

FACULTY OF ENGINEERING

BE (Civil) (AICTE) IV-Semester (Main & Backlog) Examination, October 2021

Subject: Materials Testing and Evaluation

Time: 2 Hours

Max marks: 70

Missing data, if any, may be suitably assumed

PART – A

Note: Answer any five questions.

(5x2=10 Marks)

1. Write about classification of bricks.
2. Explain about application of timber in construction industry.
3. Briefly explain about hydration of cement.
4. Write about classification of aggregate based on size.
5. List out the benefits of mineral admixture.
6. What is the function of accelerator in concrete?
7. Differentiate between nominal and design mix concrete.
8. Briefly write about usage of polymers in concrete.
9. Write briefly about usage of bitumen in construction works.
10. Name any three industrial waste products.

PART - B

Note: Answer any four questions.

(4x15=60 Marks)

11. a) Explain about the manufacturing process of clay bricks.
b) Write about the various types of steel, their uses and advantages.
12. a) Describe the procedure of conducting Normal consistency test and compression test on cement
b) Write about alkali-aggregate reaction and deleterious substance in aggregate.
13. a) Explain about the general requirements for quality of water used in concrete.
b) Write briefly about necessity and benefits of mineral admixtures.
14. a) Explain the necessity and various methods of curing of concrete.
b) Briefly explain about destructive test on hardened concrete.
15. a) Write about necessity and various types of colour washing and white washing applied in buildings
b) Explain the necessity of cement mortar plastering and the process of plastering the walls and ceiling.
16. Explain in detail the ultrasonic pulse velocity test and rebound hammer test on hardened concrete.
17. Write about accelerator, retarder and water reducing elements used in concrete. Explain about their dosage and functions.

FACULTY OF ENGINEERING**BE IV Semester (AICTE) (EE/Inst.) (Main& Backlog) Examination, October 2021****Subject: Power Electronics****Time: 2 Hours****Max marks: 70****Missing data, if any, may be suitably assumed****PART – A****Note: Answer any five questions.****(5x2=10 Marks)**

1. The reverse recovery time of a diode is $t_{rr} = 8 \mu S$, and the rate of fall of the diode current is $\frac{di}{dt} = 100 \mu S$. If the softness factor is $SF = 0.75$, determine peak reverse current, I_{RR} .
2. Draw the SCR firing circuit diagram for single-phase half-wave controlled rectifier using RC-triggering circuit.
3. Compare full-controlled rectifiers and semi-controlled rectifiers.
4. Define the following. i) Input power factor ii) Transformer Utilization factor
5. Derive voltage gain of Buck-Boost converter.
6. What is the effect of load inductance on the performance of AC voltage Controller?
7. List the advantages of Multiple-pulse PWM over Single-pulse PWM.
8. Define amplitude and frequency modulation indices with a neat sketch.
9. List the advantages and disadvantages of a VSI compared to a CSI.
10. Distinguish 120° and 180° conduction modes of 3- ϕ VSI?

PART - B**Note: Answer any four questions.****(4x15=60 Marks)**

11. a) Explain the working with neat structure of an n-channel power IGBT and plot its output characteristics.
b) Draw and explain two transistor analogy of SCR.
12. a) Obtain average and rms load voltage expressions for 3- ϕ semi-controlled converter supplying highly inductive load with help of waveforms. Assume constant load current.
b) A 1- ϕ full-converter is connected to 230 V, 50 Hz supply with a highly inductive load. The load current is continuous, constant and negligible ripple. For the delay angle $\alpha = \pi/4$, calculate average and rms load voltage, THD and input PF.
13. a) An ideal Boost converter operates at a switching frequency of 50 kHz, with an output capacitor of $1 \mu F$ and input voltage of 50 V. It operates under continuous conduction mode and the duty ratio is set such that the switch is turned on for $6.5 \mu s$ for every switching cycle. Calculate the minimum load resistance required so that the output voltage ripple does not exceed 10% of its average value?

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- b) Sketch input voltage, input current for a 1- ϕ ac controller supplying R-L load for $\alpha < \phi$ where $\phi = \tan^{-1}\left(\frac{\omega L}{R}\right)$.
14. a) List the advantages of Pulse width modulation of Inverters.
b) Explain unipolar sinusoidal PWM with neat waveforms and derive related expressions.
15. a) Explain 120° conduction mode of 3-phase bridge inverter with neat waveforms and derive expressions for instantaneous phase voltages and rms line-line voltage.
b) What are purposes of feedback diodes in inverter?
16. a) Discuss dv/dt protection of SCR and deduce expression for C_s and R_s .
b) A 1- ϕ full-wave rectifier has a resistive load of R and firing angle is $\alpha = \pi/3$, determine a) rectification efficiency, b) ripple factor and c) form factor.
17. a) A 1- ϕ full-bridge square-wave inverter has resistive load, $R = 10 \Omega$ and dc input voltage $V_s = 220 \text{ V}$. Determine a) rms fundamental output voltage b) Total Harmonic Distortion and c) Distortion Factor.
b) Explain operation of Single-phase CSI with a neat circuit and waveforms.

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FACULTY OF ENGINEERING

B. E. IV – Semester (AICTE) (ECE) (Main & Backlog) Examination,

October 2021

Subject: Pulse & Linear Integrated Circuits

Time: 2 hours

Max. Marks: 70

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

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 Draw equivalent circuit diagram of op-amp.
- 2 Draw the response for sinusoidal voltage for high pass RC circuit.
- 3 Define Clampers and its applications.
- 4 What are the applications of time base generators?
- 5 Draw the Schmitt trigger circuit.
- 6 What is the difference between inverting and non-inverting amplifier.
- 7 What are the ideal characteristics of op-amp?
- 8 Define CMRR and Slew rate.
- 9 Compare the voltages and current time – base generators? Give example.
- 10 Define the term virtual ground concept and zero input current.

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 (a) Show that an RC low-pass circuit can be used as integrator.
(b) Write short notes on Comparator circuit.
- 12 (a) Design a two level clipper for bias voltages $V_1 = 5v$, $V_2 = -5v$. Use practical diodes.
(b) State and prove clamping circuit theorem and explain the transfer characteristics of clamper.
13. Explain the working of weighted resistors DAC circuit.
14. (a) Define the terms UTP and LTP of a Schmitt trigger and explain how these are varied?
(b) Design 1st order Butterworth LPF with a cut-off frequency of 2 kHz and filter gain 2.
15. (a) What is differential amplifier circuit? Why it is preferred as a stage in integrated circuits.
(b) AC and DC characteristics of op-amp.
16. (a) Draw and explain block diagram of PLL.
(b) Classify different types of Clipper Circuit. Draw their circuits and explain its operation and also transfer characteristics.
17. Write technical notes on
 - (a) Antilog amplifier
 - (b) R-2R ladder.

FACULTY OF ENGINEERING

B. E. IV – Semester (AICTE) (ECE) (Main & Backlog) Examination,

October 2021

Subject: Pulse & Digital Circuits

Time: 2 hours

Max. Marks: 70

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

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 Explain the fractional list of a high pass RC Circuit. Write its expressions?
- 2 What are the applications of Sampling gate?
- 3 What are the methods of generating a time base waveform?
- 4 Draw the transfer characteristics of clamper.
- 5 Compare the different logic families.
- 6 Define the terms slope error, displacement error.
- 7 What are the merits and demerits of TTL logic?
- 8 Define multivibrator and their types?
- 9 Calculate the gate width of a Monostable multivibrator if $R=10K$ and $C=10 \mu f$.
- 10 Define Rise time and critical resistance.

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 (a) Explain about RLC ringing circuit.
(b) Describe the relationship between rise time and RC time constant of a low pass circuit.
- 12 (a) With a help of neat circuit diagram, explain the working of a two level Clipper?
(b) Give the circuit of different types of shunt clipper and explain their operation with the help of their transfer characteristics?
- 13 (a) What are general features of time base signal? Explain.
(b) Explain the operation of emitter coupled Bistable multivibrator?
- 14 (a) With the help of a neat diagram, explain the working of a six diode gate?
(b) How Pedestal can be reduced in sampling gate?
- 15 (a) Draw a TTL NAND gate and explain its operation.
(b) Describe ECL logic? With the help of a neat diagram, explain the waveform of a two input ECL OR/NOR gate?
- 16 (a) State and prove clamping circuit theorem and explain the transfer characteristics of clamper.
(b) Explain the need of the attenuator.
- 17 Write short notes on
 - (a) Emitter Coupled Logic
 - (b) Applications of sampling gates.

FACULTY OF ENGINEERING**B. E. IV – Semester (AICTE) (MECH) (Main & Backlog) Examination, October 2021****Subject: Applied Thermodynamics****Time: 2 hours****Max. Marks: 70****Note: (Missing data, if any, may be suitably assumed)****PART – A****Answer any five questions.****(5 x 2 = 10 Marks)**

- 1 Define and Classify Compressors.
- 2 Explain about perfect intercooling in Reciprocating air compressors?
- 3 Give any two general classifications of engines and how they differ in principle.
- 4 How Auto-ignition occurs in S.I engines.
- 5 State any three general classification of Boilers.
- 6 Define brake specific fuel consumption for an IC engine.
- 7 List some demerits of anti knocking additives.
- 8 How does reheating improve the performance of Rankine cycle?
- 9 What type of nozzle is used for compressible fluids and why?
- 10 Define condenser and explain any one type of jet condenser?

PART – B**Answer any four questions.****(4 x 15 = 60 Marks)**

- 11 (a) Define volumetric efficiency and obtain an expression for it in case of a reciprocating air compressor.
(b) A single-acting single-cylinder reciprocating compressor has a cylinder diameter of 200 mm and a stroke of 300 mm air enters the cylinder at 1 bar and 27°C, it is then compressed polytropically to 8 bar according to the law $PV^{1.3} = C$. If speed of compressor is 250 rpm, calculate the mass of air compressed per min and power required in KW to drive the compressor.
- 12 Discuss how knocking takes place in SI and CI engines. What are the geometrical design considerations to prevent knocking in SI engines?
- 13 (a) Explain the working principle of a cooling tower.
(b) Discuss about the classification of steam condensers.
- 14 (a) Sketch and explain Babcock and Wilcox boiler.
(b) Differentiate between jet and surface condensers.
- 15 Steam enters a convergent-divergent nozzle at 15 bar and 300°C and leaves at a pressure of 2 bar. The inlet velocity to the nozzle is 150m/s. Find the required throat and exit areas for a mass flow rate of 1 kg/s. The nozzle efficiency is 90% and $CP=2.4$ kJ/kg°K.
- 16 On a reheat cycle, steam at 500°C expands in a H.P turbine till it is saturated vapour, it is then reheated at constant pressure to 400°C and then expands in a LP turbine to 40°C. If the maximum moisture content is limited to 15%.
Find (a) the heat pressure; (b) the pressure of steam at inlet to H.P turbine;
(c) the net work output; (d) cycle efficiency. Assume all ideal process.
- 17 Write short notes on:
 - (a) Magneto ignition system
 - (b) Zenith carburetors

FACULTY OF ENGINEERING**B. E. IV – Semester (AICTE) (Prod.) (Main & Backlog) Examination, October 2021****Subject: Applied Thermodynamics and Heat Transfer****Time: 2 hours****Max. Marks: 70****Note: (Missing data, if any, may be suitably assumed)****PART – A****Answer any five questions.****(5 x 2 = 10 Marks)**

1. What are the assumptions made for calculating the work input in multistage compression?
2. Define clearance volume. Indicate on P-V diagram.
3. List out classifications of IC Engines.
4. Define brake power and frictional power.
5. What do you mean by knocking in I.C engines? Explain briefly.
6. Differentiate between simple and Zenith carburetor.
7. Explain the mechanisms of heat conduction in gases, liquids and solids.
8. What do you mean by the statement: A perfect absorber of radiant energy is also a perfect emitter?
9. Explain Kirchhoff's law of Radiation.
10. Define effectiveness and NTU of a heat exchanger.

PART – B**Answer any four questions.****(4 x 15 = 60 Marks)**

11. Explain with neat sketch the Operation of an Air Compressor. Also draw Practical P-V diagram of air compressor.
12. A 4 cylinder 4-stroke cycle engine, 82.5 mm x 130 mm bore and stroke, develops 28 kW while running at 1500 Rpm and using a 20% rich mixture. If the volume of the air in the cylinder when measured at 15.5°C and 762 mm of mercury is 70% of the swept volume, the theoretical A/F ratio is 14.8, heating value of petrol used is 45980 kJ/kg and the mechanical efficiency of the engine is 90% find: (i) the indicated thermal efficiency (ii) the brake mean effective pressure. Take $R=287 \text{ Nm/kgK}$ list various parameters which influence the natural convection heat transfer, explain each parameter influence the process.
13. (a) Explain the working of splash lubrication system with a neat labelled diagram.
(b) Briefly explain any one type of fuel injector.
14. Derive the one dimensional steady state heat conduction equation in Cartesian co-ordinate systems.
15. A double pipe heat exchanger is used to cool the lubricating oil from 90°C to 40°C using water available at 10°C. The mass flow rate of the oil is 0.15 kg/S with specific heat 2.13 KJ/Kg K and that of water is 0.3 Kg/S and specific heat 4.18 KJ/Kg. Determine the heat transfer area required if $U=50\text{W/m}^2\text{K}$ for (i) Parallel flow arrangement, (ii) Counter flow arrangement.
16. Mention different types of cooling systems typically used for IC engines. Explain any one of them clearly.
17. (a) Explain the specific fuel consumption, brake power and heat balance sheet in detail.
(b) Derive the expression for thermal conductivity in case of one dimensional steady state composite cylinders.

FACULTY OF ENGINEERING

B. E. IV – Semester (AICTE) (AE) (Main & Backlog) Examination, October 2021

Subject: Automotive Chassis Components

Time: 2 hours

Max. Marks: 70

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

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 What are the different types of materials used in the construction of a frame for an automobile?
- 2 List out the advantages of an engine fitted in front and crosswise?
- 3 Classify the chassis w.r.t. the location of the fitting of the engine.
- 4 Define e-in and Toe-out on turns with simple sketches.
- 5 What do you understand by wheel wobble?
- 6 Name the different linkages of the steering system.
- 7 What is meant by a drive line? Name the different components of drive line.
- 8 What is the need of a suspension system?
- 9 What are the different types of axle housings?
- 10 What is a vacuum assisted brake system?

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 Define a chassis in detail with all the different systems it supports and write the functions of a good chassis.
- 12 Describe the Davis Steering mechanism with a neat sketch.
- 13 Explain the Hotchkiss drive system in detail along with a sketch.
- 14 (a) What is the function of a propeller shaft? Describe its working?
(b) Name the different types of housings for differential.
- 15 (a) What is a fully-floating rear axle?
(b) Describe a MacPherson strut suspension system in detail.
- 16 Write the construction, working and assembly of a leaf spring suspension system.
- 17 (a) Explain the working of a drum brake mechanism.
(b) What are eddy retarders?

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FACULTY OF ENGINEERING

B. E. IV – Semester (AICTE) (CSE) (Main & Backlog) Examination, October 2021

Subject: Database Management Systems

Time: 2 hours

Max. Marks: 70

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

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 Tell about Database applications?
- 2 What are Weak Entity Sets?
- 3 Differentiate between file system and data base system.
- 4 What is Set Operation?
- 5 Explain about Transaction.
- 6 What is dynamic SQL?
- 7 Tell about Normalization?
- 8 Define transaction state.
- 9 What is deadlock handling?
- 10 Distinguish between Indexing & hashing?

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 (a) Draw and explain 'Database Architecture'.
(b) Write about Nested Subqueries.
- 12 (a) Explain about Fundamental Relational-Algebra Operations.
(b) Discuss about 'Null values'.
- 13 Explain about Atomic domains & First Normal Form.
- 14 (a) Give the comparison of ordered indexing and hashing bitmap indices.
(b) Explain the concept of B-tree index files.
- 15 (a) Differentiate between Timestamp based protocols & Validation based protocols.
(b) Write about storage structure.
- 16 Explain in detail Extended Relational – Algebra Operations.
- 17 Write short notes on:
 - (a) E-R Model
 - (b) Static hashing & dynamic hashing

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FACULTY OF ENGINEERING
B.E. IV - Semester (AICTE) (CME) (Main) Examination, October 2021

Subject: Database Management Systems

Time: 2 Hours

Max. Marks: 70

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

PART – A

Note: Answer any five questions.

(5x2 = 10 Marks)

- 1 Create a table(s) with constraints "UNIQUE" and "NOT NULL".
- 2 List responsibilities of DBA/
- 3 What is inclusion dependency?
- 4 Write short notes on Authorization.
- 5 What is Embedded SQL?
- 6 Write an example to illustrate "Group By" clause using an aggregate function.
- 7 Define relational instance, relational schema.
- 8 What is Boyce Codd normal form (BCNF)/
- 9 Differentiate between join and union.
- 10 Write an example to illustrate "like" operator.

PART – B

Note: Answer any four questions.

(4x15 = 60 Marks)

- 11 (a) Illustrate with suitable examples to explain "Data Definition Language".
(b) Write in detail about advantages of database management system.
- 12 (a) Write about integrity constraints with suitable examples.
(b) Explain types of relationships, degree of relationships, cardinality of relationship in E-R Model.
- 13 (a) Discuss the anomalies that occur when database is not normalized.
(b) List the advantages of normalization. Explain 1 NF with suitable example.
- 14 (a) Write in detail about "Log Based Recovery".
(b) Write about "Timestamp Based Protocols" for Concurrency Control.
- 15 (a) Write in detail about dense index file and sparse index files.
(b) Explain in detail "Conflict Serializability".
- 16 (a) Write about explicit and implicit cursor.
(b) Write short notes on stored procedures.
- 17 (a) Explain atomicity, consistency, isolation, durability with respect to a transaction.
(b) How to test the Serializability of a schedule?

FACULTY OF ENGINEERING

B.E. (I.T) (AICTE) IV – Semester (Main & Backlog) Examination, October 2021

Subject: Data Communications

Time: 2 Hours

Max. Marks: 70

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

PART – A

Note: Answer any five questions.

(5x2 = 10 Marks)

- 1 Distinguish TCP/IP and OSI Protocol Architecture.
- 2 Write the differences between Synchronous and Asynchronous transmission.
- 3 What is Stop-n-wait ARQ protocol?
- 4 What is CMA/CD? Why is it needed in different Ethernets?
- 5 Differentiate 2G and 3G Cellular networks.
- 6 Define Amplitude Modulation with an example.
- 7 Write the differences between Circuit switching and packet switching.
- 8 What are traditional Ethernet topologies?
- 9 Give the structure of ATM cell format.
- 10 Give the architecture of Bluetooth.

PART – B

Note: Answer any four questions.

(4x15 = 60 Marks)

- 11 a) Explain the components of Data Communication model.
b) Explain about different transmission impairments.
- 12 Describe Error control techniques with example for each.
- 13 Write short notes on the following:
 - a) Synchronous Time Division Multiplexing
 - b) Statistical Time Division Multiplexing
- 14 Explain in detail about LAN Protocol architecture.
- 15 Write short notes on the following:
 - a) Architecture of Wireless LAN
 - b) Zigbee Technologies
- 16 Distinguish Bridged, Switched and Full Duplex Ethernets. List Applications for each.
- 17 a) Write short notes on Frame Relay. Give Syntax.
b) Discuss about Asymmetric Digital Subscriber Line.

FACULTY OF ENGINEERING

B. E. IV – Semester (CIVIL/EE/EIE/IT) (Backlog) Examination, October 2021

Subject: Managerial Economics and Accountancy

Time: 2 hours

Max. Marks: 70

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

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 Define Managerial Economics
- 2 Explain risk and uncertainty
- 3 What is Price demand? Explain.
- 4 Write features of monopoly.
- 5 What is break-even point?
- 6 Define net working capital?
- 7 What are subsidiary books?
- 8 Write the rules of accounting.
- 9 Give journal entries for the following:
1-4-2010 sold goods for cash Rs.5,000
2-4-2010 cash withdrawn from bank Rs.10,000
3-4-2010 commission received Rs.2,000
- 10 List out two techniques of demand forecasting.

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 (a) Write any three fundamental concepts of managerial economics.
(b) Explain briefly the usefulness of managerial economics to engineers.
- 12 What is perfect competition? How price is determined under perfect competition?
- 13 What is demand? Explain the factors influencing demand.
- 14 Explain about any 5 accounting concepts with suitable examples.
- 15 (a) What are the managerial uses of Break-even analysis?
(b) Find out the Break-even point and sales value to earn a profit of Rs.60,000.
Selling Price per unit Rs.15 variable price per unit Rs.10 Fixed cost Rs.1,50,000/-

- 16 Prepare trading, profit and loss account and balance sheet as on 31-03-2006 from the following Tribal balance of Mr. Sanjay

Debit	Rs.	Credit	Rs.
Purchases	25,200	Sales	61,604
Furniture	1,600	Capital	35,000
Wages	3,500	Creditors	3,903
Machinery	20,000	Purchase Returns	222
Opening Stock	17,525		
Sales Return	1,200		
Debtors	10,400		
Carriage on purchase	200		
Salaries	10,600		
Carriage on Sales	503		
Rent and Taxes	2,001		
Cash at Bank	8,000		
	1,00,729		1,00,729

Adjustment:

- (i) Closing stock Rs.16,800
- (ii) Outstanding Salaries Rs.400
- (iii) Prepaid rent and taxes Rs.201
- (iv) Provide for bad debts reserve at 5%
- (v) Provide for depreciation on machinery at 10%
- (vi) Calculate interest on capital at 5%.

- 17 A decision is to be made between two competing projects which require an equal investment of Rs.50,000 and are expected to generate net cash flows as under.

Year	1	2	3	4	5	6
Project-I Rs.	25,000	15,000	10,000	Nil	12,000	6,000
Project-II Rs.	10,000	12,000	18,000	25,000	8,000	4,000

The rate of return of the company is 10% which project should be chosen? Evaluate the project proposal under payback period.

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