Explain Boundary Scan Design for board level testing?   | 8  |
| b) Describe the Xilinx architecture of 4-bit adder?   | 10 |
| 7. a) Explain routing resources of Xc4000 FPGA?   | 9  |
| b) Describe the architecture of CPLD with a neat sketch?  | 9  |

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**FACULTY OF ENGINEERING****M.E (ECE-ES) III-Semester (AICTE) (Main) Examination, March 2021****Subject : Energy Harvesting Technology & Power Mgmt. for IOT Devices****Time : 2 Hours****Max. Marks: 70**

- Note:** i) **First Question is compulsory. Answer any three questions from the remaining six questions.**  
 ii) **Answer to each question must be written at one place only and in the same order as they occur in the question paper.**  
 iii) **Missing data, if any, may suitably be assumed.**

**1. Answer any Four question from the following****(4 x 4 = 16 Marks)**

- a) Enumerate a few of the available energy sources for energy harvesting.
  - b) What do you understand by energy neutrality
  - c) Discuss the need of energy harvesting
  - d) Energy harvesters can phase out batteries. Explain
  - e) Compare sensor with a transducer
  - f) List out the power sources for WSN
  - g) What do you mean by SHM sensor nodes
2. a) Discuss the application of WSN for Energy and Environment Monitoring in Buildings 9  
 b) Write a note on 3<sup>rd</sup> generation PV cells 9
  3. a) Explain the application & working principle of Piezoelectric transducer 9  
 b) Describe what do you mean by microgeneration 9
  4. a) Explain what do you understand by Electrostatic Conversion 9  
 b) Write a description of Mechanical energy harvesting 9
  5. a) Explain how the principle of electromagnetic induction is used for energy harvesting 9  
 b) Explain non-linear micro vibration energy harvesting 9
  6. a) Discuss Micro-fuel Cells for wireless sensor networks 9  
 b) Describe energy harvesting using electrostrictive materials 9
  7. a) Write a note on bio MEMS based application of energy harvesting 9  
 b) Discuss energy harvesting for RF sensors. 9

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## FACULTY OF ENGINEERING

M.Tech (CSE-CSE) III-Semester (Main) (AICTE) Examination, March 2021

Subject : Cloud Computing

Time : 2 Hours

Max. Marks: 70

**Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1. Answer any Four question from the following (4 x 4 = 16 Marks)**

- |   |    |
|---|----|
| a) List the key drivers for adoption of Cloud by individuals and enterprises?   | 8  |
| b) Classify the Dynamic scaling strategies in Cloud?  | 8  |
| c) What is the need for NoSQL database in cloud computing system?   | 8  |
| d) Briefly Explain on different components of Microsoft Azure's offerings?  | 8  |
| e) What is Enterprise Architecture and SOA?   | 8  |
| f) Draw the IaaS Component Stack diagram?   | 8  |
| g) What is the importance of Load Balancing in Cloud computing?   | 8  |
| 2. a) Compare and contrast among Full Virtualization and Para-Virtualization?   | 8  |
| b) Examine "Resource pooling, virtualization and sharing of resources ultimately converge to produce the dynamic behaviour of cloud systems"?               | 10 |
| 3. a) Examine how Load balancing is an important ingredient for building any dynamic,. Flexible, scalable and robustly –distributed computing architecture? | 10 |
| b) Inspect how the Motive of the Google File System designers ensures scalability and enhanced reliability is met?  | 8  |
| 4. a) Discuss IAM in Cloud?   | 9  |
| b) Elucidate Tenancy at Different Level of Cloud Services?  | 9  |
| 5. a) Compare and Contrast several types of interoperability and portability issues to deal with in cloud computing?  | 9  |
| b) Explain the database Services of Google?   | 9  |
| 6. a) Analyze the role of SOA in Cloud Computing?   | 10 |
| b) Write a note on Enterprise Cloud Computing Ecosystem?  | 8  |
| 7. a) Elucidate the Actors and their Roles in NIST Cloud Computing Model?   | 10 |
| b) Discuss The Benefits of SaaS Multi-Tenant Architecture?  | 8  |

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**FACULTY OF ENGINEERING**  
**M.Tech. (CSE-CSE) III Semester AICTE (Main) Examination, March 2021**

**Subject: Advance Operating Systems**

**Time: 2 Hours**

**Max. Marks: 70**

**Note: : i) First Question is compulsory. Answer any three questions from the remaining six questions.**

**ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**iii) Missing data, if any, may suitably be assumed.**

**1. Answer any four questions from the following. (4 x 4 = 16 Marks)**

- (a) Define distributed system.
- (b) Write any two: (a) Advantages of distributed system  
 (b) Inherent limitations of distributed system.
- (c) What is: (a) Global state (b) Consistent global state?
- (d) Write implementation rules for vector clocks.
- (e) What are different metrics used for measuring the performance of a distributed mutual exclusion algorithm?
- (f) List the design issues of distributed shared memory.
- (g) Identify the limitations of static voting protocol.
- 2 (a) Summarize in detail various issues in designing a distributed operating system. (9)  
 (b) Elaborate on the inherent limitations of a distributed system. (9)
- 3 (a) Illustrate Lamport's distributed mutual exclusion algorithm with an example. How is it optimized in Ricart-Agrawala algorithm? (12)  
 (b) Why are agreement protocols needed in distributed system? (6)
- 4 (a) Identify various design issues in distributed file system. How are these issues addressed in Sun NFS? (12)  
 (b) List out the components of a Load distribution algorithm. (6)
- 5 (a) Distinguish between public key cryptography and private key cryptography. (6)  
 (b) Explain Kerberos system of security with a neat diagram. (12)
- 6 (a) Describe briefly concurrency control algorithms used in database operating systems. (10)  
 (b) How are the money management algorithms of single processor systems different from that of Multi-processor systems? (8)
- 7 (a) Differentiate synchronous and asynchronous check pointing algorithms. (9)  
 (b) Explain singhal's heuristic algorithm for distributed mutual exclusion. (9)

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