| CET308 | COMPREHENSIVE COURSE WORK | CATEGORY | L | T | P | CREDIT | Year of Introduction |
|---|---|---|---|---|---|---|---|
| | | PCC | 1 | 0 | 0 | 1 | 2019 |

**Preamble:** The course is designed to ensure that the student have firmly grasped the foundational knowledge in Civil Engineering familiar enough with the technological concepts. It provides an opportunity for the students to demonstrate their knowledge in various Civil Engineering subjects.

**Pre-requisite:** Nil

**Course outcomes:** After the course, the student will able to:

| | |
|---|---|
| CO1 | Learn to prepare for a competitive examination |
| CO2 | Comprehend the questions in Civil Engineering field and answer them with confidence |
| CO3 | Communicate effectively with faculty in scholarly environments |
| CO4 | Analyze the comprehensive knowledge gained in basic courses in the field of Civil Engineering |

| CET 308 Comprehensive Course Work | | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO 10 | PO 11 | PO 12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CO1 | 3 | 1 | 1 | | | 2 | | | | | | | 1 | 1 | |
| | CO2 | 3 | 1 | | | | 2 | | | | 3 | | | | | |
| | CO3 | 3 | 1 | | | 1 | 2 | | | | 3 | | | | 1 | |
| | CO4 | 3 | 3 | | | 1 | 2 | | | | | | | | | |

**Assessment pattern**

| Bloom's Category | End Semester Examination (Marks) |
|---|---|
| Remember | 25 |
| Understand | 15 |
| Apply | 5 |
| Analyze | 5 |
| Evaluate | |
| Create | |

**End Semester Examination Pattern:**

A written examination will be conducted by the University at the end of the sixth semester.The written examination will be of objective type similar to the GATE examination.Syllabus for the comprehensive examination is based on following five Civil Engineering core courses.

CET 201- Mechanics of Solids

CET 203- Fluid Mechanics and Hydraulics

CET 205- Surveying& Geomatics

CET 204- Geotechnical Engineering I

CET 309–Construction Technology and Management

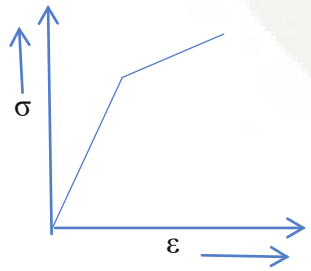
The written test will be of 50 marks with 50 multiple choice questions (10 questions from each module) with 4 choices of 1 mark each covering all the five core courses. There will be no negative marking. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed above.

| | | |
|---|---|---|
| Written examination | : | 50marks |
| **Total** | **:** | **50 marks** |

**Course Level Assessment and Sample Questions:**

1) Poisson's ratio for an incompressible isotropic material is:
   A) 0.25 B) 0.5 C) Zero D) Indeterminate

2) The following stress-strain curve is obtained for a material. It indicates




A) Rigid body behaviour
B) Perfectly plastic behaviour

C) Elastic-linear strain hardening behaviour
D) Elastic- plastic behaviour

3) A principal plane is one where the shear stress will be:
A) Maximum B) Minimum C) Zero D) Coverage of principal stress

4) In a differential manometer, the flowing fluid is water and the gauge fluid is mercury. If the manometer reading is 100mm, the differential head in meters is:
A) 13.6 B) 1.36 C)1.47 D)1.26

5) A rectangular open channel carries a flow of $2m^3$/sec/m, what is the value of minimum specific energy?
A) 0.74m B) 1.11m C) 1.48m D) 1.85m

6) A pipe has diameter 0.4m, length 0.1km and coefficient of friction 0.005. What is the length of an equivalent pipe which has diameter 0.2m and coefficient of friction 0.008?
A) 195m B) 19.5m C)1.95m D) 1950m

7) The true bearing of a line is 40°30'. Declination is 3°W. The magnetic bearing of line is:
A) 43°30' B) 37°30' C) 36°30' D) 44°30'

8) Points C and D are 1530m apart across a wide river. The following reciprocal levels are taken with one level.

| Level at | Reading on | |
|---|---|---|
| | C | D |
| C | 3.810 m | 2.165 m |
| D | 2.355 m | 0.910 m |
| | | |

The true difference in elevation between C and D is:

A)1.645 m B) 1.545 m C) 1.745 m D) 1.345 m

9) Fore bearing of a line is 540°. Declination is 2°W. True bearing of line is:
A)222° B) 218° C) S 42°E D) S 38° E

10) The dry density of a soil is 1.5 g/cc. If the saturation water content were 50%, then its saturated density and submersed density would respectively be,
A)1.5 g/cc and 1.0g/cc B)2.0 g/cc and 1.0 g/cc C )2.25 g/cc and 0.25 g/cc
D)2.50 g/cc and 1.50 g/cc

11) A clay sample has a void ratio of 0.50 in dry state and if the specific gravity of solids is 2.70, its shrinkage limit will be
A)12% B)13.5% C)18.5% D)22%

12) A non–homogenous soil deposit consists of a silt layer sandwiched between a fine–sand layer at top and a clay layer below. Permeability of the silt layer is 10 times the permeability of the clay layer and one–tenth of the permeability of the sand layer. Thickness of the silt layer is 2 times the thickness of the sand layer and two–third of the thickness of the clay layer. The ratio of equivalent horizontal and equivalent vertical permeability of the deposit is _____.
A)10.967 B)10.968 C)10.969 D)None of these

13) Which cement contains high percentage of $C_3S$ and less percentage of $C_2S$?
A) Rapid Hardening Cement B) Ordinary Portland Cement C) Quick Setting Cement D) Low Heat Cement

14) Workability of concrete is measured by _____
A) Vicat apparatus test B) Slump test C) Minimum void method D) Talbot Richard test

15) The shortest possible time in which an activity can be achieved under ideal circumstances is known as _____
A) Pessimistic time estimate B) Optimistic time estimate C) Expected time estimate D) None of these

**Course Code: CET 308**

**Comprehensive Course Work**

**MODULE 1**

Concept of stress and strain, Hooke's law, Stress-strain diagram of mild steel;Axially loaded bars.Temperature stress in composite bars, Poisson's ratio, Elastic constants and the relationship between them.Beams, Concept of bending moment and shear force, Shear force and bending moment diagrams of cantilever beams, simply supported beams and overhanging beams for different type of loads. Theory of simple bending; Shear stress in beams. Principal stresses and principal planes in 2D problems, maximum shear stress; Mohr's circle .

**MODULE 2**

Fluid properties; Fluid statics, measurement of fluid pressure. Buoyancy and Floatation: Buoyant force, Principle of floatation, stability of floating andsubmerged bodies, metacentre and metacentric height; continuity equation in one, two and three dimensions.Bernoulli's equation and its applications; Pipe flow- computation of major and minor losses in pipes,equivalent pipe.

Open channel flow, velocity distribution in open channels, uniform flow computations, Most economical sections, Specific energy, Critical flow; Hydraulic jump.

**MODULE 3**

Introduction to Surveying- Principles, Linear, angular and graphical methods.Bearing of survey lines, Local attraction, Declination; Principles of levelling, Methods of levelling. Theodolite surveying, Measurement of horizontal and vertical angle; Triangulation. Traverse Surveying, Checks in closed traverse; Theory of Errors – Types, theory of least squares, Weighting of observations. Total Station – concept of EDM, principles and working. GPS-Components and principles. Remote Sensing.

**MODULE 4**

Definitions and properties of soil, 3 phase system, Index properties of soil, Soil classification, Effective stress, Quick sand condition, Stress distribution, Permeability of soil, Darcy's law, Factors affecting permeability, Laboratory tests, Consolidation, Normally consolidated, over consolidated and under consolidated soils, Time factor, Coefficient of consolidation, Compaction Tests – OMC and MDD, shear strength of soil, Triaxial compression test, Unconfined compression test, Direct shear test and Vane shear test

**MODULE 5**

Cement: Manufacturing, chemical composition, Types, Tests, Hydration of cement. Properties of fresh concrete and hardened concrete. Types of stone masonry – composite walls - cavity walls and partition walls - Construction details and features. Finishing works: Plastering, Pointing, Painting – objectives and types. Prefabricated construction – advantages and disadvantages, Prefabricated building components. Causes of failures in RCC and Steel structures. Types of tenders, Types of contracts. Types of Schedules. Network analysis –CPM, PERT – concepts and problems

| CEL332 | TRANSPORTATION ENGINEERING LAB | CATEGORY | L | T | P | CREDIT | Year of Introduction |
|---|---|---|---|---|---|---|---|
| | | PCC | 0 | 0 | 3 | 2 | 2019 |

**Preamble:** The objective of this course is to enable students to assess the quality of various pavement materials and their suitability in highway construction. The course is designed to make student familiar with mix design and do functional evaluation of pavements.

**Prerequisite:** CET 206 Transportation Engineering I

**Course Outcomes:**

After the completion of the course the student will be able to

| | |
|---|---|
| **CO 1** | Analyse the suitability of soil as a pavement subgrade material |
| **CO 2** | Assess the suitability of aggregates as a pavement construction material |
| **CO 3** | Characterize bitumen based on its properties so as to recommend it as a pavement construction material. |
| **CO 4** | Design bituminous mixes for pavement layers |
| **CO 5** | Assess functional adequacy of pavements based on roughness of pavement surface. |

**Mapping of Course Outcome with Programme Outcome**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | 2 | | | | 1 | 2 | | | |
| CO2 | 3 | | | 2 | | | | 1 | 2 | | | |
| CO3 | 3 | | | 2 | | | | 1 | 2 | | | 2 |
| CO4 | 3 | | | 2 | | | | 1 | 2 | | | 2 |
| CO5 | 3 | | | 2 | | | | 1 | 2 | | | 2 |

**Course level assessment questions**

**CO1 :** Determine CBR value of the given sample of soil. Comment on its suitability as a subgrade material.

**CO2 :**Find the impact value of the given sample of aggregates. Assess its suitability as a pavement construction material based on specifications given relevant codes/guidelines.

**CO3 :** Determine softening point of the given sample of bitumen.

**CO4 :** Determine optimum binder content of the given bituminous mix by Marshall method of mix design.

**CO5 :** Determine IRI value of the given road surface using MERLIN. Comment on the condition of road surface comparing standard values.

**Assessment pattern**

| Bloom's Taxonomy | Continuous Internal Evaluation (CIE) (Marks) | End Semester Examination (ESE) (Marks) |
|---|---|---|
| Remember | 10 | 15 |
| Understand | 10 | 15 |
| Apply | 40 | 40 |

**Marks Distribution**

| Total marks | CIE (marks) | ESE (marks) | ESE duration |
|---|---|---|---|
| 150 | 75 | 75 | 3 hours |

**Continuous Internal Assessment (CIE ) pattern**

Attendance: 15 marks

Continuous Assessment: 30 marks

Internal Test: 30 marks

**End Semester examination (ESE)pattern**

The following guidelines should be followed regarding award of marks

Preliminary Work: 15 marks

Conduct of Experiment: 10 marks

Tabulation of readings, Calculation, Result and Inference: 25 marks

Viva: 20 marks

Record: 5 marks

**General Instructions regarding ESE**

End semester evaluation is to be conducted under the equal responsibility of both internal and external examiners. The students shall be allowed for the ESE only on submitting the duly certified record. External examiner shall endorse the record.

## Syllabus

### List of Experiments

1. Test on soil : 1 session
2. Tests on coarse aggregates : 6 sessions
3. Tests on bitumen : 4 sessions
4. Mix design of bituminous mix : 1 session
5. Functional evaluation of pavement : 1 session

### Course Content and Practical Schedule

| Expt. No | List of Experiments | Course Outcome | No.of Hours |
|---|---|---|---|
| 1 | **Test on soil**<br>California Bearing Ratio Test (soaked/unsoaked specimen) | **CO1** | 3 |
| 2 | **Test on Coarse Aggregate**<br>Specific Gravity and Water Absorption Test | **CO 2** | 3 |
| 3 | Aggregate Impact Test | | 3 |
| 4 | Los Angeles Abrasion Test | | 3 |
| 5 | Aggregate Crushing Value Test | | 3 |
| 6 | Shape Test<br>(Angularity number, flakiness index, Elongation index, Combined flakiness and elongation index) | | 3 |
| 7 | Stripping value of road aggregates | | 3 |
| 8 | **Tests on Bitumen**<br>Determination of grade of bitumen based on viscosity | **CO 3** | 3 |
| 9 | Softening point | | 3 |
| 10 | Ductility of bitumen | | 3 |
| 11 | Flash and fire point of bitumen | | 3 |
| 12 | **Design of Bituminous Mix**<br>Design of bituminous mix by Marshall method of mix design | **CO4** | 3 |
| 13 | **Functional Evaluation of Pavement**<br>Use of MERLIN apparatus to determine road roughness | **CO5** | 3 |

***Any twelve experiments are mandatory**

**Reference Books**

1. Khanna, S.K., Justo, C.E.G. and Veeraragavan, A.,"Highway Materials and Pavement Testing", Nem Chand & Bros., Roorkee

2. G. Venkatappa Rao, K. Ramachandra Rao, Kausik Pahari and D.V. Bhavanna Rao.,"Highway Material Testing and Quality Control", I.K. International.

3. L.R.Kadiyali and N.B Lal., "Principles and Practices of Highway Engineering", Khanna Publishers.

| CST 308 | COMPREHENSIVE COURSE WORK | Category | L | T | P | Credit | Year of Introduction |
|---|---|---|---|---|---|---|---|
| | | PCC | 1 | 0 | 0 | 1 | 2019 |

**Preamble:**

The objective of this Course work is to ensure the comprehensive knowledge of each student in the most fundamental core courses in the curriculum. Six core courses credited from Semesters 3, 4 and 5 are chosen for the detailed study in this course work. This course helps the learner to become competent in cracking GATE, placement tests and other competitive examinations

**Prerequisite:**

1. **Discrete Mathematical Structures**
2. **Data Structures**
3. **Operating Systems**
4. **Computer Organization And Architecture**
5. **Database Management Systems**
6. **Formal Languages And Automata Theory**

**Course Outcomes:** After the completion of the course the student will be able to

| | |
|---|---|
| CO1 | Comprehend the concepts of discrete mathematical structures (Cognitive Knowledge Level: **Understand)** |
| CO2 : | Comprehend the concepts and applications of data structures (Cognitive Knowledge Level: **Understand)** |
| CO3 : | Comprehend the concepts, functions and algorithms in Operating System (Cognitive Knowledge Level: **Understand)**) |
| CO4 : | Comprehend the organization and architecture of computer systems (Cognitive Knowledge Level: **Understand)** |
| CO5 : | Comprehend the fundamental principles of database design and manipulation (Cognitive Knowledge Level: **Understand)** |
| CO6 : | Comprehend the concepts in formal languages and automata theory Cognitive Knowledge Level: **Understand)** |

**Mapping of course outcomes with program outcomes**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | ✓ | ✓ | | | | | | | | | | ✓ |
| CO2 | ✓ | ✓ | | | | | | | | | | ✓ |
| CO3 | ✓ | ✓ | | | | | | | | | | ✓ |
| CO4 | ✓ | ✓ | | | | | | | | | | ✓ |
| CO5 | ✓ | ✓ | | | | | | | | | | ✓ |

**Assessment Pattern**

| Bloom's Category | End Semester Examination |
|---|---|
| Remember | **10** |
| Understand | **20** |
| Apply | **20** |
| Analyse | |
| Evaluate | |
| Create | |

**Mark distribution**

| Total Marks | CIE | ESE | ESE Duration |
|---|---|---|---|
| **50** | **0** | **50** | **1 hour** |

**End Semester Examination Pattern:** Objective Questions with multiple choice (Four). Question paper include fifty questions of one mark each covering the five identified courses.

# Syllabus

Full Syllabus of all six selected Courses.

1. **Discrete Mathematical Structures**
2. **Data Structures**
3. **Operating Systems**
4. **Computer Organization And Architecture**
5. **Database Management Systems**
6. **Formal Languages And Automata Theory**

## Course Contents and Lecture Schedule

| No | Topic | No. of Lectures |
|---|---|---|
| **1** | **DISCRETE MATHEMATICAL STRUCTURES (14 hours)** | |
| 1.1 | Mock Test on Module 1 and Module 2 | 1 hour |
| 1.2 | Mock Test on Module 3, Module 4 and Module 5 | 1 hour |
| **2** | **DATA STRUCTURES** | |
| 2.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 hour |
| 2.2 | Mock Test on Module 4 and Module 5 | 1 hour |
| **3** | **OPERATING SYSTEMS** | |
| 3.1 | Mock Test on Module 1 and Module 2 | 1 hour |
| 3.2 | Mock Test on Module 3, Module 4 and Module 5 | 1 hour |
| 3.3 | Feedback and Remedial | 1 hour |
| **4** | **COMPUTER ORGANIZATION AND ARCHITECTURE** | |
| 4.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 hour |
| 4.2 | Mock Test on Module 4 and Module 5 | 1 hour |
| **5** | **DATABASE MANAGEMENT SYSTEMS** | |

| | | |
|---|---|---|
| 5.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 hour |
| 5.2 | Mock Test on Module 4 and Module 5 | 1 hour |
| 6 | **FORMAL LANGUAGES AND AUTOMATA THEORY** | |
| 6.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 hour |
| 6.2 | Mock Test on Module 4 and Module 5 | 1 hour |
| 6.3 | Feedback and Remedial | 1 hour |

## Model Question Paper

**QP CODE:**

**Reg No: _____**

**Name: _____** **PAGES : 10**

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

**SIXTH SEMESTER B.TECH DEGREE EXAMINATION, MONTH & YEAR**

**Course Code: CST 308**

**Course Name: Comprehensive Course Work**

**Max. Marks: 50** **Duration: 1 Hour**

**Objective type questions with multiple choices. Mark one correct answer for each question. Each Question Carries 1 Mark**

1. What is the maximum possible number of relations from a set with 5 elements to another set with 4 elements?

   (A) 2^10 (B)2^16 (C)2^20 (D)2^25

2. The set {1,2,4,7,8,11,13,14} is a group under multiplication modulo 15. Find the inverse of element 13

   (A) 7 (B) 13 (C) 1 (D) 8

3. Consider the recurrence relation $a_1 = 2$, $a_n = 3n+a_{n-1}$ Then $a_{72}$ is

(A) 7882 (B) 7883 (C) 7884 (D) 7885

4. Which among the following is a contradiction?
   (A) $(p \wedge q) \vee \neg(p \vee q)$ (B) $(p \vee q) \wedge \neg(p \wedge q)$
   (C) $(p \wedge q) \wedge \neg(p \vee q)$ (D) $(p \wedge q) \vee (p \wedge \neg q)$

5. The number of non-negative solutions to $x + y + z = 18$, with conditions $x \geq 3, y \geq 2, z \geq 1 is$
   (A) 84 (B) 91 (C) 105 (D) 121

6. The solution of the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$ with initial conditions $a_0 = 2, a_1 = 7$, is
   (A) $3(2)^n - (-1)^n$ (B) $3(2)^n + (-1)^n$
   (C) $-3(2)^n - (-1)^n$ (D) $-3(2)^n + (-1)^n$

7. Which among the following is not a subgroup of the set of Complex numbers under addition?
   (A) $R$, the set of all Real numbers.
   (B) $Q^+$, the set of positive rational numbers.
   (C) $Z$, the set of all integers.
   (D) The set $iR$ of purely imaginary numbers including 0

8. Minimum number $n$ of integers to be selected from $S = \{1,2,\ldots,9\}$ to guarantee that the difference of two of the n integers is 5 is
   (A) 3 (B) 4 (C) 6 (D) 9

9. Find the contrapositive the of statement "If it is a sunday, then I will wake up late"
   (A) If I am not waking up late, then it is a suniday
   (B) If I am not waking up late, then it is not a suniday
   (C) If it is not a sunday, then I will not wake up late.
   (D) It is not a sunday or I will wake up late

10. In the poset $(Z^+, |)$ (where $Z^+$ is the set of all positive integers and | is the divides relation), which of the following are false?
   I. 3 and 9 is comparable
   II. 7 and 10 is comparable
   III. The poset (Z+, |) is a total order
   (A) I and III (B) II only (C) II and III (D) III only

11. Consider the following sequence of operations on an empty stack.
   push(22); push(43); pop(); push(55); push(12); s=pop();

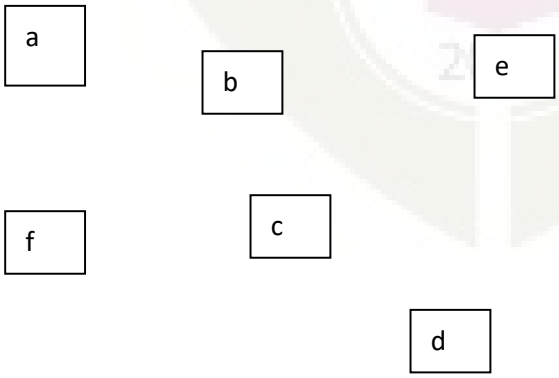
Consider the following sequence of operations on an empty queue.
enqueue(32);enqueue(27); dequeue(); enqueue(38); enqueue(12); q=dequeue();
The value of s+q is _____
(A) 44 (B) 54 (C) 39 (D) 70

12. The following postfix expression with single digit operands is evaluated using a stack:
8 2 2 ^ / 4 3 * + 5 1 * -
Note that ^ is the exponentiation operator. The top two elements of the stack after the first * is evaluated are:
(A) 12,2 (B) 12,5 (C) 2,12 (D) 2,5

13. Construct a binary search tree by inserting 8, 6, 12, 3, 10, 9 one after another. To make the resulting tree as AVL tree which of the following is required?
(A) One right rotation only
(B) One left rotation followed by two right rotations
(C) One left rotation and one right rotation
(D) The resulting tree itself is AVL

14. In a complete 4-ary tree, every internal node has exactly 4 children or no child. The number of leaves in such a tree with 6 internal nodes is:
(A) 20 (B) 18 (C) 19 (D) 17

15. Consider the following graph with the following sequences
I. a b c f d e
II. a b e d f c
III. a b f c d e
IV. a f c b e d




Which are Depth First Traversals of the above graph?

(A) I, II and IV only (B) I and IV only
(C) II, III and IV only (D) I, III and IV only

16. Consider a hash table of size seven, with starting index zero, and a hash function (2x + 5) mod7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 4, 9, 6 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.
(A) 9, _, 1, 6, _, _, 4 (B) 1, _, 6, 9, _, _, 4
(C) 4, _, 9, 6, _, _, 1 (D) 1, _, 9, 6, _, _, 4

17. Consider the following C program where TreeNode represents a node in a binary tree

```
struct TreeNode{
struct TreeNode *leftChild;
struct TreeNode *rightChild;
int element;
};
int CountNodes(struct TreeNode *t)
{
if((t==NULL)||((t->leftChild==NULL) && (t->rightChild==NULL)))
        return 0;
else
{
        return 1+CountNodes(t->leftChild)+CountNodes(t->rightChild)
}
}
```

The value returned by CountNodes when a pointer to the root of a binary tree is passed as its argument is
(A) number of nodes
(B) number of leaf nodes
(C) number of non leaf nodes
(D) number of leaf nodes-number of non leaf nodes

18. How many distinct binary search trees can be created out of 6 distinct keys?
(A) 7 (B) 36 (C) 140 (D) 132

19. Suppose a disk has 400 cylinders, numbered from 0 to 399. At some time the disk arm is at cylinder 58, and there is a queue of disk access requests for cylinder 66, 349, 201, 110, 38, 84, 226, 70, 86. If Shortest-Seek Time First (SSTF) is being used for scheduling the disk access, the request for cylinder 86 is serviced after servicing _____ number of

requests.
(A) 1 (B) 2 (C)3 (D)4

20. If frame size is 4KB then a paging system with page table entry of 2 bytes can address _____ bytes of physical memory.
(A) 2^12 (B) 2^16 (C) 2^18 (D) 2^28

21. Calculate the internal fragmentation if page size is 4KB and process size is 103KB.
(A) 3KB (B) 4KB (C) 1KB (D) 2KB

22. Which of the following scheduling policy is likely to improve interactiveness?
(A) FCFS (B) Round Robin
(C) Shortest Process Next (D) Priority Based Scgeduling

23. Consider the following program

Semaphore X=1, Y=0

```
Void A ( )
{
    While (1)
    {
    P(X);
    Print'1';
    V(Y);
    }
}
```

```
Void B ( )
{
    While (1)
    {
    P(Y);
    P(X);
    Print'0';
    V(X);
    }
}
```

The possible output of the program:
(A) Any number of 0's followed by any number of 1's.
(B) Any number of 1's followed by any number of 0's.
(C) 0 followed by deadlock
(D) 1 followed by deadlock

24. In a system using single processor, a new process arrives at the rate of 12 processes per minute and each such process requires 5 seconds of service time. What is the percentage of CPU utilization?
(A) 41.66 (B) 100.00 (C) 240.00 (D) 60.00

25. A system has two processes and three identical resources. Each process needs a maximum of two resources. This could cause
(A) Deadlock is possible (B) Deadlock is not possible

(C) Starvation may be present (D) Thrashing

26. Which of the following is true with regard to Round Robin scheduling technique?
    (A) Responds poorly to short process with small time quantum.
    (B) Works like SJF for larger time quantum
    (C) Does not use a prior knowledge of burst times of processes.
    (D) Ensure that the ready queue is always of the same size.

27. The size of the physical address space of a 32-bit processor is 2^W words. The capacity of cache memory is 2^N words. The size of each cache block is 2^K words. For a M-way set-associative cache memory, the length (in number of bits) of the tag field is
    (A) $W - N + \log_2 M$ (B) $W - N - \log_2 M$
    (C) $W - N - K - \log_2 M$ (D) $W - N - K + \log_2 M$

28. A 64-bit processor can support a maximum memory of 8 GB, where the memory is word-addressable (one word is of 64 bits). The size of the address bus of the processor is atleast ____ bits.
    (A) 30 (B) 31 (C) 32 (D) None

29. The stage delays in a 4-stage pipeline are 900, 450, 400 and 350 picoseconds. The first stage (with delay 900 picoseconds) is replaced with a functionally equivalent design involving two stages with respective delays 600 and 550 picoseconds. The throughput increase of the pipeline is _____ percent.
    (A) 38 (B) 30 (C) 58 (D) 50

30. Consider a direct mapped cache of size 256 Kilo words with block size 512 words. There are 6 bits in the tag. The number of bits in block (index) and word (offset) fields of physical address are is:
    (A) block (index) field = 6 bits, word (offset) field = 9 bits
    (B) block (index) field = 7 bits, word (offset) field = 8 bits
    (C) block (index) field = 9 bits, word (offset) field = 9 bits
    (D) block (index) field = 8 bits, word (offset) field = 8 bits

31. The memory unit of a computer has 1 Giga words of 64 bits each. The computer has instruction format, with 4 fields: an opcode field; a mode field to specify one of 12 addressing modes; a register address field to specify one of 48 registers; and a memory address field. If an instruction is 64 bits long, how large is the opcode field?
    (A) 34 bits (B) 24 bits (C) 20 bits (D) 14 bits

32. A computer has 64-bit instructions and 28-bit address. Suppose there are 252 two-address instructions. How many 1-address instructions can be formulated?

(A) 2^24 (B) 2^26 (C) 2^28 (D) 2^30

33. Determine the number of clock cycles required to process 200 tasks in a six-segment pipeline.(Assume there were no stalls),each segment takes 1 cycle.
(A) 1200 cycles (B) 206 cycles (C) 207 cycles (D) 205 cycles

34. Match the following Lists:

| | |
|---|---|
| P.DMA | 1.Priority Interrupt |
| Q. Processor status Word | 2.I/O Transfer |
| R. Daisy chaining | 3.CPU |
| S. Handshaking | 4.Asynchronous Data Transfer |

(A) P-1, Q-3, R-4, S-2 (B) P-2, Q-3, R-1, S-4
(C) P-2, Q-1, R-3, S-4 (D) P-4, Q-3, R-1, S-2

35. Let E1, E2 and E3 be three entities in an E/R diagram with simple single-valued attributes. R1 and R2 are two relationships between E1 and E2, where R1 is one-to-many, R2 is many-to-many. R3 is another relationship between E2 and E3 which is many-to-many. R1, R2 and R3 do not have any attributes of their own. What is the minimum number of tables required to represent this situation in the relational model?
(A) 3 (B) 4 (C) 5 (D) 6

36. Identify the minimal key for relational scheme R(U, V, W, X, Y, Z) with functional dependencies F = {U → V, V → W, W → X, VX → Z}
(A) UV (B) UW (C) UX (D) UY

37. It is given that: “Every student need to register one course and each course registered by many students”, what is the cardinality of the relation say “Register” from the “Student” entity to the “Course” entity in the ER diagram to implement the given requirement.
(A) M:1 relationship (B) M:N relationship
(C) 1:1 relationship (D) option (B) or(C)

38. Consider the relation branch( branch_name, assets, branch_city)
SELECT DISTINCT T.branch_name FROM branch T, branch S WHERE T.assets > L.assets AND S.branch_city = "TVM" .
Finds the names of
(A) All branches that have greater assets than all branches located in TVM.
(B) All branches that have greater assets than some branch located in TVM.
(C) The branch that has the greatest asset in TVM.
(D) Any branch that has greater asset than any branch located in TVM.

39. Consider the following relation instance, where "A" is primary Key.

| A1 | A2 | A3 | A4 |
|---|---|---|---|
| 1 | 1 | 1 | Null |
| 5 | 2 | 5 | 1 |
| 9 | 5 | 13 | 5 |
| 13 | 13 | 9 | 15 |

Which one of the following can be a foreign key that refers to the same relation?
(A) A2 (B) A3 (C) A4 (D) ALL

40. A relation R(ABC) is having the tuples(1,2,1),(1,2,2),(1,3,1) and (2,3,2). Which of the following functional dependencies holds well?
(A) A → BC (B) AC → B (C) AB → C (D) BC → A

41. Consider a relation R with attributes A, B, C, D and E and functional dependencies A → BC, BC → E, E →DA. What is the highest normal form that the relation satisfies?
(A) BCNF (B) 3 NF (C) 2 NF (D) 1 NF

42. For the given schedule S, find out the conflict equivalent schedule.
S : r1(x); r2(Z) ; r3(X); r1(Z); r2(Y); r3(Y);W1(X); W2(Z); W3(Y); W2(Y)
(A) T1→T2→T3 (B) T2->T1->T3
(C) T3→T1→T2 (D) Not conflict serializable

43. Which of the following strings is in the language defined by the grammar:
S → aX
X → aX | bX | b
(A) aaaba (B) babab (C) aaaaa (D) ababb

44. Consider the regular expression (x+y)*xyx(x+y)* where Σ = (x,y). If L is the language represented by this regular expression, then what will be the minimum number of states in a DFA recognizing L ?
(A) 2 (B) 3 (C) 4 (D) 5

45. Which of the following cannot handle the same set of languages?
(A) Deterministic Finite Automata and Non-Deterministic Finite Automata
(B) Deterministic Push Down Automata and Non-Deterministic Push Down Automata
(C) All of these
(D) None of these

46. Consider L be a context-free language and M be a non-context-free language. Which among the following is TRUE?

(I) L will definitely pass the pumping lemma test for CFLs.
(II) M will definitely pass the pumping lemma test for CFLs.
(III) L will not definitely pass the pumping lemma test for CFLs.
(IV) M will not definitely pass the pumping lemma test for CFLs.
(V) L may or maynot pass the pumping lemma test for CFLs.
(VI) M may or maynot pass the pumping lemma test for CFLs.
(A) I, II (B) II, V (C) I, VI (D) IV, V

47. Which of the following problem(s) is/are decidable?
(I) Whether a CFG is empty or not.
(II) Whether a CFG generates all possible strings.
(III) Whether the language generated by a Turing Machine is regular.
(IV) Whether the language generated by DFA and NFA are same.
(A) I and II (B) II and III (C) II and IV (D) I and IV

48. Which of the following is/are TRUE?
(I) Regular languages are closed under complementation.
(II) Recursive languages are closed under complementation.
(III) Context free languages are closed under complementation.
(IV) Context free languages are not closed under complementation.
(A) I, II and III (B) I, II and IV (C) II and III (D) III only

49. Which of the following regular expressions defined over the alphabet $\Sigma = \{0,1\}$ defines the language of all strings of length l where l is a multiple of 3?
(A) (0 + 1 + 00 + 11 + 000 +111)* (B) (000 + 111)*
(C) ((0 + 1)(0 + 1)(0 + 1))* (D) ((000 + 01 + 1)(111 + 10 + 0))*

50. Determine the minimum number of states of a DFA that recognizes the language over the alphabet {a,b} consisting of all the strings that contain at least three a's and at least four b's.
(A) 6 (B) 12 (C) 15 (D) 20

**ANSWER KEY:-**

| QNo | Ans. Key | QNo | Ans. Key | QNo | Ans. Key | QNo | Ans. Key | QNo | Ans. Key |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (C) | 11 | (C) | 21 | (C) | 31 | (B) | 41 | (A) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | (A) | 12 | (A) | 22 | (B) | 32 | (D) | 42 | (D) |
| 3 | (B) | 13 | (A) | 23 | (D) | 33 | (D) | 43 | (D) |
| 4 | (C) | 14 | (C) | 24 | (B) | 34 | (B) | 44 | (C) |
| 5 | (B) | 15 | (A) | 25 | (B) | 35 | (C) | 45 | (B) |
| 6 | (A) | 16 | (D) | 26 | (C) | 36 | (D) | 46 | (C) |
| 7 | (B) | 17 | (C) | 27 | (A) | 37 | (A) | 47 | (D) |
| 8 | (C) | 18 | (D) | 28 | (A) | 38 | (B) | 48 | (B) |
| 9 | (B) | 19 | (C) | 29 | (D) | 39 | (B) | 49 | (C) |
| 10 | (C) | 20 | (D) | 30 | (C) | 40 | (D) | 50 | (D) |

| ECT308 | COMPREHENSIVE COURSE WORK | CATEGORY | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| | | PCC | 1 | 0 | 0 | 1 |

**Preamble:** The objective of this Course work is to ensure the comprehensive knowledge of each student in the most fundamental Program core courses in the curriculum. Five core courses credited from Semesters 3, 4 and 5 are chosen for the detailed study in this course work. This course has an End Semester Objective Test conducted by the University for 50 marks. One hour is assigned per week for this course for conducting mock tests of objective nature in all the listed five courses.

**Prerequisite:**

1. **ECT202 Analog Circuits**
2. **ECT203 Logic Circuit Design**
3. **ECT301 Linear Integrated Circuits**
4. **ECT303 Digital Signal processing**
5. **ECT305 Analog and Digital communication**

**Course Outcomes:** After the completion of the course the student will be able to

| | |
|---|---|
| **CO 1** | Apply the knowledge of circuit theorems and solid state physics to solve the problems in electronic Circuits |
| **CO 2** | Design a logic circuit for a specific application |
| **CO 3** | Design linear IC circuits for linear and non-linear circuit applications. |
| **CO 4** | Explain basic signal processing operations and Filter designs |
| **CO 5** | Explain existent analog and digital communication systems |

**Mapping of course outcomes with program outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 3 | 1 | | | | | | | | | 2 |
| **CO 2** | 3 | 3 | 1 | | | | | | | | | 2 |
| **CO 3** | 3 | 3 | 1 | | | | | | | | | 2 |
| **CO 4** | 3 | 2 | | | | | | | | | | 2 |
| **CO 5** | 3 | 2 | 1 | | | | | | | | | 2 |

**Assessment Pattern**

| Bloom's Category | End Semester Examination |
|---|---|
| Remember | 10 |
| Understand | 20 |
| Apply | 20 |
| Analyse | |
| Evaluate | |
| Create | |

**Mark distribution**

| Total Marks | CIE | ESE | ESE Duration |
|---|---|---|---|
| 50 | 0 | 50 | 1 hour |

**End Semester Examination Pattern:** Objective Questions with multiple choice (Four). Question paper include Fifty Questions of One mark each covering the five identified courses.

**Syllabus**

**Full Syllabus of all five selected courses**

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**Course Contents and Lecture Schedule**

| No | Topic | No. of Lectures |
|---|---|---|
| **1** | **Analog Circuits** | |
| 1.1 | Mock Test on Module 1 and Module 2 | 1 |
| 1.2 | Mock Test on Module 3, Module 4 and Module 5 | 1 |
| 1.3 | Feedback and Remedial | 1 |
| **2** | **Logic Circuit design** | |
| 2.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 |
| 2.2 | Mock Test on Module 4 and Module 5 | 1 |
| 2.3 | Feedback and Remedial | 1 |
| **3** | **Linear IC** | |
| 3.1 | Mock Test on Module 1 and Module 2 | 1 |
| 3.2 | Mock Test on Module 3, Module 4 and Module 5 | 1 |
| 3.3 | Feedback and Remedial | 1 |
| **4** | **Digital Signal Processing** | |
| 4.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 |
| 4.2 | Mock Test on Module 4 and Module 5 | 1 |
| 4.3 | Mock Test on Module 1, Module 2 and Module 3 | 1 |
| **5** | **Analog and Digital Communication** | |
| 5.1 | Mock Test on Module 1, Module 2 and Module 3 | 1 |
| 5.2 | Mock Test on Module 4 and Module 5 | 1 |
| 5.3 | Feedback and Remedial | 1 |

| CODE | COURSE NAME | CATEGORY | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| EET308 | COMPREHENSIVE COURSE WORK | PCC | 1 | 0 | 0 | 1 |

**Preamble:** The objective of this Course work is to ensure the comprehensive knowledge of each student in the most fundamental Program core courses in the curriculum. Five core courses credited from Semesters 3, 4 and 5 are chosen for the detailed study in this course work. This course has an End Semester Objective Test conducted by the University for 50 marks. One hour is assigned per week for this course for conducting mock tests of objective nature in all the listed five courses.

**Prerequisite:**
1.EET 201 Circuits and Networks
2. EET 202 DC Machines and Transformers
3. EET 206 Digital Electronics
4. EET 301 Power Systems I
5. EET 305 Signals and Systems

**Course Outcomes:** After the completion of the course the student will be able to

| | |
|---|---|
| **CO 1** | Apply the knowledge of circuit theorems to solve the problems in electrical networks |
| **CO 2** | Evaluate the performance of DC machines and Transformers under different loading conditions |
| **CO 3** | Identify appropriate digital components to realise any combinational or sequential logic. |
| **CO 4** | Apply the knowledge of Power generation, transmission and distribution to select appropriate components for power system operation. |
| **CO 5** | Apply appropriate mathematical concepts to analyse continuous time and discrete time signals and systems |

**Mapping of course outcomes with program outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | | | | | | | | | | 2 |
| **CO2** | 3 | 2 | | | | | | | | | | 2 |
| **CO3** | 3 | 3 | 1 | | 1 | | | | | | | 2 |
| **CO4** | 3 | 3 | | | | 1 | 1 | 1 | | | 1 | 2 |
| **CO5** | 3 | 3 | 1 | | 1 | | | | | | | 2 |

**Assessment Pattern**

| Bloom's Category | End Semester Examination |
|---|---|
| Remember | 10 |
| Understand | 20 |
| Apply | 20 |
| Analyse | |
| Evaluate | |
| Create | |

**Mark distribution**

| Total Marks | CIE | ESE | ESE Duration |
|---|---|---|---|
| 50 | 0 | 50 | 1 hour |

**End Semester Examination Pattern:** Objective Questions with multiple choice (Four). Question paper include Fifty Questions of One mark each covering the five identified courses.

**Course Level Assessment Questions**

**Course Outcome 1 (CO1):**

1. A circuit with resistor, inductor and capacitor in series is resonant at $f_0$ Hz. If all the component values are now doubled, the new resonant frequency is

a) $2\ f_0$
b) Still $f_0$
c) $f_0/2$
d) $f_0/4$

2. The line A to neutral voltage is $10\angle 15^0$ V for a balance three phase star connected load with phase sequence ABC. The voltage of line B with respect to line C is given by

a) $10\sqrt{3}\angle 105^0$ V
b) $10\angle 105^0$ V
c) $10\sqrt{3}\angle 75^0$ V
d) $-10\sqrt{3}\angle 90^0$ V

3. The average power delivered to an impedance $(4-j3)\Omega$ by a current $5\cos(100\pi t+100)$A is

a) 44.2 W
b) 50 W
c) 62.5 W
d) 125 W

**Course Outcome 2 (CO2)**

1. The DC motor which can provide zero speed regulation at full load without any controller is

a) Series
b) Shunt
c) Cumulatively compound
d) Differentially compound

2. For a single phase, two winding transformer, the supply frequency and voltage are both increased by 10%. The percentage changes in the hysteresis and eddy current loss, respectively are

a) 10 and 21
b) -10 and 21
c) 21 and 10
d) -21 and 10

3. Match the following

| List I-Performance Variables | List II-Proportional to |
|---|---|
| A. Armature emf (E) Current(Ia) | 1. Flux ($\phi$), speed ($\omega$), Armature |
| B. Developed Torque (T) | 2. $\phi$ and $\omega$ only |
| C. Developed Power (P) | 3. $\phi$ and Ia only |
| | 4. Ia and $\omega$ only |
| | 5. Ia only |

Choices:

| | A | B | C |
|---|---|---|---|
| a) | 3 | 3 | 1 |
| b) | 2 | 5 | 4 |
| c) | 3 | 5 | 4 |
| d) | 2 | 3 | 1 |

**Course Outcome 3(CO3):**

1. The SOP (sum of products) form of a Boolean function is ∑(0, 1, 3, 7, 11), where inputs are A, B, C, D (A is MSB and D is LSB). The equivalent minimized expression of the function is

a) (B'+C)(A'+C)(A'+B')(C'+D)
b) (B'+C)(A'+C)(A'+C')(C'+D)
c) (B'+C)(A'+C)(A'+C')(C'+D')
d) (B'+C)(A+B')(A'+B')(C'+D)

2. A cascade of three identical modulo-5 counters has an overall modulus of

a) 5
b) 25
c) 125
d) 625

3. The octal equivalent of the HEX number AB.CD is

a) 253.314
b) 253.632
c) 526.314
d) 526.632

**Course Outcome 4 (CO4):**

1. Corona losses are minimized when

a) Conductor size is reduced
b) Smoothness of the conductor is reduced
c) Sharp points are provided in the line hardware
d) Current density in the conductors is reduced

2. Keeping in view the cost and overall effectiveness, the following Circuit Breaker is best suited for capacitor bank switching

a) Vacuum
b) Air Blast
c) $SF_6$
d) Oil

3. The horizontally placed conductors of a single phase line operating at 50Hz are having outside diameter of 1.6cm and the spacing between centres of the conductors is 6m. The permittivity of free space is $8.854 \times 10^{-12}$ F/m. The capacitance to ground per kilometre of each line is

a) $4.2 \times 10^{-9}$ F

b) $4.2 \times 10^{-12}$ F
c) $8.4 \times 10^{-9}$ F
d) $8.4 \times 10^{-12}$ F

**Course Outcome 5 (CO5):**

1. Consider a continuous time system with input x(t) and output y(t) given by y(t)=x(t)cos(t). This system is

a) Linear and time invariant
b) Non-linear and time invariant
c) Linear and time varying
d) Non-linear time varying

2. Signal Flow Graph is used to obtain

a) Stability of the system
b) Transfer Function of a system
c) Controllability of a system
d) Observability of a system

3. The steady state error due to a step input for Type 1 system is

a) Zero
b) Infinity
c) 1
d) 0.5

**Syllabus**

Full Syllabus of all Five selected Courses.

**Course Contents and Lecture Schedule**

| No | Topic | No. of Lectures |
|---|---|---|
| 1 | **Circuits and Networks** | |
| 1.1 | Mock Test on Module 1 and Module 2 | **1** |
| 1.2 | Mock Test on Module 3, Module 4 and Module 5 | **1** |
| 1.3 | Feedback and Remedial | **1** |
| 2 | **DC Machines and Transformers** | |
| 2.1 | Mock Test on Module 1, Module 2 and Module 3 | **1** |
| 2.2 | Mock Test on Module 4 and Module 5 | **1** |
| 2.3 | Feedback and Remedial | **1** |
| 3 | **Digital Electronics** | |
| 3.1 | Mock Test on Module 1 and Module 2 | **1** |
| 3.2 | Mock Test on Module 3, Module 4 and Module 5 | **1** |

| | | |
|---|---|---|
| 3.3 | Feedback and Remedial | **1** |
| 4 | **Power Systems I** | |
| 4.1 | Mock Test on Module 1, Module 2 and Module 3 | **1** |
| 4.2 | Mock Test on Module 4 and Module 5 | **1** |
| 4.3 | Mock Test on Module 1, Module 2 and Module 3 | **1** |
| 5 | **Signals and Systems** | |
| 5.1 | Mock Test on Module 1, Module 2 and Module 3 | **1** |
| 5.2 | Mock Test on Module 4 and Module 5 | **1** |
| 5.3 | Feedback and Remedial | **1** |

| MET308 | COMPREHENSIVE COURSE WORK | CATEGORY | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| | | PCC | 1 | 0 | 0 | 1 |

**Preamble:** The course is designed to ensure that the students have firmly grasped the foundational knowledge in Mechanical Engineering familiar enough with the technological concepts. It provides an opportunity for the students to demonstrate their knowledge in various Mechanical Engineering subjects.

**Pre-requisite:** Nil

**Course outcomes:** After the course, the student will able to:

| | |
|---|---|
| **CO1** | Learn to prepare for a competitive examination |
| **CO2** | Comprehend the questions in Mechanical Engineering field and answer them with confidence |
| **CO3** | Communicate effectively with faculty in scholarly environments |
| **CO4** | Analyze the comprehensive knowledge gained in basic courses in the field of Mechanical Engineering |

**Mapping of course outcomes with program outcomes:**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | **3** | **2** | | | | | | | | | | **2** |
| **CO 2** | **3** | **2** | | | | | | | | | | **2** |
| **CO 3** | **3** | **2** | | | | | | | | | | **2** |
| **CO 4** | **2** | **3** | | | | | | | | | | **2** |

**Assessment pattern**

| Bloom's Category | End Semester Examination (Marks) |
|---|---|
| Remember | 25 |
| Understand | 15 |
| Apply | 5 |

| | |
|---|---|
| Analyze | 5 |
| Evaluate | |
| Create | |

**End Semester Examination Pattern:**

A written examination will be conducted by the University at the end of the sixth semester. The written examination will be of objective type similar to the GATE examination. Syllabus for the comprehensive examination is based on following five Mechanical Engineering core courses.

MET203- MECHANICS OF FLUIDS

MET205- METALLURGY AND MATERIAL SCIENCE

MET202- ENGINEERING THERMODYNAMICS

MET204– MANUFACTURING PROCESS

MET301- MECHANICS OF MACHINERY

The written test will be of 50 marks with 50 multiple choice questions (10 questions from each module) with 4 choices of 1 mark each covering all the five core courses. There will be no negative marking. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practicing questions based on the core courses listed above.

Written examination: 50marks

**Total : 50 marks**

**Course Level Assessment and Sample Questions:**

1. The shear stress developed in lubricating oil, of viscosity 9.81 poise, filled between two parallel plates 1cm apart and moving with relative velocity of 2 m/s is
   (a) 20 $N/m^2$
   (b) 19.62 $N/m^2$
   (c) 29.62 $N/m^2$
   (d) 40 $N/m^2$
2. For a Newtonian fluid
   (a) Shear stress is proportional to shear strain
   (b) Rate of shear stress is proportional to shear strain
   (c) Shear stress is proportional to rate of shear strain

(d) Rate of shear stress is proportional to rate of shear strain

3. Atomic packing factor (APF) in the case of copper crystal is
   (a) 0.52
   (b) 0.68
   (c) 0.74
   (d) 1.633
4. What is the approximate strain energy expression for a dislocation of unit length, irrespective of its edge or screw character?
   (a) $G^2b/2$
   (b) $Gb^2/2$
   (c) $G^2b/4$
   (d) $Gb^2/4$
5. Consider the following statements
   1. Zeroth law of thermodynamics is related to temperature
   2. Entropy is related to first law of thermodynamics
   3. Internal energy of an ideal gas is a function of temperature and pressure
   4. Van der Waals' equation is related to an ideal gas
   Which of the above statements is/are correct?
   (a) 1 only
   (b) 2, 3 and 4
   (c) 1 and 3
   (d) 2 and 4
6. A gas is compressed in a cylinder by a movable piston to a volume one-half of its original volume. During the process, 300 kJ heat left the gas and the internal energy remained same. What is the work done on the gas?
   (a) 100 kNm
   (b) 150 kNm
   (c) 200 kNm
   (d) 300 kNm
7. Which one of the following casting processes is best suited to make bigger size hollow symmetrical pipes?
   (a) Die casting
   (b) Investment casting
   (c) Shell moulding
   (d) Centrifugal casting
8. In gas welding of mild steel using an oxy-acetylene flame, the total amount of acetylene consumed was 10 litre. The oxygen consumption from the cylinder is
   (a) 5 litre
   (b) 10 litre
   (c) 15litre
   (d) 20 litre
9. The number of inversions for a slider crank mechanism is

   ( a) 6 (b) 5 ( c) 4 ( d) 3

10. Total number of instantaneous centers for a mechanism with n links are

( a ) n/2 ( b ) n ( c) ( n- 1 ) / 2 ( d ) (n(n-1)) /2

**Syllabus**

**MODULE 1**

Fluids and continuum, Physical properties of fluids, Newton's law of viscosity. Ideal and real fluids, Newtonian and non-Newtonian fluids. Fluid Statics- Pressure-density-height relationship, manometers, pressure on plane and curved surfaces, center of pressure, buoyancy, stability of immersed and floating bodies

Kinematics of fluid flow: Eulerian and Lagrangian approaches, classification of fluid flow, stream lines,path lines, streak lines, stream tubes, , stream function and potential function

Equations of fluid dynamics: Differential equations of mass, energy and momentum (Euler's equation), Bernoulli's equation, Pipe Flow: Viscous flow: shear stress and velocity distribution in a pipe Hagen Poiseuille equation. Darcy-Weisbach equation,

**MODULE 2**

Development of atomic structure - Primary bonds: - characteristics of covalent, ionic and metallic bond - properties based on atomic bonding Crystallography: - SC, BCC, FCC, HCP structures, APF , Miller Indices: - crystal plane and direction - Modes of plastic deformation: - Slip and twinning

Classification of crystal imperfections - forest of dislocation, role of surface defects on crack initiation- Burgers vector –Frank Read source - Correlation of dislocation density with strength and nano concept - high and low angle grain boundaries– driving force for grain growth and applications

Phase diagrams: - need of alloying - classification of alloys - Hume Rothery`s rule – equilibrium diagram of common types of binary systems: five types - Coring - lever rule and Gibb`s phase rule - Reactions- Detailed discussion on Iron-Carbon equilibrium diagram with micro structure and properties -Heat treatment: - TTT, CCT diagram, applications - Tempering- Hardenability, Jominy end quench test, applications- Surface hardening methods.

**MODULE 3**

Basic Thermodynamic Concepts Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic System and Control Volume, Surrounding, Boundaries, Types of Systems, Universe, Thermodynamic properties, Process, Cycle, Thermodynamic Equilibrium, Quasi – static Process, State, Point and Path function. Zeroth Law of Thermodynamics, Measurement of Temperature, reference Points, Temperature Scales.

First law of Thermodynamics - First law applied to Non flow and flow Process- SFEE

Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements, Equivalence of two statements Entropy- Entropy changes in various thermodynamic processes, principle of increase of entropy and its applications,Available Energy, Availability and Irreversibility- Second law efficiency.

**MODULE 4**

Casting:-Characteristics of sand - patterns- cores- -chaplets- simple problems- solidification of metals and Chvorinov's rule - Elements of gating system- risering -chills

Welding:-welding metallurgy-heat affected zone- grain size and hardness- stress reliving- joint quality -heat treatment of welded joints - weldability - destructive and non destructive tests of welded joints Thermit welding, friction welding - Resistance welding, Arc Welding, Oxyacetyline welding

Rolling:- principles - types of rolls and rolling mills - mechanics of flat rolling-Defects-vibration and chatter - flat rolling -miscellaneous rolling process

Forging: methods analysis, applications, die forging, defects in forging

**MODULE 5**

Introduction to kinematics and mechanisms - various mechanisms, kinematic diagrams, degree of freedom- Grashof's criterion, inversions, coupler curves mechanical advantage, transmission angle. straight line mechanisms exact, approximate. Displacement, velocity analysis– relative motion - relative velocity. Instantaneous centre -Kennedy's theorem.

Acceleration analysis- Relative acceleration - Coriolis acceleration - graphical and analytical methods.
Cams - classification of cam and followers - displacement diagrams, velocity and acceleration analysis of SHM, uniform velocity, uniform acceleration, cycloidal motion
Graphical cam profile synthesis, pressure angle.

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Est. 2003

## LIST OF STUDENTS ATTENDED COMPREHENSIVE COURSE WORK (2022-23)

| Sl. No. | Register No. | Name of student |
|---|---|---|
| 1 | SNC20CE001 | ABHIJITHA |
| 2 | SNC20CE002 | AKSHAYA PV |
| 3 | SNC20CE003 | ALEN ALEX |
| 4 | SNC20CE004 | AMAYA T |
| 5 | SNC20CE006 | ANUVINDA P |
| 6 | SNC20CE007 | APARNA P |
| 7 | SNC20CE008 | ARJUN KM |
| 8 | SNC20CE009 | FATHIMATHUL MARJAN |
| 9 | SNC20CE010 | FATHIMATH ZUHRA |
| 10 | SNC20CE011 | FIZA FARHEEN |
| 11 | SNC20CE012 | KEERTHANA SURENDRAN |
| 12 | SNC20CE013 | MOOHAMMED EBRAHIM |
| 13 | SNC20CE014 | RAJATH MANOHARAN |
| 14 | SNC20CE015 | SAJJAD ZAINUDHEEN |
| 15 | SNC20CE016 | SHAHANA SHERIN |
| 16 | SNC20CE017 | SREELAKSHMI K |
| 17 | SNC20CE018 | SREEVISHNU K |
| 18 | SNC20CE019 | VAISHNAVI N K |
| 19 | SNC20CE020 | VYSHNA K |
| 20 | LSNC20CE021 | ANUPRIYA K |

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| SL.NO: | REGISTER NO | NAME |
|---|---|---|
| 1 | SNC20CS001 | AARDRA PRASANTH |
| 2 | SNC20CS002 | AATHISH R |
| 3 | SNC20CS003 | ABHIJITH A |
| 4 | SNC20CS004 | ABHINAV A V |
| 5 | SNC20CS005 | ABHIRAM A V |
| 6 | SNC20CS006 | ABHIRAM T |
| 7 | SNC20CS007 | ABHISHEK K |
| 8 | SNC20CS008 | AKASH SUNILKUMAR |
| 9 | SNC20CS009 | AMAL M |
| 10 | SNC20CS010 | AMAL M.V |
| 11 | SNC20CS011 | ANAGHA ANILKUMAR |
| 12 | SNC20CS012 | ANAGHA P P |
| 13 | SNC20CS013 | ANANDASREE KRISHNAN |
| 14 | SNC20CS014 | ANIRUDH SHAJI |
| 15 | SNC20CS015 | ANJALI M |
| 16 | SNC20CS016 | ANURAG MT |
| 17 | SNC20CS017 | ARJUN M |
| 18 | SNC20CS018 | ASWATHI PI |
| 19 | SNC20CS019 | DILNA P |
| 20 | SNC20CS020 | FATHIMATHUL FAMEENABI P V |
| 21 | SNC20CS021 | GOKUL A |
| 22 | SNC20CS022 | GOPIKA PRAMOD KUMAR |
| 23 | SNC20CS023 | G P THRISHNA |
| 24 | SNC20CS024 | HAMNA SHERIN A |
| 25 | SNC20CS025 | HIMA MURALI K |
| 26 | SNC20CS026 | K ATHUL |
| 27 | SNC20CS027 | KEERTHANA CV |
| 28 | SNC20CS028 | MOHAMMED RAZI HAMZA |
| 29 | SNC20CS029 | MOHAMMED ZANIL P V |
| 30 | SNC20CS030 | MOHAMMED ZAYISH THAYYIL |
| 31 | SNC20CS031 | MRUDHUNA MANOJ K |
| 32 | SNC20CS032 | MUHAMMED ANSAR SAFER |
| 33 | SNC20CS033 | NANDANA M.V |
| 34 | SNC20CS034 | NILEENA C |
| 35 | SNC20CS035 | PARTHIP K ANISH |
| 36 | SNC20CS036 | REHAN P |
| 37 | SNC20CS037 | RIYA RAJESH |
| 38 | SNC20CS038 | SAFA ACHIRETHARAMMAL KURUKKAN |
| 39 | SNC20CS039 | SANDRA B |
| 40 | SNC20CS040 | SNEHA E |

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| 41 | SNC20CS041 | SREERAJ S NAIR |
| 42 | SNC20CS042 | VISWAJEETH P |

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| B-TECH IN ELECTRICAL AND ELECTRONICS ENGINEERING | | |
|---|---|---|
| 1 | SNC20EC002 | DEEPNA C |
| 2 | SNC20EC003 | HANEENA SULTHANA |
| 3 | SNC20EC004 | SANJAY SUDHAKARAN |
| 4 | SNC20EC005 | SOORAJ SURECH V O |
| 5 | SNC20EC006 | THEJASREE T K |
| 6 | LSNC20EC006 | FATHIMA NASLA M V |
| 7 | LSNC20EC007 | MEGHANA GANGADHARAN |

| B-TECH IN ELECTRICAL AND ELECTRONICS ENGINEERING | | |
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| 3 | SNC20EE003 | HRUDHUL RAGH |

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|---|---|---|
| 1 | SNC20ME001 | ARJUN SHYLESH |
| 2 | SNC20ME002 | ASHISH K K |
| 3 | SNC20ME003 | ASHWIN JOHN |
| 4 | SNC20ME004 | ASWIN BABU M V |
| 5 | SNC20ME005 | ASWIN P P |
| 6 | SNC20ME006 | DHEERAJ K V |
| 7 | SNC20ME007 | KN MUHAMMED MISHAL |
| 8 | SNC20ME008 | MAJID V V |
| 9 | SNC20ME009 | MOHAMMED SHAD ABDUL SATHAR |
| 10 | SNC20ME010 | SOURAG K |

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**DEPARTMENT OF :** Electronics & Communication Engineering

# CLASS RECORD
# THEORY

**NAME** : Meera. M

**DESIGNATION** : Assistant Professor

**ACADEMIC YEAR** : 2021-2022

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## Class Attendan

| Sl.No | Reg. No. | Name |
|---|---|---|
| 1. | SNC19EC001 | Arjun Ashok |
| 2. | SNC19EC002 | Jithin Sasidharan. N |
| 3. | SNC19EC003 | Keerthana. C.V |
| 4. | SNC19EC004 | Maniyambi |
| 5. | SNC19EC005 | Sanishma Sachithan |
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| Sl.No | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
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## Class Attendance and Assessment

| Sl.No | Reg. No. | Name | Month | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
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| | | | Date | 5 | 5 | 5 | 13 | 12 | 13 | 19 | 19 | 19 | 26 |
| | | | Hour | 4 | 5 | 6 | 4 | 5 | 6 | 4 | 5 | 6 | 4 |
| 1. | SNC19EC001 | Arjun Ashok | | X | X | X | X | X | X | A | A | A | X |
| 2. | SNC19EC002 | Jithin Sasidharan. N V | | X | X | X | A | A | A | A | A | A | X |
| 3. | SNC19EC003 | Keerthana. C.V | | X | X | X | A | A | A | A | A | A | X |
| 4. | SNC19EC004 | Maniyambi | | X | X | X | X | X | X | X | X | X | X |
| 5. | SNC19EC005 | Sanishma Sachithanand | | X | X | X | X | X | X | X | X | X | X |
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LIC

**1.Which of the following is not a charecteristics of an ideal operational amplifier?**

a) BW is infinite b) Perfect balance V0= 0 when V1=V2 c) Gain is infinite d) Input resistance is zero

**2 CMRR for an opamp should be**

a) As large as possible b) Close to zero c) Close to unity d) As small as possible

**3.Which of the following is an operational amplifier?**

a) IC 8085 b) IC 7805 c) IC 741 d) IC 555

**4.An opamp as a voltage follower has a voltage gain of**

a) infinity b) zero c) unity d) Less than unity

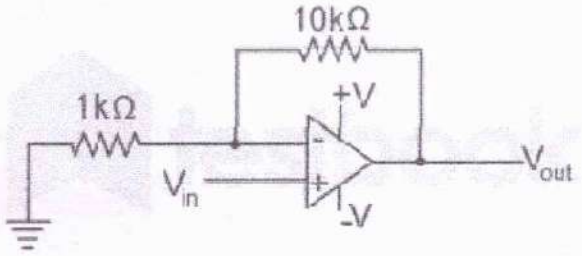
**5 An oscillator circuit which meant for converting sine wave into square wave is called**

a) Schmitt triger b) Blocking Oscillator c) Multivibrator d) Weinbridge oscillator

**6.The maximum rate that an output of an operational amplifier can change**

a) CMRR b) Slew rate c) input offset voltage d) none of the above

**7.For the circuit shown ,find the output voltage for an input voltage of -1 V**




a) -11 V b) 11 V c) -10 V d) 10 V

**8.In an opamp inverting amplifier,pin 2 of 741 IC is at virtual ground .This statement is based on which law?**

a) KVL b) KCL c) Ohms law d) Coulombs law

**9.When a step input is given to an opampintegrator ,the output will be**

a) A ramp b) A sinusoidal c) A rectangular wave d) A triangular wave with dc bias

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**10.The approximate input impedance of an opamp circuit which had Ri=10 K,Rf=100 K ,Rl=10K**

a)infinity b) 120 K c) 110 K d) 10 K

**11.Which of the following electrical charecteristics is not exhibited by an ideal opamp?**

a) Infinite voltage gain bb) Infinite BW c) Infinite output resistance d) Infinite slew rate

**12.A differential amplifier .....**

a). is a part of an Op-amp b). has one input and one output c). has two outputs
d) answers (a) and (b)

**13.Ideal opamp has infinite voltage gain because**

a) To control the output voltage b) to obtain finite output voltage

c) to receive zero noise output voltage d) None of the above

**14 Find the output voltage of an ideal opamp .If V1 and V2 are the two input voltages**

a) V0=V1*-V2 b) V0=A*(V1-V2) c) A*(V1+V2) d) V0=V1*V2

**15.Which is not the ideal charecteristics of an opamp?**

a) Input resistance >=0 b) Output resistance >=0 c) Bandwidth >=infinity

d) Openloop voltage gain >=infinity

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LCD

**1.The output of a logic gate is 1 when all its inputs are logic 0.The gate is either**

a) NAND or EX-OR gate b) NOR or EX-NOR gate c) OR or Ex-Nor gate

d) AND or EX-OR gate

**2.Which of the examples below expresses the commutative law of multiplication?**

a) A+B=B+A b)A*B=B*A c) A*B=B+A d) A*(B*C)=(A*B)*C

**3. What will be the output from a D flip-flop if D = 1 and the clock is low?**

a) No change b) Toggle between 0 and 1 c) 0 d) 1

**4.There are _____ cells in a 4-variable K-map.**

a)12 b) 16 c) 18 d) 8

**5.A(A + B) = ?**

a) AB b)1 c)(1+AB) d) 0

**6.(A + B)(A' * B') = ?**

a) 1 b) 0 c) AB d)AB'

**7.The logical expression Y=A+A'B=**

a) Y=AB b)Y=AB' c) Y= A'+B d) Y=A+B

**8.Minimum number of NAND gate required to implement A+AB'+ABC' =?**

a) 0 b) 1 c) 4 d) 7

**9. The octal number $(651.124)_8$ is =**

a) $(1A9.2A)_{16}$ b) $(1B0.10)_{16}$ c)$(1A8.A3)_{16}$ d) $(1B0.B0)_{16}$

**10.Convert hexadecimal number (1E2) into decimal**

a) 480 b) 483 c) 482 d) 484

**11. The string of 8 bits is known as**

a) Nibble b) Byte c) Octed d) Quad

**12.The 1's complement of a binary number is obtained by changing**

a) Each 1 to a 0 b) Each 0 to a 1 c) Each 1 to 0 and each 0 to 1 d) None of the above

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**13.The base of a hexadecimal number is**

a) 6 b) 8 c) 16 d) 10

**14.Which out of the following binary number is equivalent to decimal number 24**

a) 1101111 b) 11000 c) 111111 d) 11001

**15.If each successive code differs from its preceding code by a single bit only,then this code is called**

a) BCD code b) Gray code c) weighted code d) Binary code

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AC

1. **Neagtive feedback in an amplifier results in**
   a) Reduces gain b) Increases distortion c) Reduces BW d) Increases noise

**2.Cross over distortion occurs at**

a) Class A output stage b) Class B output stage c) Class Ab output stage

d) Common pulse output stage.

**3. Which of the following BJT configuration has highest power gain?**

a) CE b) CC c) CB d) None of the above

**4. An amplifier has a open loop voltage gain of -500 .This gain is reduced to -100 when negative feedback is applied.The reverse transmission factor B of the system is?**

a) -0.025 b) -0.008 c) 0.1 d) -0.2

**5.An amplifier has a voltage gain of 120.To reduce distortion ,10% negative FB is employed .The gain of the amplifier with feedback is ?**

a) 141 b) 92.3 c)9.23 d) 1.41

**6.In class B amplifier , the output current flows for?**

a) less than half input cycle b) More than half input cycle c) Half input cycle

d) Entire input cycle

**7.Push pull amplifier cicuit is used as**

a) Power amplifier b) Audio amplifier c) RF amplifier d) Emitter follower

**8.In class A operation of the amplifier,the current flows through the active device for?**

a) Whole input cycle b) Half of i/p cycle c) More than half of i/p cycle d) More than three fourth of the input cycle

**9.The maximum theoretical efficiency of a Class A amplifier can be**

a) 50% b) 78% c) 25% d) 100%

**10 Class AB operation is often used in power amplifiers in order to**

a) Get maximum efficiency b) Re,ove even harmonics c) Overcome a cross over distortion d) Reduce collector distortion

**11.An oscillator produces ------- oscillations**

a) Damped b) Undamped c) Modulated d) None of the above

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**12. An oscillator employs ------ feedback**

a) Positive b) Negative c) neither positive nor negative d)Data insufficient

**13 Hartley oscillator is commonly used in**

a) Radio receivers b) Radio transmitters c) TV receivers d) None of the above

**14. A weinbridge oscillator uses -----feedback**

a) Positive b) Negative c) Both positive and negative d)Non of the above

**15.The piezoelectric effect in crystal is -----**

a) A voltage developed because of mechanical stress b) A change in resistance because of temperature c) A change in frequency because of temperature d) None of the above

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Name Jithin Sasidharan NV Subject AC

| Question Number | Response | Question Number | Response |
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| 1 | a ✓ | 1 | a ✓ |
| 2 | b ✗ | 2 | a ✗ |
| 3 | a ✓ | 3 | b ✗ |
| 4 | b ✓ | 4 | e ✓ |
| 5 | a ✓ | 5 | b ✗ |
| 6 | d ✗ | 6 | c ✗ |
| 7 | b ✓ | 7 | a ✗ |
| 8 | b ✗ | 8 | c ✗ |
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Name ARJUN ASHOK. K Subject LCD

| Question Number | Response | Question Number | Response |
|---|---|---|---|
| 1 | A. ✓ | 1 | C ✓ |
| 2 | B. ✓ | 2 | D ✓ |
| 3 | A. ✓ | 3 | |
| 4 | B. ✗ | 4 | b ✓ |
| 5 | A. ✓ | 5 | |
| 6 | D. ✓ | 6 | |
| 7 | b ✗ | 7 | |
| 8 | b ✗ | 8 | a ✓ |
| 9 | a ✗ | 9 | |
| 10 | a ✗ | 10 | |
| 11 | | 11 | b ✓ |
| 12 | c ✓ | 12 | c ✓ |
| 13 | c ✗ | 13 | c ✓ |
| 14 | a ✓ | 14 | b ✓ |
| 15 | b ✓ | 15 | A ✓ |
| 16 | b ✓ | | |
| 17 | a ✗ | | |
| 18 | | | |
| 19 | c ✗ | | |
| 20 | B. ✗ | | |

17/35

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Name Sanishma Sachithanand S6 EC

Subject LIC

| Question Number | Response | Question Number | Response |
|---|---|---|---|
| 1 | a ✓ | 1 | c ✓ |
| 2 | d ✓ | 2 | a ✓ |
| 3 | a ✓ | 3 | c ✓ |
| 4 | b ✓ | 4 | a ✓ |
| 5 | | 5 | d ✗ |
| 6 | d ✗ | 6 | b ✗ |
| 7 | b ✗ | 7 | b ✗ |
| 8 | a ✗ | 8 | b ✓ |
| 9 | | 9 | c ✓ |
| 10 | a ✓ | 10 | d ✓ |
| 11 | a ✓ | 11 | d ✗ |
| 12 | d ✓ | 12 | a ✗ |
| 13 | a ✗ | 13 | c ✗ |
| 14 | b ✓ | 14 | b ✓ |
| 15 | a ✓ | 15 | c ✓ |
| 16 | | | |
| 17 | | | |
| 18 | | | |
| 19 | b ✗ | | |
| 20 | c ✓ | | |

19/25

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PAYYANUR, KANNUR

Name Keerthana. CV

Subject ADC, LCD

| Question Number | Response | Question Number | Response |
|---|---|---|---|
| 1 | a. ✓ | 1 | a ✓ |
| 2 | b ✓ | 2 | b ✓ |
| 3 | a. ✓ | 3 | c ✓ |
| 4 | b ✓ | 4 | d ✓ |
| 5 | a ✓ | 5 | a ✓ |
| 6 | d ✓ | 6 | d. ✓ |
| 7 | b ✓ | 7 | d. ✓ |
| 8 | b ✓ | 8 | d. ✓ |
| 9 | a ✓ | 9 | d. ✓ |
| 10 | a ✓ | 10 | b ✓ |
| 11 | | 11 | a ✓ |
| 12 | c ✓ | 12 | a ✓ |
| 13 | a ✓ | 13 | b ✓ |
| 14 | a ✓ | 14 | c ✓ |
| 15 | b ✓ | 15 | b |
| 16 | b ✓ | | |
| 17 | a ✓ | | |
| 18 | | | |
| 19 | c ✓ | | |
| 20 | b ✓ | | |

25/25

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**ADC**

**1.Generation of SSB SC signal is done by**

a) Amplitude Modulator b) Frequency discrimination method

c) Product modulator d) None of the above

**2.What is the maximum transmission efficiency of an AM signal?**

a) 64.4% b) 33.33% c) 56.66% d) 75.55%

**3. Which of the following analog modulation scheme requires minimum transmitted power and minimum channel bandwidth**?

a) DSB-FC (b) VSB c) DSB-SC (d) SSB

**4.Armstrong method is used for the generation of**

a) Direct FM (b) Indirect FM c) SSB-SC (d) DSB-SC

**5.For AM, with 100% modulation, power in each sideband is _____ of that of carrier?**

a) 50% (b) 70% c) 25% (d) 60%

**6.The Nyquist sampling rate of the continuous time signal Sinc(500t) is**

a) 1000 Hz. b) 100 Hz. c) 500 Hz d) 250 Hz

**7.In the generation of a modulated signal, a varactor diode can be used for**

a) FM generation only. b) AM generation only. c) PM generation only. d) Both (b) and (c)

**8 In uniform quantization process**

a) The step size remains same b) Step size varies according to the values of input signal
c) The quantizer has linear charecteristics d) Both a and c are correct

**9.One of the disadvantage of PCM is**

a) It requires large bandwidth b) Very high noise c) Cannot be decoded easily

d) All the above

**10.In Delta modulation**

a) One bit per sample is transmitted b) All of the coded bits used for sampling are transmitted c) The sampling size is fixed d) Both a and C are correct

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**11.Granular noise occurs when**

a) Step size is too small b) Step size is too large c) There is interference from the adjacent channel d) bandwidth is too large

**12.Matched Filter may be optimally used only for?**

a)Gaussian noise b)Transit time noise c) Flicker d) All the above

**13.Regenerative repeater is used for?**

a) Eliminating noise b) Reconstruction of signals c) Transmission over long distance c) All the above

**14.The bandwidth of BFSK is ---------- than BPSK**

a) Lower b) Same c) Higher d) Not predictable

**15.QPSK is a modulation scheme where each symbol consists of**

a) 4 bits b) 2 bits c) I bit d) m bits

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**DSP**

4. (a) 36

**Description:** Let the two sequences be M and N.

M = 40

N = 900

Number of DFT = 64

The number of smaller DTS required = L + M - 1 = Number of given DFT points

L + M - 1 = 64

L + 40 - 1 = 64

L = 25

Total blocks = N / L = 900/25 = 36

Hence, the number of smallest DFTs required to compute the linear convolution is 36.

5. (d) The output sequence is represented in bit-reversal order.

**Description:** The output sequence of the DIT-FFT is represented in regular order instead of bit-reversal order.

6. (b) {0.5, 0, 0.5, 0}

**Description:** IDFT is given by:

x(n) = IDFT [X(k)]

$$x(n) = \frac{1}{N}\sum_{K=0}^{N-1} X(k)e^{\frac{j2\pi kn}{N}}$$

$$x(n) = \frac{1}{4}[X(0) + X(1)e^{\frac{j\pi n}{2}} + X(2)e^{j\pi n} + X(3)e^{\frac{j3\pi n}{2}}]$$

**Step 1:** For, n = 0

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$x(0) = ¼ [ x(0) + x(1) + x(2) + x(3)]$

$= ¼[1 + 0 + 1 + 0]$

$= 2/4$

$= 1/2$

$= 0.5$

**Step 2:** For, n = 1

$x(1) = ¼ [ x(0) + x(1) + x(2) + x(3)]$

$= ¼[1 + 0(j)+ 1(-1) + 0(-j)]$

$= ¼ [1 +0 -1 + 0]$

$= 0$

**Step 3:** For, n = 2

$x(2) = ¼ [ x(0) + x(1) + x(2) + x(3)]$

$= ¼[1 + 0(-1)+ 1(1) + 0(-1)]$

$= ¼[1 + 0 + 1 + 0]$

$= 2/4$

$= 1/2$

$= 0.5$

**Step 4:** For, n = 3

$x(3) = ¼ [ x(0) + x(1) + x(2) + x(3)]$

$= ¼[1 + 0(-j)+ 1(-1) + 0(j)]$

$= ¼ [1 +0 - 1 + 0]$

$= 0$

Thus, $x(n) = \{0.5, 0, 0.5, 0\}$

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7.(d) All of the above

**Description:** Butterfly structure is an efficient structure that has various advantages, such as reducing complexity, involvement of less number of multiplications and additions. It also combines the result of small DFTs into large or vice versa.

8.c) The filters in the cascade are connected in parallel.

**Description:** The filters in the cascade realization are connected in series.

9.: (a) Impulse invariant method

**Description:** The practical analog filters are not generally perfectly band-limited. Hence, the filter using the impulsive invariant method can cause such an aliasing effect in the filters.

10. (b) 3/4 y(n - 1) - 1/8 y(n - 2) + x(n) + 1/3x(n - 1)

**Description:** The direct form-I is the structure formed after finding the z-transform of X(z) and Y(z), which is mentioned on both sides of the figure. Let's first determine X(z) and Y(z) and then their inverse Z-transform to find the equation of the discrete system.

**Step 1:** LHS

The left side is the X(z).

$X(z) [1 + 1/3 z^{-1}] = W(z)$

$X(Z) + 1/3 z^{-1} X(z) = W(z)$

The inverse can be represented as:

$x(n) + 1/3x(n - 1) = w(n)$

**Step 2:** RHS

The right side is the Y(z).

$Y(z) = 3/4 z^{-1} Y(z) - 1/8 z^{-2} Y(z) + W(z)$

The inverse can be represented as:

$y(n) = 3/4 y(n - 1) - 1/8 y(n - 2) + w(n)$

Substituting the value of w(n) from step 1, we get:

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$y(n) = 3/4\ y(n-1) - 1/8\ y(n-2) + x(n) + 1/3x(n-1)$

It is the discrete equation of the given system.

11. (a) Direct form- I

**Description:** There are two types of direct form, direct form I and direct form-II. Both forms can be used for IIR (Infinite Impulse Response) filters.

14. (b) Even

**Description:** Let x1(n) and x2(n) be the two signals.

If both these signals are odd, $x1(-n) = -x1(n)$ and $x2(-n) = -x2(n)$

If a signal is even, $x(-n) = x(n)$

$x(-n) = x1(-n) \cdot x2(-n)$

$x(-n) = -x1(n). -x2(n)$

$x(-n) = x1(n). x2(n)$

It means that $x(-n) = x(n)$, which is even.

Hence, the product of two odd signals is even.

15.(b) Causal

**Description:**

**Step 1**: The system is causal if its output depends only on the past and present inputs. Let's check its causality.

We will check the value of y(n) for different values of n.

For,

$n= 0, y(0) = x(0) + 1/x(-1)$

$n = 1, y(1) = x(1) + 1/x(0)$

Thus, the system is causal.

**Step 2**: The system that satisfies the superposition theorem can be classified as the linear system.

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$Y1(n) = x1(n) + 1/x1(n - 1)$

$Y2(n) = x2(n) + 1/x2(n - 1)$

To satisfy the linearity, $ay1(n) + by2(n) = ax1(n) + bx2(n)$

LHS

$ay1(n) + by2(n) = a\,[x1(n) + 1/x1(n - 1)] + b\,[x2(n) + 1/x2(n - 1)]$

$ay1(n) + by2(n) = ax1(n) + bx2(n) + a/x1(n - 1) + b/x2(n - 1)$

It is not equal to RHS

Hence, the system is non-linear.

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$Y1(n) = x1(n) + 1/x1(n - 1)$

$Y2(n) = x2(n) + 1/x2(n - 1)$

To satisfy the linearity, $ay1(n) + by2(n) = ax1(n) + bx2(n)$

LHS

$ay1(n) + by2(n) = a [x1(n) + 1/x1(n - 1)] + b [x2(n) + 1/x2(n - 1)]$

$ay1(n) + by2(n) = ax1(n) + bx2(n) + a/x1(n - 1) + b/x2(n - 1)$

It is not equal to RHS

Hence, the system is non-linear.

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Sree Narayana Guru College of Engineering and Technology
Estd: 2003

# Sree Narayana Guru College of Engineering & Technology

P.O. Chalakode, Payyanur - 670 307, Kannur Dist., Kerala State.

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**Managed by Sree Bhakthi Samvardhini Yogam, Kannur-2.**

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## *Vision*

A knowledge society promoting
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through effective education

## *Mission*

To provide technical education of the highest quality
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embedded in clearly articulated values
and supported by commitments

# Class Record

## THEORY

Department ELECTRICAL AND ELECTRONICS ENGINEERING

Faculty PRABHA CHANDRAN

Academic Year 2021-2022

Branch EEE Semester 6

Course EET 308 : COMPREHENSIVE COURSE

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## Class Attendance and Assessment

| Sl.No | Reg. No. | Name | Month | 4 | 5 | 5 | 5 | 6 | 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Date | 30 | 7 | 14 | 28 | 4 | 11 | | | | |
| | | | Hour | 4 | 4 | 4 | 4 | 4 | 4 | | | | |
| 1. | SNC19EE001 | ANUSHA JYOTHI | | X | X | X | X | X | X | | | | |
| 2. | SNC19EE002 | DEVI KEERTHANA T. P. | | X | X | X | X | X | X | | | | |
| 3. | SNC19EE003 | VAISHNAV T. V. | | X | X | X | X | X | X | | | | |
| 4. | SNC19EE004 | VISHAL K. | | X | X | X | X | X | X | | | | |
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| Signature | | | | | | | | | | | | | |

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**MODEL QUESTION PAPER**
**EET308**
**COMPREHENSIVE COURSE WORK**

**Max Marks: 100** **Duration: 1Hrs**

## CIRCUITS AND NETWORKS

1. Superposition theorem cannot be applied in linear circuits to find out the following variable
A. voltage B. current C. power D. none of these

2. source impedance of a non- ideal voltage source is Zs = 6+j 8 Ω and is connected to a resistive load. W hat should be the load for maximum power transfer.
A. 6 Ω B. 8 Ω C. 10 Ω D. 14 Ω
max. power trans. = |Zs|

3. there are 4 branches and 3 nodes then number of links in a co -tree are?
A. 2 B. 4 C. 6 D. 8

4.two -port network is represented by the following equations, $I_1=V_1 - 0.5V_2$, $I_2= -V_1 + V_2$, Z parameters are given by Z=

A. $Z=\begin{bmatrix}1 & -0.5\\ -1 & 1\end{bmatrix}$, B. $Z=\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$, C. $Z=\begin{bmatrix}1 & -2\\ -1 & 1\end{bmatrix}$ D. $Z=\begin{bmatrix}2 & 1\\ 2 & 2\end{bmatrix}$

5. The line A to neutral voltage is $10\angle 15^0$ V for a balance three phase star connected load with phase sequence ABC. The voltage of line B with respect to line C is given by

a) $10\sqrt{3}\angle 105^0$ V
b) $10\angle 105^0$ V
c) $10\sqrt{3}\angle 75^0$ V
d) $-10\sqrt{3}\angle 90^0$ V

$V_L = \sqrt{3}\, V_{ph}$

6. The average power delivered to an impedance (4-j3)Ω by a current $5\cos(100\pi\pi t+100)$A is
a) 44.2 W
b) 50 W
c) 62.5 W
d) 125 W

$|Z| = \sqrt{4^2+3^2} = 5$
$\cos\phi = \frac{R}{Z} = \frac{4}{5} = 0.8$

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## DC MACHINES AND TRANSFORMERS

1 The resistance of the transformer referred to low voltage side of a 240/120 V 1 – phase transformer with R1 =0.1 ohm and R2=0.03 ohm is
A. 0.055 ohm
B. 0.43 ohm
C. 0.22 ohm
D. 0.1075 ohm

2 Retardation test on dc shunt motor is conducted to determine
A. stray loss only,
B. . Stray loss and moment of inertia,
C. Temperature rise.
D. effect of flux distortion on iron loss

3 Retardation test on dc shunt motor is conducted to determine
A. stray loss only,
B. Stray loss and moment of inertia,
C. Tempe rature rise.
D. effect of flux distortion on iron loss

4 DC Series generator is used for

A. charging batteries, B. booster in distribution systems,
C. Arc welding D. Lamp loads

5 The equalizer connections are used for

A. Lap winding B. Wave winding
C. Wave winding with dummy coils D. Not for dc windings

6 A 4-pole dc machine is having double layer lap winding arranged in 80 slots. Winding resistance is 0.2 Ω per conductor. Determine the armature resistance (Ra).

A. 8 ohms B. 4 ohms C. 2 ohms D. 1 ohm

7 For a 1-phase transformer the maximum regulation occurs at 0.5 pf lagging, then the zero regulation occurs at a power factor equals to……
A. upf
B. 0.5 lead
C. 0.707 lead
D. 0.866 lead

8 Which among the following statement regarding a star-delta 3 phase transformer is not true
A. no problem with third harmonic components
B. unbalanced loads can be handled
C. can operate this connection in parallel with delta- delta
D. t here is a 30 Degree phase shift between Secondary to Primary phase voltages

9. The DC motor which can provide zero speed regulation at full load without any controller is
a) Series
b) Shunt

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c) Cumulatively compound
d) Differentially compound

10. For a single phase, two winding transformer, the supply frequency and voltage are both increased by 10%. The percentage changes in the hysteresis and eddy current loss, respectively are
a) 10 and 21
b) -10 and 21
c) 21 and 10
d) -21 and 10

11. Match the following

| List I-Performance Variables | List II-Proportional to |
|---|---|
| A. Armature emf (E) | 1. Flux ($\phi$), speed ($\omega$), Armature Current(Ia) |
| B. Developed Torque (T) | 2. $\phi$ and $\omega$ only |
| C. Developed Power (P) | 3. $\phi$ and Ia only |
| | 4. Ia and $\omega$ only |
| | 5. Ia only |

Choices:

| | A | B | C |
|---|---|---|---|
| a) | 3 | 3 | 1 |
| b) | 2 | 5 | 4 |
| c) | 3 | 5 | 4 |
| d) | 2 | 3 | 1 |

**DIGITAL ELECTRONICS**

1 A 4 bit pattern that wi ll produce the same pattern when 2's complement is taken.
A. 0001 B. 0010 C. 0100 D. 1000

2 The logical expression F=A + $\bar{A}B$ can be simplified to
A. F=AB, B. F=A+B C . F = 1 D. F = $\bar{A}$ +B

3 In a one-digit BCD adder, the number of bits in the output is
A. 3 B. 4 C. 5 D. 6

4 If D - FF is modified with switch -tail ring counter connection, the circuit becomes
A. SR FF, B. D FF C. JK FF D. T FF

5 The number of Flip Flops required to build Mod- 13 counter is
A . 2 B. 3 C. 4 D. 5

6 The capacity of a Memory chip is 8192 Bytes. The number of address lines required are
A. 11 B. 12 C. 13 D. 14

7 The resistor corresponding to the LSB of a 4-bit Weighted resistor DAC is 64 K ohms.

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Then the value of resistor assigned to MSB will be

A. 512 k ohm B. 64 k ohm C. 16 k ohm D. 8 k ohm

8. The SOP (sum of products) form of a Boolean function is ∑(0, 1, 3, 7, 11), where inputs are A, B, C, D (A is MSB and D is LSB). The equivalent minimized expression of the function is

a) (B'+C)(A'+C)(A'+B')(C'+D)
b) (B'+C)(A'+C)(A'+C')(C'+D)
c) (B'+C)(A'+C)(A'+C')(C'+D')
d) (B'+C)(A+B')(A'+B')(C'+D)

9. A cascade of three identical modulo-5 counters has an overall modulus of

a) 5
b) 25
c) 125
d) 625

10 The octal equivalent of the HEX number AB.CD is

a) 253.314
b) 253.632
c) 526.314
d) 526.632

## POWER SYSTEMS I

1. Efficiency of thermal power plant is ?
2. Corona losses are minimized when

a) Conductor size is reduced
b) Smoothness of the conductor is reduced
c) Sharp points are provided in the line hardware
d) Current density in the conductors is reduced

3. Keeping in view the cost and overall effectiveness, the following Circuit Breaker is best suited for capacitor bank switching

a) Vacuum
b) Air Blast
c) $SF_6$
d) Oil

4. The horizontally placed conductors of a single phase line operating at 50Hz are having

outside diameter of 1.6cm and the spacing between centres of the conductors is 6m. The permittivity of free space is 8.854 x 10-12 F/m. The capacitance to ground per kilometre of each line is

a) 4.2 x 10-9 F
b)4.2 x 10-12 F
c)8.4 x 10-9 F
d)8.4 x 10-12 F

## SIGNALS AND SYSTEMS

1. The Laplace transform of a circuit current is $I(s) = (5s^2+2s+6)/[s(s^2+3s+3)]$. The initial value i(o) is
A. 2 A B. 5A C. 6A D. Infinity

2. A circuit with resistor, inductor and capacitor in series is resonant at f0 Hz. If all the component values are now doubled, the new resonant frequency is

a) $2\ f_0$
b) Still $f_0$
c) $f_0/2$
d) $f_0/4$

3. Consider a continuous time system with input x(t) and output y(t) given by y(t)=x(t)cos(t).This system is
a)Linear and time invariant
b)Non-linear and time invariant
c)Linear and time varying
d)Non-linear time varying

4. Signal Flow Graph is used to obtain
a)Stability of the system
b)Transfer Function of a system
c)Controllability of a system
d)Observability of a system

5. The steady state error due to a step input for Type 1 system is
a)Zero
b)Infinity
c)1
d)0.5

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**EET308**
**COMPREHENSIVE COURSE WORK**

**Max Marks: 100** **Duration: 1Hrs**

## CIRCUITS AND NETWORKS

1. Superposition theorem cannot be applied in linear circuits to find out the following variable
A. voltage B. current C. power D. none of these

2. source impedance of a non- ideal voltage source is Zs = 6+j 8 Ω and is connected to a resistive load. W hat should be the load for maximum power transfer.
A. 6 Ω B. 8 Ω C. 10 Ω D. 14 Ω

3. there are 4 branches and 3 nodes then number of links in a co -tree are?
A. 2 B. 4 C. 6 D. 8

4.two -port network is represented by the following equations, $I_1=V_1 - 0.5V_2$, $I_2= -V_1 + V_2$, Z parameters are given by Z=

A. $Z=\begin{bmatrix}1 & -0.5\\ -1 & 1\end{bmatrix}$, B. $Z=\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$, C. $Z=\begin{bmatrix}1 & -2\\ -1 & 1\end{bmatrix}$ D. $Z=\begin{bmatrix}2 & 1\\ 2 & 2\end{bmatrix}$

5. The line A to neutral voltage is $10\angle 15^0$ V for a balance three phase star connected load with phase sequence ABC. The voltage of line B with respect to line C is given by

a) $10\sqrt{3}\angle 105^0$ V
b) $10\angle 105^0$ V
c) $10\sqrt{3}\angle 75^0$ V
d) $-10\sqrt{3}\angle 90^0$ V

6. The average power delivered to an impedance (4-j3)Ω by a current $5\cos(100\pi\pi t+100)$A is
a) 44.2 W
b) 50 W
c) 62.5 W
d) 125 W

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## DC MACHINES AND TRANSFORMERS

1 The resistance of the transformer referred to low voltage side of a 240/120 V 1 – phase transformer with R1 =0.1 ohm and R2=0.03 ohm is
A. 0.055 ohm
B. 0.43 ohm
C. 0.22 ohm
D. 0.1075 ohm

2 Retardation test on dc shunt motor is conducted to determine
A. stray loss only,
B. . Stray loss and moment of inertia,
C. Temperature rise.
D. effect of flux distortion on iron loss

3 Retardation test on dc shunt motor is conducted to determine
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4 DC Series generator is used for

A. charging batteries, B. booster in distribution systems,
C. Arc welding D. Lamp loads

5 The equalizer connections are used for

A. Lap winding B. Wave winding
C. Wave winding with dummy coils D. Not for dc windings

6 A 4-pole dc machine is having double layer lap winding arranged in 80 slots. Winding resistance is 0.2 Ω per conductor. Determine the armature resistance (Ra).

A. 8 ohms B. 4 ohms C. 2 ohms D. 1 ohm

7 For a 1-phase transformer the maximum regulation occurs at 0.5 pf lagging, then the zero regulation occurs at a power factor equals to……
A. upf
B. 0.5 lead
C. 0.707 lead
D. 0.866 lead

8 Which among the following statement regarding a star-delta 3 phase transformer is not true
A. no problem with third harmonic components
B. unbalanced loads can be handled
C. can operate this connection in parallel with delta- delta
D. t here is a 30 Degree phase shift between Secondary to Primary phase voltages

9. The DC motor which can provide zero speed regulation at full load without any controller is
a) Series
b) Shunt

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c) Cumulatively compound
d) Differentially compound

10. For a single phase, two winding transformer, the supply frequency and voltage are both increased by 10%. The percentage changes in the hysteresis and eddy current loss, respectively are
a) 10 and 21
b) -10 and 21
c) 21 and 10
d) -21 and 10

11. Match the following

| List I-Performance Variables | List II-Proportional to |
|---|---|
| A. Armature emf (E) | 1. Flux ($\Phi$), speed ($\omega$), Armature Current(Ia) |
| B. Developed Torque (T) | 2. $\Phi$ and $\omega$ only |
| C. Developed Power (P) | 3. $\Phi$ and Ia only |
| | 4. Ia and $\omega$ only |
| | 5. Ia only |

Choices:

| | A | B | C |
|---|---|---|---|
| a) | 3 | 3 | 1 |
| b) | 2 | 5 | 4 |
| c) | 3 | 5 | 4 |
| d) | 2 | 3 | 1 |

$F = \bar{A}\bar{B} + \bar{A}B$

$F = A(\bar{A}+\bar{B}) + \bar{A}B(A)$

$= A\bar{A} + AB + \bar{A}A + \bar{A}AB$

**DIGITAL ELECTRONICS**

1 A 4 bit pattern that wi ll produce the same pattern when 2's complement is taken.
A. 0001 B. 0010 C. 0100 D. 1000

2 The logical expression F=A + $\bar{A}B$ can be simplified to
A. F=AB, B. F=A+B C . F = 1 D. F = $\bar{A}$ +B

3 In a one-digit BCD adder, the number of bits in the output is
A. 3 B. 4 C. 5 D. 6

4 If D - FF is modified with switch -tail ring counter connection, the circuit becomes
A. SR FF, B. D FF C. JK FF D. T FF

5 The number of Flip Flops required to build Mod- 13 counter is
A . 2 B. 3 C. 4 D. 5

6 The capacity of a Memory chip is 8192 Bytes. The number of address lines required are
A. 11 B. 12 C. 13 D. 14

7 The resistor corresponding to the LSB of a 4-bit Weighted resistor DAC is 64 K ohms

Then the value of resistor assigned to MSB will be

A. 512 k ohm B. 64 k ohm C. 16 k ohm D. 8 k ohm

8. The SOP (sum of products) form of a Boolean function is ∑(0, 1, 3, 7, 11), where inputs are A, B, C, D (A is MSB and D is LSB). The equivalent minimized expression of the function is

a) (B'+C)(A'+C)(A'+B')(C'+D)
b) (B'+C)(A'+C)(A'+C')(C'+D)
c) (B'+C)(A'+C)(A'+C')(C'+D')
d) (B'+C)(A+B')(A'+B')(C'+D)

9. A cascade of three identical modulo-5 counters has an overall modulus of

a) 5
b) 25
c) 125
d) 625

10 The octal equivalent of the HEX number AB.CD is

a) 253.314
b) 253.632
c) 526.314
d) 526.632

## POWER SYSTEMS I

1. Efficiency of thermal power plant is ?
2. Corona losses are minimized when

a) Conductor size is reduced
b) Smoothness of the conductor is reduced
c) Sharp points are provided in the line hardware
d) Current density in the conductors is reduced

3. Keeping in view the cost and overall effectiveness, the following Circuit Breaker is best suited for capacitor bank switching

a) Vacuum
b) Air Blast
c) $SF_6$
d) Oil

4. The horizontally placed conductors of a single phase line operating at 50Hz are having

outside diameter of 1.6cm and the spacing between centres of the conductors is 6m. The permittivity of free space is 8.854 x $10^{-12}$ F/m. The capacitance to ground per kilometre of each line is

a) 4.2 x $10^{-9}$ F
b)4.2 x $10^{-12}$ F
c)8.4 x $10^{-9}$ F
d)8.4 x $10^{-12}$ F

## SIGNALS AND SYSTEMS

1. The Laplace transform of a circuit current is $I(s) = (5s^2+2s+6)/[s(s^2+3s+3)]$. The initial value i(o) is
A. 2 A B. 5A C. 6A D. Infinity

2. A circuit with resistor, inductor and capacitor in series is resonant at f0 Hz. If all the component values are now doubled, the new resonant frequency is

a) $2\ f_0$
b) Still $f_0$
c) $f_0/2$
d) $f_0/4$

3. Consider a continuous time system with input x(t) and output y(t) given by y(t)=x(t)cos(t).This system is
a)Linear and time invariant
b)Non-linear and time invariant
c)Linear and time varying
d)Non-linear time varying

4. Signal Flow Graph is used to obtain
a)Stability of the system
b)Transfer Function of a system
c)Controllability of a system
d)Observability of a system

5. The steady state error due to a step input for Type 1 system is
a)Zero
b)Infinity
c)1
d)0.5

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# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY,

## DEPARTMENT OF MECHANICAL ENGINEERING

## STUDENTS NAME LIST(2019-2023)

| ROLL NO | REGISTER NO | NAME OF STUDENT |
|---|---|---|
| 1 | SNC19ME001 | ADARSH P K |
| 2 | SNC19ME002 | ADWAIDH BALAN |
| 4 | SNC19ME004 | ANURAG A |
| 5 | SNC19ME005 | ARSH IBRAHIM |
| 6 | SNC19ME006 | ASWANTH C |
| 7 | SNC19ME007 | ATHUL. B |
| 8 | SNC19ME008 | BIPIN.K |
| 9 | SNC19ME009 | FARHAN.C |
| 10 | SNC19ME010 | JASIN.P |
| 11 | SNC19ME011 | MOHAMMED AAFIL ISMAYIL M K |
| 12 | SNC19ME012 | MOHAMMED RAMADAN ANWAR |
| 13 | SNC19ME013 | MRIDUL.C |
| 14 | SNC19ME014 | NITHIN.A |
| 15 | SNC19ME015 | SAFVAN. I M |
| 16 | SNC19ME016 | SANDESH K DINESH |
| 17 | SNC19ME017 | SREEHARI S NAMBIAR |
| 18 | SNC19ME018 | VIDYASAGAR.P |

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Sree Narayana Guru College of Engineering and Technology
Estd: 2003

# Sree Narayana Guru College of Engineering & Technology

P.O. Chalakode, Payyanur - 670 307, Kannur Dist., Kerala State.

(Approved by AICTE New Delhi and Affiliated to APJ Abdul Kalam Technological University)

**Managed by Sree Bhakthi Samvardhini Yogam, Kannur-2.**

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**Email:** info@sngcet.org sngcet@bsnl.in **Website:** sngcet.org

## *Vision*

A knowledge society promoting
human excellence and enlightenment
through effective education

## *Mission*

To provide technical education of the highest quality
and standard of excellence for socio-economic progess
embedded in clearly articulated values
and supported by commitments

# Class Record

## THEORY

Department CIVIL ENGINEERING

Faculty Dr SUSAN ABRAHAM

Academic Year 2021-2022

Branch CIVIL ENGG Semester

Course CET 308 COMPREHENSIVE COURSE

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## Class Attendance and Assessment

| Sl.No | Reg. No. | Name | Month | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 |
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| | | | Date | 12 | 12 | 12 | 26 | 26 | 10 | 10 | 10 | 17 | 17 |
| | | | Hour | 4 | 5 | 6 | 5 | 6 | 4 | 5 | 6 | 4 | 5 |
| 1. | SNC19CE001 | AADITHYA KRISHNAN | | X | X | X | X | X | X | A | X | P | X |
| 2. | 002 | ABHIRAMY RAJ (F) | | X | X | X | X | X | A | A | A | X | X |
| 3. | 003 | AKASH PV | | X | X | X | X | X | A | A | A | X | X |
| 4. | 004 | ANANDHU ASHOK | | X | X | X | X | X | A | A | A | A | A |
| 5. | 005 | ANANJANA C (F) | | X | X | X | X | X | X | X | X | X | X |
| 6. | 006 | ANJALI MP (F) | | X | X | A | X | X | A | A | A | X | X |
| 7. | 007 | ANJANA C (F) | | X | X | X | X | X | X | X | X | X | X |
| 8. | 008 | ASHAYA RAMESH (F) | | X | X | X | X | X | X | X | X | X | X |
| 9. | 009 | ASWITHA GANGADHARAN (F) | | X | X | X | X | A | X | X | X | X | X |
| 10. | 010 | ATHIRA ARUN (F) | | X | X | X | X | X | A | A | A | A | A |
| 11. | 011 | AYSHATH SAIFA (F) | | X | X | X | X | X | A | A | A | X | X |
| 12. | 012 | KRISHNAPRASAD SL | | X | X | X | X | X | A | A | A | X | X |
| 13. | 013 | MUHAMMED HANNAN | | X | X | X | X | X | A | A | A | A | A |
| 14. | 014 | MUHAMMED RUFAIDM | | X | A | A | A | A | A | A | A | A | A |
| 15. | 015 | NIKHIL SAI K | | X | X | X | X | A | A | A | A | X | X |
| 16. | 016 | PRANAVAK | | X | X | X | A | A | A | A | A | X | X |
| 17. | 017 | PRAYAG PRABHAKARAN | | X | X | X | X | X | A | A | A | A | A |
| 18. | 018 | SACHIN SURENDRAN M | | X | X | X | X | X | X | X | X | X | X |
| 19. | 019 | SHAMSHAD PV | | X | X | X | X | X | A | A | A | A | A |
| 20. | 020 | SILNA M (F) | | X | X | X | X | X | X | X | A | X | X |
| 21. | LSNC19CE001 | SREEHARI K K | | X | X | X | X | X | X | A | X | X | X |
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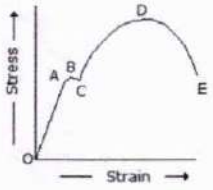
**SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY**
**DEPARTMENT OF CIVIL ENGINEERING**
**SEMESTER S6 CE**
CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

3/10

| | |
|---|---|
| 1. | The ratio of change in volume to the original volume is called<br>A.linear strainB.lateral strainC.volumetric strainD.Poisson's ratio |
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
| 3 | Hook's law holds good up to<br>A.yield pointB.elastic limitC.plastic limitD.breaking point |
| 4 | The forces in the members of simple trusses, may be analysed by<br>A. graphical methodB. method of jointsC. method of sectionsD. all the above. |
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
| 6 | The Young's modulus of a material is 125 GPa and Poissons ratio is 0.25. The modulus of rigidity of me material is<br>a.30 GPa B.50 GPa C.80 GPa D.100 GPa |
| 7 | The compression test is carried on _____ materials.<br>A.Ductile B.brittle C.malleable D.Plastic |
| 8 | The modulus of elasticity for mild steel is approximately equal to<br>A.10 Kn/mm$^2$B.80 Kn/mm$^2$C.100 Kn/mm$^2$D.210 Kn/mm$^2$ |
| 9 | The deformation per unit length is called strain |
| 10 | The unit of modulus of elasticity is same as those of<br>A. stress, strain and pressure<br>B. stress, force and modulus of rigidity<br>C. strain, force and pressure<br>D. stress, pressure and modulus of rigidity |

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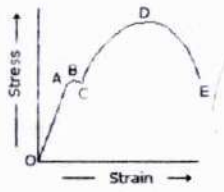
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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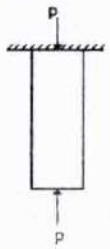
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
| 6 | The Young's modulus of a material is 125 GPa and Poissons ratio is 0.25. The modulus of rigidity of me material is<br>a.30 GPa B.50 GPa C.80 GPa D.100 GPa |
| 7 | The compression test is carried on _____ materials.<br>A.Ductile B.brittle C.malleable D. Plastic |
| 8 | The modulus of elasticity for mild steel is approximately equal to<br>A.10 Kn/mm$^2$B.80 Kn/mm$^2$C.100 Kn/mm$^2$D.210 Kn/mm$^2$ |
| 9 | The deformation per unit length is called Strain |
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**DEPARTMENT OF CIVIL ENGINEERING**

**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

8/10

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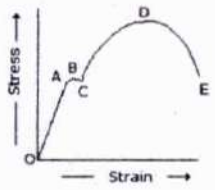
| 1. | The ratio of change in volume to the original volume is called<br>A.linear strainB.lateral strainC.volumetric strainD.Poisson's ratio |
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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MECHANICS OF SOLIDS QUESTIONS

7/10

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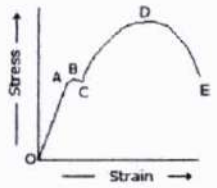
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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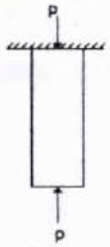
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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$E = \frac{2c}{1+\mu}$

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**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

Sreehari.K.K

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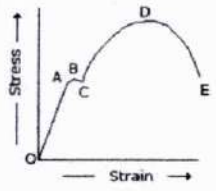
| 1. | The ratio of change in volume to the original volume is called<br>A.linear strainB.lateral strainC.volumetric strainD.Poisson's ratio |
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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MECHANICS OF SOLIDS QUESTIONS

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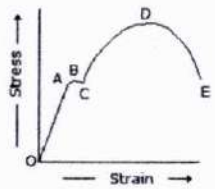
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

7/10

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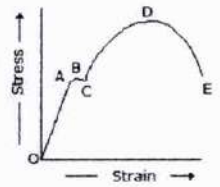
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

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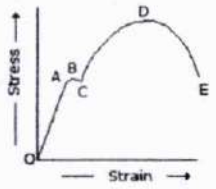
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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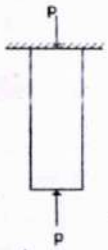
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

7/10 24/5

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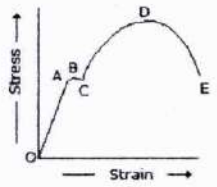
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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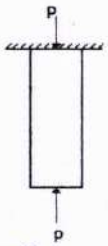
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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MECHANICS OF SOLIDS QUESTIONS

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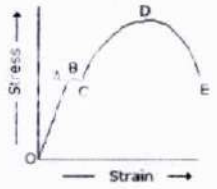
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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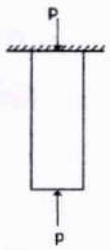
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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5/10

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MECHANICS OF SOLIDS QUESTIONS

8/10

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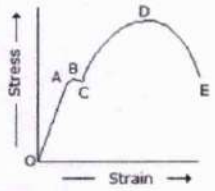
| 2. | In the below figure, the stress corresponding to point $D$ is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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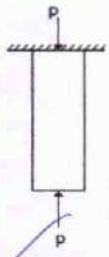
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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MECHANICS OF SOLIDS QUESTIONS

9/10

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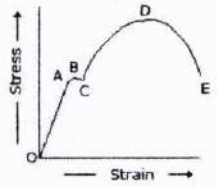
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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**DEPARTMENT OF CIVIL ENGINEERING**

**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

3/10

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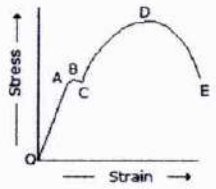
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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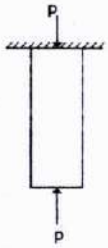
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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MECHANICS OF SOLIDS QUESTIONS

7/10

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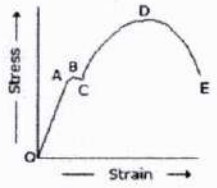
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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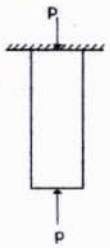
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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**SEMESTER S6 CE**
CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

8/10

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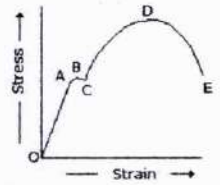
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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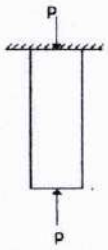
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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**SEMESTER S6 CE**
CET308 COMPREHENSIVE COURSE WORK

MECHANICS OF SOLIDS QUESTIONS

7/10

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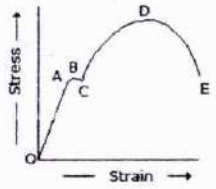
| 2. | In the below figure, the stress corresponding to point *D* is<br>  <br><br>A.yield point stressB.breaking stressC.ultimate stressD.elastic limit |
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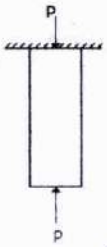
| 5 | The forces acting normally on the cross section of a bar shown in the given figure introduce<br>  <br><br>A. compressive stress B. tensile stress C. shear stressD. none of these. |
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CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

| | |
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| 1. | Maximum Shearing stress in a beam is at _____<br>a) Neutral axis<br>b) Extreme fibres ✓<br>c) Mid span<br>d) Action of loading |
| 2. | At the neutral axis, bending stress is _____<br>a) Minimum<br>b) Maximum ✓<br>c) Zero<br>d) Constant |
| 3 | What are the units of flexural rigidity?<br>a) Nm2 ✓<br>b) Nm<br>c) N/m<br>d) m/N3 |
| 4 | Calculate the modulus of section of rectangle beam of size 240 mm × 400 mm.<br>a) 5.4 × 106 mm3<br>b) 6.2 × 106 mm3<br>c) 5.5 × 106 mm3<br>d) 6.4 × 106 mm3 |
| 5 | What is the maximum shear force, when a cantilever beam is loaded with udl throughout?<br>a) w×l<br>b) w<br>c) w/l ✓<br>d) w+l |
| 6 | Sagging, the bending moment occurs at the _____ of the beam.<br>a) At supports<br>b) Mid span<br>c) Point of contraflexure<br>d) Point of emergence |
| 7 | What will be the variation in BMD for the diagram? [Assume l = 2m].<br><br>a) Rectangular b) Trapezoidal c) Triangular d) Square |
| 8 | What are the units of axial stiffness?<br>a) m3 b) m2 c) N/ m d) -m |
| 9 | _____ strength is caused by a moment of resistance offered by a section.<br>a) Shear<br>b) Flexural ✓<br>c) Axial<br>d) Longitudinal |
| 10 | A Steel rod 200 mm diameter is to be bent into a circular arc section. Find radius of curvature. Take f = 120N/mm2 & E = 2×105 N/mm2.<br><br>a) 134m b) 166m c) 162m d) 174m |
| 11 | Which of these are types of normal stresses?<br>a) Tensile and compressive stresses<br>b) Tensile and thermal stresses<br>c) Shear and bending ✓<br>d) Compressive and plane stresses |
| 12 | The extremities of any diameter on Mohr's circle represent<br>(A) Principal stresses ✓<br>(B) Normal stresses on planes at 45°<br>(C) Shear stresses on planes at 45°<br>(D) Normal and shear stresses on a plane |

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CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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S6 CE

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**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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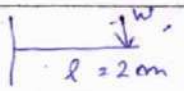
| 6 | Sagging, the bending moment occurs at the _____ of the beam.<br>a) At supports<br>b) Mid span<br>c) Point of contraflexure<br>d) Point of emergence<br>  |
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**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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$I = \frac{BD^3}{12}$

$\frac{240 \times 400^3}{12}$

$= 128 \times 10^7$

$y_{max} = 120$

$Z = \frac{I}{y_{max}}$

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CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

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**SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY**

**SEMESTER S6 CE**

CET308 COMPREHENSIVE COURSE WORK-MECHANICS OF SOLIDS Test 2

| | |
|---|---|
| 1. | Maximum Shearing stress in a beam is at _____<br>a) Neutral axis<br>b) Extreme fibres<br>c) Mid span<br>d) Action of loading |
| 2. | At the neutral axis, bending stress is _____<br>a) Minimum<br>b) Maximum<br>c) Zero<br>d) Constant |
| 3 | What are the units of flexural rigidity?<br>a) Nm2<br>b) Nm<br>c) N/m<br>d) m/N3 |
| 4 | Calculate the modulus of section of rectangle beam of size 240 mm × 400 mm.<br>a) 5.4 × 106 mm3<br>b) 6.2 × 106 mm3<br>c) 5.5 × 106 mm3<br>d) 6.4 × 106 mm3 |
| 5 | What is the maximum shear force, when a cantilever beam is loaded with udl throughout?<br>a) w×l<br>b) w<br>c) w/l<br>d) w+l |
| 6 | Sagging, the bending moment occurs at the _____ of the beam.<br>a) At supports<br>b) Midspan<br>c) Point of contraflexure<br>d) Point of emergence |
| 7 | What will be the variation in BMD for the diagram? [Assume l = 2m].<br><br>a) Rectangular b) Trapezoidal c) Triangular d) Square |
| 8 | What are the units of axial stiffness?<br>a) m3 b) m2 c) N/ m d) -m |
| 9 | _____ strength is caused by a moment of resistance offered by a section.<br>a) Shear<br>b) Flexural<br>c) Axial<br>d) Longitudinal |
| 10 | A Steel rod 200 mm diameter is to be bent into a circular arc section. Find radius of curvature. Take f = 120N/mm2 & E = 2×105 N/mm2.<br><br>a) 134m b) 166m c) 162m d) 174m |
| 11 | Which of these are types of normal stresses?<br>a) Tensile and compressive stresses<br>b) Tensile and thermal stresses<br>c) Shear and bending<br>d) Compressive and plane stresses |
| 12 | The extremities of any diameter on Mohr's circle represent<br>(A) Principal stresses<br>(B) Normal stresses on planes at 45°<br>(C) Shear stresses on planes at 45°<br>(D) Normal and shear stresses on a plane |

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