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R22

Course Code: B420304



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Finite Element Analysis

(Structural Engineering)

Date: 12.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define the term plane stress analysis? Give examples. 1 M
2. Write a short note on types of deformations in Finite element analysis. 1 M
3. Discuss in brief about the approximate method of analysis. 1 M
4. Write a note on shape functions for 2D CST element. 1 M
5. Discuss the concept of Iso-parametric elements in FEA. 1 M
6. Describe about the term strain displacement matrix. 1 M
7. Discuss in detail about stiffness matrix. 1 M
8. Write a note on finite element formulation for 3-D elements. 1 M
9. Write a note on simple 1-D, 2D and 3D model. 1 M
10. Discuss briefly about the post processing of the results in FEA software. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

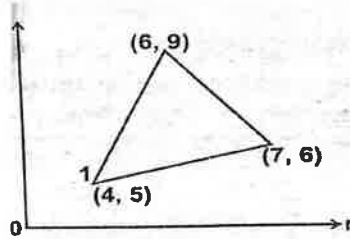
5x10=50M

- 11.A). Derive the stress and strain relations for a 3D system. 10M
- OR**
11. B). Discuss in detail about the general procedure of FEM formulation with an example. 10M
12. A). Applying Lagrangian's polynomials develop the shape functions for an 8-noded brick element. 10M
- OR**
12. B). Determine the shape functions for Constant Strain Triangular (CST) element interims of natural coordinate systems. Take 3 nodes. 10M
13. A). Develop an expression for strain displacement matrix and outline the procedure for developing element stiffness matrix in plane stress linear rectangular element with iso-parametric formulation. 10M
- OR**
13. B). Discuss in detail about Gaussian quadrature of numerical integration in FEM. 10M
14. A). Find the expression for a cantilever beam subjected to a point load "P" at the end having a moment of inertia "I", Young modulus "E" and length of the beam "L" using Galerkin's finite element method. 10M

(P.T.O.)

OR

14. B). Calculate the element strains for an axisymmetric triangular element shown in fig the nodal displacement are. $u_1 = 0.001$, $u_2 = 0.002$, $u_3 = -0.003$, $w_1 = 0.002$, $w_2 = 0.001$ and $w_3 = 0.004$ all dimensions are in mm 10M



15. A). Discuss about the various stages that are involved such as pre-processing, processing and post-processing data in finite element analysis software in detail. 10M

OR

15. B). Discuss the use of commercial FEA software. Explain about Von mises stress and Volume Co-ordinates. 10M

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R22

Course Code: B420305



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Structural Dynamics

(Structural Engineering)

Date: 14.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is free vibration? 1 M
2. Define degree of freedom. 1 M
3. What does a transmissibility ratio greater than 1 indicate about a system's response? 1 M
4. What type of loading conditions can Duhamel's integral handle? 1 M
5. How are natural frequencies related to the eigenvalues of the system matrix? 1 M
6. Give an example of a structure that can be modeled as an MDOF system 1 M
7. What is meant by the fundamental mode in vibration analysis? 1 M
8. In what scenarios is Holzer's method particularly useful for structural dynamics problems? 1 M
9. What distinguishes a continuous system from a discrete system in vibration analysis? 1 M
10. What is typically considered an elementary case in the study of beam vibrations? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Derive the equation of motion for damped single degree of freedom system with forced vibration. 5M
- ii) Explain various method of discretization analysis of dynamic problem. 5M

OR

11. B). i) Explain natural frequency and time period. 5M
- ii) A harmonic motion has a time period of 0.2 seconds and Amplitude of 0.4 cm, determine the maximum velocity and acceleration. 5M

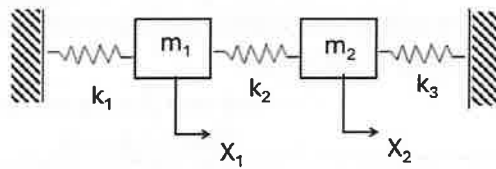
12. A). An idealized SDOF system is subjected to harmonic excitation $P_0 \sin \omega t$. Discuss the damped forced response. Obtain the expressions for dynamic magnification factor and phase angle. 10M

OR

12. B). i) An SDOF system of mass m & stiffness K is found to vibrate with a period of 0.12sec. When the mass is increased by 3kg, the period recorded is 0.135sec. Determine mass and stiffness for the original system. 5M
- ii) Explain the process of deriving the response of a single degree of freedom system for undamped free vibration. 5M

(P.T.O.)

13. A). Determine the natural frequencies and mode shapes of the system in figure shown (free vibration and no damping) $k_1=16\text{N/m}$, $k_2=24\text{N/m}$, $k_3=16\text{N/m}$ and $m_1=1\text{Kg}$, $m_2=1\text{Kg}$. 10M



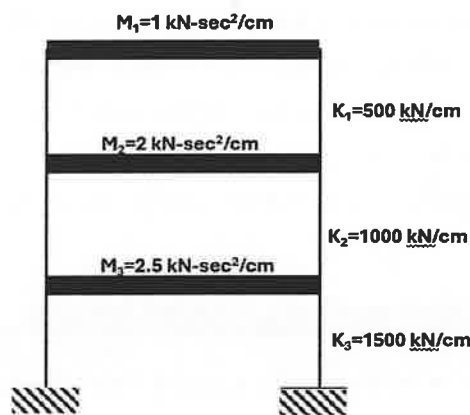
OR

13. B). State and prove the Orthogonality property of mode shapes and discuss Orthogonality and Normality principles. 10M

14. A). Explain step by step procedure of Holzer method? Derive fundamental natural frequencies and mode shapes. 10M

OR

14. B). Apply the Stodola method to calculate the fundamental mode frequency and shape for the shear building depicted in the figure. 10M



15. A). Derive the differential equation of motion for free flexural vibration of a simply supported beam. Sketch the response of first three modes. 10M

OR

15. B). Derive the natural frequency for uniform beam having both end fixed. 10M

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R22

Course Code: B420407



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Advanced Structural Steel Design

(Structural Engineering)

Date: 17.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

- | | |
|---|-----|
| 1. Mention about tacking bolts. | 1 M |
| 2. State about maximum pitch. | 1 M |
| 3. What is shape factor? | 1 M |
| 4. Define plastic hinge. | 1 M |
| 5. Mention about flexible connection. | 1 M |
| 6. What is rigid connection? | 1 M |
| 7. How the Pratt trusses structurally better than Howe trusses? | 1 M |
| 8. Mention the secondary stresses in roof trusses. | 1 M |
| 9. State the five economic properties of trusses. | 1 M |
| 10. List out the different components of truss bridge. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Calculate the strength of a 20 mm diameter bolt of grade 4.6 for the following cases. The main plates to be jointed are 10 mm thick. (i) Lap joint (ii) Single cover butt joint; the cover plate being 8 mm thick (iii) Double cover butt joint; each of the cover plate being 8 mm thick. 10M

OR

11. B). Two flats (Fe 410 Grade Steel), each 200 mm × 10 mm, are to be jointed using 20 mm diameter, 4.6 grade bolts, to form a lap joint. The joint is supposed to transfer a factored load of 200 kN. Design the joint and determine suitable pitch for the bolts. 10M

12. A). Find out the collapse load for a propped cantilever of length L m subjected to a uniformly distributed load w/unit length. 10M

OR

12. B). Explain about the different methods of plastic analysis. 10M

13. A). Design an un-stiffened welded seat connection for a beam ISMB 250 @ 365.9 N/m transmitting an end reaction of 110 kN, due to the factored loads, to the flange of column ISHB 200 @ 365.9 N/m. The seat angle is welded to the column flange in workshop. 10M

OR

13. B). Explain in detail about the procedure for unstiffened seat connection. 10M

(P.T.O.)

14. A). Design the principal tie member of a fink type roof truss for the following data. Design also its connection with a 10 mm thick gusset plate using 18 mm diameter bolts of grade 4.6. Use steel of grade Fe 410. Design tensile force 250 kN (due to D.L and L.L) Design compressive force 45 kN (due to D.L and W.L) 10M

OR

14. B). Design a strut in a roof truss for the following data. 10M
Length of the strut 2.5 m
Factored compressive force = 75 kN (due to D.L and L.L)
Factored tensile force = 15 kN (due to D.L and W.L)
Grade of steel Fe 410
Grade of bolts 4.6
Bolt diameter 15 mm

15. A). The effective span of a through type truss girder highway through two lane bridge is 70 m. The reinforced concrete slab is 200 mm thick inclusive of the wearing coal. The foot paths are provided on either side of the carriageway. The spacing between centre to centre of truss girder is 12 m.. Design the central top chord member, the central bottom chord member, the vertical and diagonal member of the central panel. The highway bridge is to carry IRC class A standard loading. 10M

OR

15. B). The effective span of a through type Pratt truss girder railway bridge for a single broad gauge track is 50 m. Pratt truss girder consists of 12 panels @ 4 m. The height of girder between c.g. to c.g. of chords is 6 m. The spacing between main truss girders is 7 m. The rail level is 800 mm above the c.g. of bottom chord. The chord members are 550 mm deep × 644 mm wide. The inner web members are 600 mm deep × 260 wide. The end posts are 600 mm deep × 644 mm wide. Determine the increase or decrease of forces in the central chord member of the leeward truss girder in the following cases : 10M
(i) Overturning effect due to wind, when the bridge is loaded.
(ii) Lateral effects of top chord and bottom chord bracings, when the bridge is loaded.

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R22

Course Code: B420411



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Special Concretes

(Structural Engineering)

Date: 20.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

- | | |
|--|-----|
| 1. Illustrate space ratio. | 1 M |
| 2. Distinguish between creep and shrinkage. | 1 M |
| 3. List the demerits of high strength concrete. | 1 M |
| 4. When high performance concretes are used? | 1 M |
| 5. What is bacterial concrete? | 1 M |
| 6. List the merits of white topping. | 1 M |
| 7. What is the necessity of quality assurance? | 1 M |
| 8. Recall the methods adopted for concrete mix design. | 1 M |
| 9. What is durability factor? | 1 M |
| 10. Mention the necessity of performance evaluation. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | |
|--|-----|
| 11.A). Summarize the properties of fresh concrete and relevant tests to be performed to determine them. | 10M |
| OR | |
| 11. B). Explain about different types of shrinkage of concrete in detail. | 10M |
| 12. A). Discuss the requirements and applications of high-performance concretes in detail. | 10M |
| OR | |
| 12. B). Discuss the uses and applications of high strength concrete and also its design considerations in detail. | 10M |
| 13. A). Describe the factors affecting the properties of Fibre reinforced concrete and mention the uses of reactive powder concrete. | 10M |
| OR | |
| 13. B). Discuss the properties and applications geo-polymer concrete and its types in detail. | 10M |
| 14. A). Design of M30 Concrete mix as per IS: 10262-2009, Concrete mix portioning-guidelines. | 10M |
| Grade designation: M30 | |
| Type of cement: OPC 43 grade conforming to IS 8112 | |
| Maximum nominal size of aggregates: 20mm, Specific gravity of CA=2.67, FA= 2.63, Zone II FA | |
| Minimum cement content: 350 kg/m ³ | |
| Maximum water cement ratio: 0.50 | |
| Workability: 25mm-50mm (slump) | |
| Exposure condition: moderate | |
| Degree of supervision: good | |
| Types of aggregate: crushed angular aggregate | |
| Maximum cement content: 450kg/m ³ | |
| Chemical admixture: not recommended. | |

(P.T.O..)

OR

14. B). Discuss the various factors that influence the choice of mix design and also explain the properties of concrete related to the mix design. 10M
15. A). Enumerate the various effects of concrete exposed to acidic environment and remedial methods to control it. 10M

OR

15. B). With neat sketches, explain the ultrasonic pulse velocity test with its applications in detail. 10M



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Supplementary Examinations August-2024

Course Name: Design of Pre stressed Concrete Structures
(Structural Engineering)

Date: 17.08.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions (Compulsory)

Each question carries FOUR marks.

5x4=20M

1. List the types of losses in prestressed concrete beam. 4M
2. Explain different types of shear failures in prestressed concrete beams. 4M
3. State any two factors influencing the deflection. 4M
4. What is transmission length? 4M
5. Explain advantages of statically indeterminate structures in PSC. 4M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

6. A). A prestressed concrete beam 200×300 mm deep is prestressed with wires (area = 320 mm^2) located at 50 mm from the bottom carrying an initial stress of 1000 N/mm^2 . The span of the beam is 10 m. Calculate the percentage loss of prestress in wires when the beam is post-tensioned. Assume $E_s = 210 \text{ kN/mm}^2$, $E_c = 35 \text{ kN/mm}^2$. Relaxation of steel stress = 5% initial stress, shrinkage of concrete = 200×10^{-6} , creep coefficient = 1.6, slip at anchorage = 1 mm, friction coefficient = 0.0015 per metre. 10M

OR

6. B). Explain any two methods of prestressing system. 10M
7. A). A beam is of simply supported span 8 m. The size of the beam is $350 \text{ mm} \times 700 \text{ mm}$. A prestressing force of 1000 kN was applied. The cable is parabolic with an eccentricity of 100 mm at the centre and zero at the supports. It is subjected to a UDL of 25 kN/m. Compute the extreme stresses at midspan. 10M

OR

7. B). How will you improve the shear resistance of structural concrete members by applying prestressing technique? 10M
8. A). Explain the procedure for computing short-term and long-term deflection of PSC beams. 10M

OR

8. B). A concrete beam having a rectangular section 100×300 mm is prestressed by a parabolic cable with an initial prestressing force of 240 kN. The cable has an eccentricity of 50 mm at the centre and concentric at the supports. If the span of the beam is 10 m and subjected to a live load of 2 kN/m. Calculate the short-term deflection at midspan. Assume $E_c = 38 \text{ kN/mm}^2$, creep coefficient = 2, loss of prestress = 20%. Estimate the long-term deflection. 10M
9. A). Explain Guyon's method for end block design. 10M

OR

9. B). Define End block. Draw the stress distribution in end block. 10M
10. A). Discuss about P and C lines in PSC statically indeterminate structures. 10M

OR

10. B). Explain about linear transformation concordant and non-concordant cable profiles 10M

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R22

Course Code: B443303



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Advanced Power Electronic Converters-II
(Power Electronics)

Date: 12.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What are the key differences between a buck converter and boost converter. 1 M
2. List out advantages of multi output boost converters. 1 M
3. What are the common control strategies used in push-pull converters 1 M
4. Write any two applications of push pull converters. 1 M
5. In what types of applications are parallel resonant inverters typically used? 1 M
6. Explain about switching in resonant inverter. 1 M
7. Write any two comparisons between ZCS and ZVS 1 M
8. What are the main advantages of using ZCS in power converters? 1 M
9. What are the advantages and disadvantages of matrix converters compared to conventional AC-DC-AC converters 1 M
10. What are the applications of uninterrupted power supplies? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What are the conditions for continuous and discontinuous mode operation in a boost converter? 10M

OR

11. B). Derive the expression for the output voltage of a boost converter in terms of the input voltage and the duty cycle. 10M

12. A). Explain operation of full bridge Push pull converter and derive the expression for the output voltage of a push-pull converter in terms of the input voltage and the turns ratio of the transformer. 10M

OR

12. B). Explain the basic operation of a flyback converter and derive the expression for the output voltage of a flyback converter. 10M

13. A). Explain in detail about Parallel Resonant Inverter with neat diagram and output waveforms. 10M

OR

13. B). Explain in detail about Class E Resonant rectifier with neat diagram and output waveforms. 10M

(P.T.O.)

14. A). Explain in detail about M type ZCS resonant converter with different types of operation modes. 10M

OR

14. B). The ZCS Resonant Converter delivers a maximum power of $P_L = 350\text{MW}$ at $V_o = 6\text{V}$. The supply voltage is $V_s = 18\text{V}$. The maximum operating frequency is $f_{\max} = 50\text{kHz}$. Find the value of L and C . Assume that the intervals t_1 and t_3 are very small and $x = 1.7(I_m/I_o)$. 10M

15. A). What is a matrix converter. Explain the structure and operation with neat sketches. 10M

OR

15. B). What is a Luo converter. Explain the structure and operation with neat sketches. 10M

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R22

Course Code: B443304



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Power Electronics Application to Power Systems
(Power Electronics)

Date: 14.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is phase shifting transformer? 1 M
2. List the associated difficulties in reactive power compensation. 1 M
3. What do you understand by sensitive analysis? 1 M
4. Define contingency selection. 1 M
5. Define voltage stability. 1 M
6. Define PV curve. 1 M
7. What is meant by shunt compensator? 1 M
8. Draw the operating characteristics of TCR. 1 M
9. What is the basic principle of TCSC? 1 M
10. Draw the transient stability model of TCSC. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss the problems associated reactive power transfer over a long transmission line. 10M
- OR**
11. B). Explain how do you form Y-Bus by direct inspection with a suitable example. 10M
12. A). i) Explain the meaning of pre and post contingency connective rescheduling. 5M
ii) Develop necessary condition for security constrained economic dispatch? 5M
- OR**
12. B). Discuss in detail about generation shift and line outage distribution factors. 10M
13. A). i) What do you mean by "Voltage Stability"? How to it is enhanced by facts controllers? 5M
ii) Define "PV-Curve". What are the significances and limitations of this curve? 5M
- OR**
13. B). How will you obtain minimum Eigen values of reduced load flow Jacobian? 10M
14. A). Explain configuration and operating characteristics of TCR and TSC. 10M
- OR**
14. B). i) What is meant by shunt compensation? Explain about SATCOM. 5M
ii) Why static voltage compensator is more effective in comparison with TCR or TCS for improving the performance of power system? 5M
15. A). State and explain variable reactance mode TCSC. 10M
- OR**
15. B). State and explain transient stability model of TCSC. 10M

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R22

Course Code: B443411



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Power Quality Improvement Techniques
(Power Electronics)

Date: 17.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define Voltage Flicker. 1 M
2. Define THD. 1 M
3. Explain the Causes of Power Quality. 1 M
4. What are the power quality issues caused by Nonlinear loads? 1 M
5. What is Compensator? 1 M
6. Differentiate Shunt and Series Compensation. 1 M
7. Write differences between Active shunt and Series compensation. 1 M
8. Write the classification of Active series compensators. 1 M
9. Define Unified Power Quality conditioner. 1 M
10. Differentiate UPFC & UPQC. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain different types of Power quality problems and explain their effects and write the mitigation techniques used in detail. 10M

OR

11. B). Explain the Power Quality terms used and explain Analyze the objectives of IEEE and IEC standards. 10M

12. A). Explain the Analysis of power quality issues due to nonlinear loads with neat diagrams. 10M

OR

12. B). What are the causes of power quality due to nonlinear loads explain in detail? 10M

13. A). Explain the Principle of operation of Passive Shunt and Series Compensations with neat diagrams. 10M

OR

13. B). Explain the Passive shunt compensation for three phase four wire system with neat diagram. 10M

14. A). What are the main functions of DVR & Explain the different control algorithms used for DVR? 10M

OR

14. B). Explain the operation of Distribution Static Compensator (DSTATCOM) used for sag mitigation. 10M

15. A). Explain the Principle of operation of UPQC with neat diagram. 10M

OR

15. B). Explain the Control techniques of UPQC with neat diagram. 10M

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R22

Course Code: B443414



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: **Distributed Generation**

(Power Electronics)

Date: 20.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is Distributed generation? 1 M
2. Why integration of distributed generation is needed? 1 M
3. Why Distributed generation system planning is important? 1 M
4. What are the rotating machine interfaces in DG's? 1 M
5. What are the technical impacts of Distributed generation? 1 M
6. What is Deregulation? 1 M
7. What are the control aspects of DG's market facts? 1 M
8. What are the voltage control techniques in DG's? 1 M
9. List the types of Micro grids? 1 M
10. What is the impact of transients in Micro grids? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss in detail the need for Distributed Generation. 10M
- OR**
11. B). Explain the Renewable sources in Distributed generation. 10M
12. A). What are the different types of interfaces in DG? Explain in detail. 10M
- OR**
12. B). Explain the Aggregation of Multiple DG units. 10M
13. A). Discuss the impact of DG's upon protective relaying. 10M
- OR**
13. B). Explain the technical impacts of DG's on transmission systems. 10M
14. A). Discuss in detail the issues, challenges and limitations of DG's. 10M
- OR**
14. B). Explain the Reliability of DC based systems. 10M
15. A). Compare and contrast the Autonomous and Non-autonomous grids. 10M
- OR**
15. B). Explain in detail how the Micro-grids can be protected from transients. 10M

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R18

Course Code: B30311



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Supplementary Examinations August-2024

Course Name: Solid State AC Drives

(Power Electronics)

Date: 12.08.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions (Compulsory)

Each question carries FOUR marks.

5x4=20M

1. Derive the expression for Torque equation from induction motor drive. 4M
2. List the advantages and disadvantages of VSI fed Induction motor drives. 4M
3. Determine the torque expression with stator fluxes. 4M
4. Justify a vector controlled induction motor drive operates like a separately excited dc motor drive. 4M
5. What is self control mode of synchronous motor drive? 4M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

6. A). Describe the operation of voltage control, frequency control and V/f speed control of induction motor. 10M
- OR
6. B). Explain about speed and flux control in current fed inverter drive. 10M
7. A). Explain six step inverter voltage control of Induction motor. 10M
- OR
7. B). i) Compare VSI and CSI? 5M
ii) Explain the voltage source inverter (VSI) fed induction motor drive operated as stepped wave inverter. 5M
8. A). Discuss the mechanism of static resistor rotor control of induction motor 10M
- OR
8. B). Explain the principle of operation of static Scherbius system. 10M
9. A). Explain the DC drive analogy of a three phase induction motor drive. 10M
- OR
9. B). Explain the direct torque control technique. 10M
10. A). Explain the self control load commutated synchronous motor drive, with neat diagram. 10M
- OR
10. B). Explain the operation of three phase full wave brushless dc motor. 10M

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R18

Course Code: B30314



CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

M.Tech II Semester Supplementary Examinations August-2024

Course Name: **Flexible AC Transmission Systems**

(Power Electronics)

Date: 17.08.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions (Compulsory)

Each question carries FOUR marks.

5x4=20M

1. What are the factors which limit loading capability? 4M
2. What do you mean by pulse width modulation converter? And list the advantages of it. 4M
3. Write short notes on Improvement of Transient Stability 4M
4. List the applications of SVC. 4M
5. Write the advantages of TCSC? 4M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

6. A). Explain in detail about the classifications of different types of FACTS controllers. 10M
- OR**
6. B). Explain reactive power control in electrical power transmission lines. 10M
7. A). Explain transformer connections for 12-pulse operation. 10M
- OR**
7. B). With a neat schematic diagram, explain the operation of single -phase full bridge converter. 10M
8. A). What are the objectives of shunt compensation? Explain how shunt compensation is used for voltage regulation at the midpoint to segment the transmission line? 10M
- OR**
8. B). Explain the Hybrid VAR generation with their operating V-I areas. 10M
9. A). Explain how SVC can be used to enhance the power transfer capacity of a transmission line. 10M
- OR**
9. B). Explain the transfer function and dynamic performance of SVC. 10M
10. A). Explain the operation of GTO Thyristor-controlled series capacitor. 10M
- OR**
10. B). Explain control schemes for GSC and TCSC. 10M

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R22

Course Code: B455303



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: ARM Microcontrollers

(Embedded Systems)

Date: 12.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Differentiate between features of RISC and CISC. 1 M
2. Write the Vector table of ARM with its addresses. 1 M
3. List the advantages of Thumb mode of ARM. 1 M
4. Define the stack instructions of ARM. 1 M
5. Define Scalability and Compatibility. 1 M
6. List the specifications of Cortex-M Processors. 1 M
7. List the cortex-M4 Processor special features. 1 M
8. Compare the instruction set of ARM Cortex-M Processors. 1 M
9. List the application of ARM Cortex-M Processor in the field of Embedded systems and IoT. 1 M
10. Write the format of FPACR register of ARM Cortex-M Processor. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the register set of ARM. 10M
- OR**
11. B). Explain the pipelining structure of ARM with suitable example. 10M
12. A). Explain the Load Store instructions of ARM with suitable example. 10M
- OR**
12. B). Explain the software interrupt instructions of ARM with suitable example. 10M
13. A). Explain the Cortex-M3 architecture with a neat diagram and write the architectural features. 10M
- OR**
13. B). Explain the interrupt handling process in ARM Cortex-M processor. 10M
14. A). Write a note on assembly language syntax of Data processing instructions of ARM with suitable examples. 10M
- OR**
14. B). Explain the working of special registers used in programming of Cortex-M processors. 10M
15. A). Explain the working of floating-point unit of ARM Cortex-M4 Processor with a suitable diagram. 10M
- OR**
15. B). Explain the design aspects of FIR Filter using ARM Cortex-M4 Processor. 10M

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R22

Course Code: B455304



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Digital Control Systems

(Embedded Systems)

Date: 14.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

- | | |
|---|-----|
| 1. State the Sampling Theorem. | 1 M |
| 2. What are the main components of a Digital Control Systems? | 1 M |
| 3. What are the advantages of state variable method for analysis of digital control system? | 1 M |
| 4. Define the terms Controllability and Observability. | 1 M |
| 5. Define the concept of bounded input bounded output stability in discrete systems. | 1 M |
| 6. What are the preferred locations of the z-domain poles for the system to be stable? | 1 M |
| 7. What are the advantages of a PID Controller? | 1 M |
| 8. What are the criterion to be considered for design of a proportional controller? | 1 M |
| 9. List the advantages of reduced order observer. | 1 M |
| 10. What is state feedback control? | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | |
|---|-----|
| 11.A). Deduce the transfer function of a Zero order Hold. | 10M |
| OR | |
| 11. B). Discuss about the various properties of Z-Transforms. | 10M |
| 12. A). Investigate the controllability and observability of the following system. | 10M |
| $X(k+1) = \begin{bmatrix} -2 & 1 \\ 1 & -2 \end{bmatrix} X(k) + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u(k); Y(k) = [1 \quad -1]X(k)$ | |
| OR | |
| 12. B). Derive the relationship between discrete state space model and pulse transfer function. | 10M |
| 13. A). Determine the stability of the system using Jury's stability test for the characteristic equation $P(z) = z^4 - 1.2z^3 + 0.07z^2 + 0.3z - 0.08 = 0$. | 10M |
| OR | |
| 13. B). Discuss about the concept of Bilinear transformation for determining the stability of a digital control systems. | 10M |
| 14. A). List the steps in the design of a digital controller with dead beat response. | 10M |
| OR | |
| 14. B). Explain the process for adjusting the steady state error in the design of a digital controller. | 10M |
| 15. A). Explain the concept of pole placement by state feedback. | 10M |
| OR | |
| 15. B). State and prove the necessary condition for arbitrary pole-placement. | 10M |

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R22

Course Code: B455408

**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Design for Testability

(Embedded Systems)

Date: 17.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define the terms defect and error. 1 M
2. What are the benefits of testing? 1 M
3. List five different modeling levels. 1 M
4. List two different simulation mechanisms. 1 M
5. What are the two attributes of testability analysis? 1 M
6. What is the 1-controllability(C1)? 1 M
7. What is the purpose of single input changing (SIC) pattern. 1 M
8. What is called hardcore? 1 M
9. What Is the purpose of BSDL? 1 M
10. Define boundary register. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

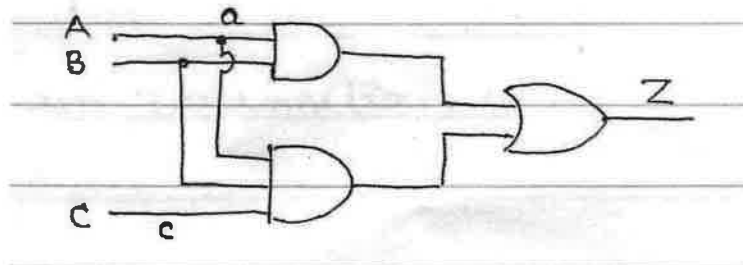
5x10=50M

- 11.A). Discuss register transfer level (RTL) fault model. 10M

OR

11. B). For the following circuit: 10M

- i) Find the set of all tests that detect the fault c s-a-1
- ii) Find the set of all tests that detect the fault a s-a-0
- iii) Find the set of all test that detect the multiple fault {c s -a -1, a s -a -0}



12. A). Explain about Gate level event driven simulation with example. 10M

OR

12. B). Explain Serial and Parallel Fault Simulation with an example. 10M

13. A). Explain Ad Hoc Design for Testability Techniques. 10M

OR

13. B). Describe the method to enhance observability and controllability by means of scan register. 10M

(P.T.O..)

14. A). Explain in detail about different operating modes of BILBO. 10M

OR

14. B). i) Discuss the design rules for self-test at board level. 5M

ii) Write a short notes on any two TPG techniques. 5M

15. A). i) Draw and explain hardware in the elementary boundary scan test cell. 5M

ii) Draw the TAP controller timing diagram. 5M

OR

15. B). i) Discuss BSDL description components. 5M

ii) Explain BSDL pin descriptions. 5M

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R22

Course Code: B455410



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: **Hardware and Software Co-Design**

(Embedded Systems)

Date: 20.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is hardware-software partitioning? 1 M
2. Define Co-Design model. 1 M
3. Define emulation. 1 M
4. What is prototyping? 1 M
5. Define modern embedded systems. 1 M
6. Define 'compilation techniques'. 1 M
7. What is concurrent computation? 1 M
8. What is a co-design computational model? 1 M
9. Define multi-language co-simulation. 1 M
10. What is design representation? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Which block diagram explains a generic co-design methodology? 5M
ii) Write different languages used in co-design. 5M
- OR**
11. B). What are the different types of co-design models & architectures? 10M
12. A). i) Write a short note on system communication infrastructure. 5M
ii) What are the architecture specialization techniques of emulation and prototyping. 5M
- OR**
12. B). Write short note on:
i) Architecture specialization techniques. 5M
ii) Target Architecture. 5M
13. A). i) With neat diagram explain the modern embedded system. 5M
ii) Write the advantages of modern embedded systems. 5M
- OR**
13. B). i) What are the different compilation techniques? Explain in detail. 5M
ii) What are the special features of modern embedded architecture? 5M

(P.T.O.)

14. A). i) Explain co-design computational model. 5M
ii) Discuss in detail about design verification co-design. 5M

OR

14. B). Explain about design verification and implementation verification. 10M

15. A). i) Explain the design representation for system level synthesis. 5M
ii) Discuss the system level specification languages. 5M

OR

15. B). i) Discuss the multi-language co-simulation Lycos system. 5M
ii) What are the different heterogeneous specifications? 5M

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R22

Course Code: B458304



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: **Advanced Algorithms**

(Computer Science & Engineering)

Date: 12.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define sorting. 1 M
2. What is a stable algorithm? 1 M
3. What is the main idea behind the greedy algorithm? 1 M
4. Who discovered MST? 1 M
5. What type of algorithm is ford Fulkerson algorithm? 1 M
6. Define LUP Decomposition. 1 M
7. What is DFT? 1 M
8. Define FFT. 1 M
9. Define NP Completeness. 1 M
10. What is NP Hardness? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Compare various sorting algorithms with time complexities. 10M
- OR**
11. B). Give detail description on BFS. 10M
12. A). Explain in detail the greedy algorithm. 10M
- OR**
12. B). Brief note on Edmond's blossoms Algorithms to compute augmenting path. 10M
13. A). Give detailed description on Ford Fulkerson algorithm to compute maximum flow. 10M
- OR**
13. B). What is the general method of Divide and Conquer and explain Strassen's matrix multiplication. 10M
14. A). Explain in detail the dynamic programming with example. 10M
- OR**
14. B). What is Chinese remainder theorem? Explain. 10M
15. A). Discuss on NP Hard and NP complete. 10M
- OR**
15. B). Explain recent problem solving approaches in detail. 10M

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R22

Course Code: B458305



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Advanced Computer Architecture

(Computer Science & Engineering)

Date: 14.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is a parallel computer? 1 M
2. What are the different hardware technologies? 1 M
3. Explain bandwidth of memory? 1 M
4. What is PRAM Model? 1 M
5. What is pipelining? 1 M
6. Compare any Sequential and Weak Consistency Models? 1 M
7. What is Cache Coherence? 1 M
8. Differentiate between SIMD and MIMD? 1 M
9. Briefly explain SIMD and Multi vector Computers? 1 M
10. What is the CM-5 environment in advance computer architecture? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Introduce briefly current state of computing. 5M
ii) Write about Elements of Modern Computers and Evolution of Computer Architecture. 5M
- OR**
11. B). i) Explain the operations in the instruction set. 5M
ii) Define computer architecture. Discuss the Instruction set architecture. 5M
12. A). Distinguish between typical RISC and CISC processor architectures. 10M
- OR**
12. B). Explain the following concepts in pipeline processors: 10M
i) Clocking and Timing control
ii) Speedup
iii) Efficiency
iv) Throughput
13. A). Compare Sequential and Weak Consistency Models. 10M
- OR**
13. B). Illustrate the Instruction and Arithmetic Pipeline design. 10M
14. A). Explain the generations of multicomputer. 10M
- OR**
14. B). Discuss the challenges of parallel processing in multi processors. 10M
15. A). Explain architecture design goals of multi vector multiprocessors. 10M
- OR**
15. B). What is Compound Vector Processing and explain? 10M

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R22

Course Code: B458408



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Advanced Computer Networks
(Computer Science & Engineering)

Date: 17.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define routing. 1 M
2. Write about Mobile IP. 1 M
3. What is UDP? 1 M
4. Write about client-server architecture. 1 M
5. What is FTP? 1 M
6. Write about webserver. 1 M
7. What is wireless communication? 1 M
8. Write about Handoff. 1 M
9. What is streaming stored video? 1 M
10. Write about distribution networks. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What are the responsibilities of data link layer? 10M
- OR**
11. B). Demonstrate multiple access protocols. Explain least cost path algorithm. 10M
12. A). Summarize the duties of transport layer. Compare TCP and UDP. 10M
- OR**
12. B). Explain about congestion control techniques. 10M
13. A). Compare the differences between HTTP, FTP, SMTP. 10M
- OR**
13. B). Explain socket programming in UDP. 10M
14. A). Illustrate in detail about the overview of IEEE 802.11 wireless network architecture. 10M
- OR**
14. B). Explain in detail how to manage mobility in cellular network. 10M
15. A). Outline about Packet-Loss, Packet Delay, Packet Jitter, Voice over IP. 10M
- OR**
15. B). Summarize about RTP, RTCP, SIP protocols in Multimedia Networking. 10M

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R22

Course Code: B458412



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech II Semester Regular/Supplementary Examinations August-2024

Course Name: Robotic Process Automation

(Computer Science & Engineering)

Date: 20.08.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is Robotic Process Automation? 1 M
2. List the two types of RPA bots. 1 M
3. What is control room in RPA? 1 M
4. Define Features Panel. 1 M
5. What is workload queue? 1 M
6. What is an RPA administrator? 1 M
7. What is the role of RPA recorder? 1 M
8. Which command will you use for reversing a string in RPA? 1 M
9. What is PGP command? 1 M
10. What is the Error Handling command allows used to? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Summarize the process of Bot creation. 10M
- OR**
11. B). Explain in detail Advance features and capabilities of RPA. 10M
12. A). Discuss in detail view bots uploaded and credentials. 10M
- OR**
12. B). Write about Robotic Process Automation Insight Dashboard and workload. 10M
13. A). What is Audit Logs? Elaborate how to work efficiently with audit log entries. 10M
- OR**
13. B). Illustrate various steps in RPA Migration. 10M
14. A). Explain in detail Loop Commands. 10M
- OR**
14. B). Elaborate XML commands with example. 10M
15. A). Explain in detail Object Cloning Commands. 10M
- OR**
15. B). What are the terminal emulator commands? Explain in detail. 10M
