D 13937

(Pages : 2)

Name.....................................

Reg. No.............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electrical and Electronics Engineering

EE 14 501—POWER ELECTRONICS

Time : Three Hours   Maximum : 100 Marks

Part A

*Answer any **eight** questions.*

Each question carries 5 marks.

I. (1) Explain the turn on methods of SCR.

   (2) Discuss the turn off characteristics of SCR and it's mechanism of turn OFF.

   (3) What is meant by commutation of SCR and list its types ?

   (4) A two pulse converter is fed with a 230 V, 50 Hz supply. The load on the converter is a pure resistance of R = 10 Ω. Obtain the average output voltage for a firing angle of α = 135°

   (5) Predict the circuits turn -off time for single phase full converter.

   (6) Differentiate phase control and sequence control of voltage controller.

   (7) State the advantages of PWM control in inverter.

   (8) Write about voltage and harmonic control with neat diagram.

   (9) Briefly state the working of four quadrant DC chopper

  (10) A step up chopper is operated with a duty ratio of 0.6 for a dc input of 100 V. Determine the output voltage for a load resistance of RL-5 ohm.

(8 × 5 = 40 marks)

Part B

*Answer any **four** questions.*

Each question carries 15 marks.

II. (1) Describe with circuit IGBT static I-V, transfer and turn-on and turn-off characteristics.

Or

   (2) (i) Describe the UJT triggering circuit with neat sketch.

       (ii) Explain the steady state and switching characteristics of MOSFET.

Turn over

(3) Discuss the effect of series inductance on the performance of the single phase full converter indicating clearly the conduction of various thyristors during one cycle.

Or

(4) Describe the operation of three phase semiconverter with R load and also draw the output voltage waveforms for 30° and 90°.

(5) Describe the principle of operation of 3 phase voltage source inverter with 180"conduction mode with necessary waveforms and circuits. Also obtain the expression for line to line voltage

Or

(6) Describe the operating principle of single phase to single phase cycloconverter with continuous and discontinuous load current with circuit and waveform

(7) (i) Explain the control strategies of chopper with neat diagrams.

(ii) Explain the application of DC to DC Converter.

Or

(8) Draw the power circuit diagram of a buck regulator and explain its operation with equivalent circuit for different modes and waveforms.

(4 × 15 = 60 marks)

D 13931

(Pages : 2)

Name...

Reg. No...................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electronics and Communication Engineering

EC 14 501—COMPUTER ORGANIZATION AND ARCHITECTURE

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. What are CISC and RISC machines ? Compare their instruction sets.

2. What is a compiler ? Explain its functions.

3. With an example, explain direct addressing mode.

4. Explain branch instruction.

5. Explain multiple bus organization.

6. What are Asynchronous DRAMs ? Explain.

7. Explain EPROM and EEPROM technology.

8. What is set Associative Mapping ? Explain.

9. What is Interrupt Nesting ? Explain.

10. What are exceptions ? Explain.

(8 × 5 = 40 marks)

Part B

11. a) With block diagram, explain the functions of various building blocks of a computer.

Or

b) i) Design a 4-bit carry look-ahead adder.

(8 marks)

ii) Explain bit pair recoding technique.

(7 marks)

12. a) Explain single-bus organization of the datapath inside a processor and input/output gating for the registers.

Or

Turn over

b) i) Explain the memory read and write operations. (8 marks)

ii) Explain microprogrammed control. (7 marks)

13. a) i) Explain the internal organization of memory chips. (7 marks)

ii) With circuit schematic, explain the operation of a static RAM cell. (8 marks)

Or

b) i) Explain cache memory. (8 marks)

ii) What is memory interleaving ? Explain. (7 marks)

14. a) i) How interrupts are enabled and disabled ? Explain. (7 marks)

ii) Explain interrupt priority schemes. (8 marks)

Or

b) Discuss in detail about operating system routines.

$(4 \times 15 = 60$ marks)

D 13954

(Pages : 2)

Name.................................

Reg. No..............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Information Technology

CS/IT/ME/AM/MT/PT 14 501—ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT

Time : Three Hours

Maximum : 100 Marks

Section I

PART A

Answer any **four** *questions.*
Each question carries 5 marks.

1. Define Inflation and list the causes of inflation.

2. Write the classification of cost.

3. State the necessity of Fiscal policy.

4. Calculate the yearly interest rate if an investment is paid 1.75% interest every two months.

5. Write the difference between present worth and future worth.

(4 × 5 = 20 marks)

PART B

Answer **all** *the questions.*
Each question carries 15 marks.

6. (A) Elaborate the method of deriving selling price of a product.

Or

(B) Describe the methods of improving economic efficiency.

7. (A) Explain the procedure for calculating internal rate of return.

Or

(B) Describe the procedure for drawing cash flow diagram in lender's perspective and also in borrower's perspective.

(2 × 15 = 30 marks)

Turn over

Section II

Part A

Answer any **four** *questions.*

Each question carries 5 marks.

1. Discuss the different kinds of basic skills required for a manager.

2. Write the importance of decision-making in management.

3. List the primary responsibilities of Human Resource Manager.

4. Bring out the relationship between journal and a ledger.

5. Illustrate the preparation of profit and loss account statement.

(4 × 5 = 20 marks)

Part B

Answer **all** *the questions.*

Each question carries 15 marks.

6. (A) Define decision-making. Explain the essential steps in decision-making.

Or

(B) Describe why planning is an important element of managerial function.

7. (A) Explain the preparation of cost sheet using an example.

Or

(B) Describe the mechanism of balancing an account.

(2 × 15 = 30 marks)

D 13955

(Pages : 2)

Name....................................

Reg. No................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Information Technology

CS/IT 14 502—SOFTWARE ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. What is Software, Software engineering ? Describe the reasons for failure of software products.

2. Compare and contrast waterfall model from prototyping model.

3. List the design guidelines and attributes to be followed for an effective design.

4. Draw an ER diagram for the inventory management system.

5. Explain briefly steps followed in architectural design.

6. **What are the objectives of testing ? Specify the need for internal documentation.**

7. Write a note on unit testing and integration testing.

8. Explicate how test plan is generated and test results are reported.

9. Write a note on the methods for software licensing.

10. Describe the issues in software maintenance and reuse.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 marks.

11. Explain with a diagram the spiral lifecycle model of software development.

Or

12. With a neat provide the features of incremental model. Analyze the pros and cons of this model and compare it with prototyping model.

13. Explain in detail the design concepts that are applied for an effective design.

Or

14. What is structured design ? Illustrate the structured design process from DFD to structured chart with a case study.

15. Explain the different types of System testing.

Or

16. Describe how a formal technical review is conducted ?

17. Explain in detail the various phases of project management.

Or

18. Describe the cost estimation techniques for a software project with a case study.

(4 × 15 = 60 marks)

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Name..................................

Reg. No..............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE
[2014 SCHEME] EXAMINATION, NOVEMBER 2021

Printing Technology Engineering

PT 14 502—ANALOG AND DIGITAL ELECTRONICS

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **eight** *questions.*
Each question carries 5 marks.

1. Explain how FET can be used as a switch.

2. Define important parameters of JFET.

3. With reference to a differential amplifier, define the following terms : (i) Common mode gain A_{cm} ; and (ii) Slew rate.

4. Explain grounded type voltage to current converter using OPAMP.

5. What are the characteristics of an ideal operational amplifier ?

6. Realize the function of NOR, AND, OR gates only with NOR gates.

7. Explain how a full adder circuit can be designed with the help of two half adders.

8. State and prove De Morgan's theorem.

9. Draw and explain the working of Universal shift register.

10. Draw and explain four bit Johnson counter and also draw its timing diagram.

($8 \times 5 = 40$ marks)

Part B

Answer **all** *question.*
Each question carries 15 marks.

11. With the help of neat diagram explain the operation of an n-channel enhancement type MOSFET.

(15 marks)

Or

12. Sketch a typical transfer characteristic for an n-channel JFET and show how the trans conductance can be derived from the transfer characteristic.

(15 marks)

Turn over

13. (a) What are the different stages of an op-amp ? Explain why a level-transistor stage is required in an op-amp.

(8 marks)

(b) What are the desirable characteristics of an ideal operational amplifier and also input stage of an op-amp.

(7 marks)

Or

14. (a) Draw and explain circuit diagram of square wave generator with waveforms. (7 marks)

(b) Explain the working of an OP-AMP as non-inverting amplifier and derive an expression for the output.

(8 marks)

15. (a) Distinguish between a multiplexer and a demultiplexer. (5 marks)

(b) Define half subtractor and full subtractor. Design full subtractor using half subtractor.

(10 marks)

Or

16. (a) Convert A 3BH and 2 F3H into binary and octal respectively. (7 marks)

(b) Simplify using k-map to obtain a minimum pos expression (Product of Sums) : $(A' + B'+ C + D)$ $(A + B' + C + D) (A + B + C + D') (A + B + C' + D') (A' + B + C' + D') (A + B + C' + D)$.

(8 marks)

17. With the help of circuit diagram and tables explain the working of J-K flip-flop. Explain race around condition in J-K flip-flop.

(15 marks)

Or

18. (a) Draw the circuit of RS flip-flop. Explain its working with the help of truth table. (8 marks)

(b) Convert SR flip-flop toT and JK flip-flop. (7 marks)

[4 × 15 = 60 marks]

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Name..

Reg. No...

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electronics and Communication Engineering

EC 14 502—LINEAR INTEGRATED CIRCUITS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any **eight** questions.*
Each question carries 5 marks.

1. Define slew rate and power supply rejection rate.

2. Draw the electrical equivalent circuit of opamp 741 and list its characteristics.

3. Derive the condition for oscillation of RC phase shift oscillator.

4. Design a wide band pass filter with $f_I = 500Hz$, $f_H = 2kHz$ and pass band gain of 2.

5. Design a monostable multivibrator to generate a delay of 2ms and draw the circuit and its output.

6. Differentiate between LM723 and three terminal regulator.

7. Define the lock range and pull in time of PLL.

8. How a PLL operates as a frequency translator ?

9. Define resolution, accuracy and monotonic characteristics of ADC.

10. Explain about all pass filters.

$(8 \times 5 = 40 \text{ marks})$

Part B

*Answer **all** questions.*
Each question carries 15 marks.

11. a) i) Discuss any two compensation schemes.

    ii) Explain the operation of intergrator.

    (10 marks)

    Or

    (5 marks)

    b) Discuss about input bias current, differentiator and l-V converter.

    (15 marks)

Turn over

12. a) i) Explain the operation of Astable circuit. (8 marks)

    ii) Derive the transfer function of second order Sallen key HPF and design a second order LPF filter with a cut off frequency of 3KHz.

(7 marks)

Or

b) Explain the operation of Wein bridge oscillator and realization of filters using switched capacitor concept.

(15 marks)

13. a) i) Describe the astable mode of operation of 555 timer. (8 marks)

    ii) Explain the working of an 8 bit successive approximation ADC. (7 marks)

Or

b) Discuss the working of R-2R DAC AND LM723. (15 marks)

14. a) Discuss the operation of second order PLL and voltage controlled oscillator. (15 marks)

Or

b) Explain any three applications of PLL. (15 marks)

[4 × 15 = 60 marks]

D 13938

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Name...................................

Reg. No...............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electrical and Electronics Engineering

EE 14 502—ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any **eight** questions.*
Each question carries 5 marks.

I. 1 Explain PWR (Pressurized water Reactor) and state its advantages and disadvantages.

2 List out the various components of Gas Turbine Power Plant.

3 Define tariff, what are its objectives ?

4 Explain about sag template.

5 Generalize the different types of insulators.

6 Deduce the desirable properties of insulator.

7 Draw the single line diagram of ring main distributor.

8 What are the main requirements of the insulating materials used for cable ?

9 A three phase transmission line has its conductor at the corners of an equilateral triangle with side 3m. The diameter of each conductor is 1.63cm. Examine the inductance per phase per km of the line.

10 Write ABCD constants of medium T network.

(8 × 5 = 40 marks)

Part B

*Answer **all** questions.*
Each question carries 15 marks.

II. 1 State the merits and demerits of Solar energy conversion and utilization. State various types of solar thermal collectors along with their advantages and disadvantages.

Or

Turn over

2 A plant costing Rs.65,000 has a useful life of 15 years. Find the amount which should be saved annually to replace the equipment at the end of that time. a) by the straight line method and b) by the sinking fund method if the annual rate of compound interest is 15%. Assume that the salvage value of the equipment is Rs. 5,000.

3 (i) An overhead line has the following data :

   Span length 160 metres, conductor dia 0.95 cm, weight per unit length of the conductor 0.65 kg/metre. Ultimate stress 4250 kg/cm2, wind pressure 40 kg/m2 of projected area. Factor of safety 5. Calculate the sag
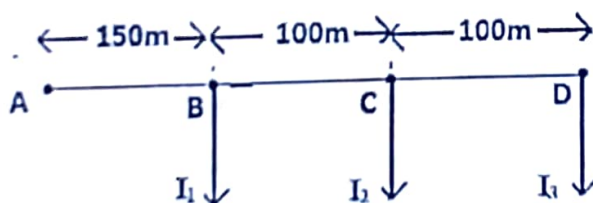
  (ii) What is a sag-template ? Explain how this is useful for location of towers and stringing of power conductors ?

Or

4. (i) A string of eight suspension insulator is to be graded to obtain uniform distribution of voltage across the string. If the capacitance of the top unit is 10 times the capacitance to ground of each unit, determine the capacitance of the remaining seven units.

   (ii) Discuss how string efficiency is improved by capacitance grading suspension insulators.

5 The DC distributor shown in fig is loaded as follows : $I1 = 100A$; $I2 = 150A$; $I3 = 200A$. The resistance of conductor (go and return) is 0.1Ω per 1000m. Find the voltage at points C, D and B if voltage at A $V_a = 200V$.

Or

6 (i) Compare overhead lines and underground cables.

   (ii) Explain different types of cables with neat diagram.

7 (i) Calculate the GMR of a conductor having seven strands each of 3mm radius.

   (ii) Explain why and how transposition of three phase lines are done.

Or

8 Determine the efficiency and regulation of a 3 phase 100km, 50Hz transmission line delivering 20MW at a p.f of 0.8 lagging and 66kV to a balanced load. The conductors are copper, each having resistance 0.1Ω/km, 1.5cm outside dia, spaced equilaterally 2m between centers. Neglect reactance and use (i) Nominal T (ii) Nominal π method.

(4 × 15 = 60 marks)

D 13961

(Pages : 2)

Name.................................

Reg. No.............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Mechanical Engineering

ME 14 502—METAL CUTTING AND FORMING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. What are the factors affecting tool life ? Write down Taylor's tool life equation.

2. Differentiate between positive and negative rake angle and state the conditions under which these are recommended.

3. Distinguish between Crater wear and Flank wear with neat sketches.

4. What is Broaching ? How broaches are classified ?

5. Distinguish between dressing and truing of grinding wheels.

6. Distinguish between countersinking and counterboring.

7. What are the essential requirements of electrolytes in ECM ? Give examples of commonly used electrolytes.

8. List out the advantages and disadvantages of USM.

9. Distinguish between forward and backward extrusion.

10. Explain the working principle of electro hydraulic forming.

(8 × 5 = 40 marks)

Turn over

D 13961

(Pages : 2)

Name.................................

Reg. No.............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Mechanical Engineering

ME 14 502—METAL CUTTING AND FORMING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. What are the factors affecting tool life ? Write down Taylor's tool life equation.

2. Differentiate between positive and negative rake angle and state the conditions under which these are recommended.

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8. List out the advantages and disadvantages of USM.

9. Distinguish between forward and backward extrusion.

10. Explain the working principle of electro hydraulic forming.

(8 × 5 = 40 marks)

Turn over

Part B

Answer all the questions.

Each question carries 15 marks.

11. (a) In an orthogonal cutting operation, the following data have been observed.

Uncut chip thickness = 0.127 mm, Width of cut = 6.35 mm, cutting speed = 2m/s,

Rake angle = 10°, Cutting force = 567 N, Thrust force = 227 N, Chip thickness = 0.228 mm Determine shear angle, friction angle, shear stress along the shear plane and the power for the cutting operation.

Or

(b) Briefly explain the characteristics of following tool materials (i) HSS ; (ii) Cemented carbides ; and (iii) CBN.

12. (a) With neat sketches explain any *three* methods of turning taper in lathe.

Or

(b) Distinguish between Plain milling cutter, Side milling cutter and end mill. What are the different types of these milling cutters ?

13. (a) What is the working principle of abrasive jet machining ? With a schematic diagram, discuss the components of AJM machine. List out the applications.

Or

(b) Explain the working principle of plasma arc machining with neat sketch. Also comment on the selection of gas for PAM.

14. (a) Discuss in detail the different methods of reducing force required for punching operation

Or

(b) With a schematic diagram explain the closed die forging process and explain the forging processes (i) Fullering ; (ii) Edging ; (iii) Blocking ; and (iv) Coining.

(4 × 15 = 60 marks)

D 13933

(Pages : 2)

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, NOVEMBER 2021

Electronics and Communication Engineering

EC 14 503—DIGITAL COMMUNICATION

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. List the requirements of line coding.

2. Derive the expressions for the quantization noise of PCM system and DM System.

3. Write notes on eye diagram.

4. What is a matched filter ? Derive the expression for the threshold of a matched filter.

5. Explain the working of an optimum receiver for coloured noise.

6. Explain the need for carrier and bit synchronization.

7. Compare the performance of various digital receivers.

8. What is a coherent system ? Draw the ASK, FSK and PSK waveforms of the bit stream :

   11001001

9. State sampling theorem. Write notes on aliasing.

10. Write notes on the terms : (i) Norms ; and (ii) Orthogonality.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

11. a) (i) State and prove sampling theorem.

(7 marks)

   (ii) Draw the Bipolar RZ, Bipolar NRZ, Manchetstor, on-ff RZ waveforms of the binary stream 11000110.

Or

(8 marks)

Turn over

b) Derive the expression for the power spectral density of Bipolar and on-off NRZ line coding schemes.

12. a) State and prove Nyquist first criterion for zero ISI.

Or

b) Explain, in detail, Nyquist second criterion for zero ISI.

13. a) (i) Write notes on Gaussian Random Process.

(7 marks)

(ii) Derive the expression for bit error probability of a matched filter.

(8 marks)

Or

b) Explain a method each for carrier and bit synchronization.

14) a) (i) Derive the expressions for the power spectra of ASK, FSK and PSK waveforms.

(8 marks)

(ii) Derive the bit error probability of coherent ASK receiver.

(7 marks)

Or

b) Derive the bit error probability of coherent FSK and PSK receivers.

[4 × 15 = 60 marks]

D 13939 (Pages : 2)

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electrical and Electronics Engineering

EE 14 503—ELECTRICAL MACHINES—II

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

I. 1 Define Distribution factor.

2 What are the sources of harmonics in the generated EMF in case of alternator? How to minimize them ?

3 What is air gap line ? Explain its significance with respect to magnetization characteristic of an alternator ?

4 Discuss briefly any *two* assumptions made in Potier method.

5 Compare MMF and synchronous impedance methods of estimating voltage regulation of synchronous alternator.

6 Explain the significance of synchronizing current in parallel operation of alternators.

7 Define Synchronizing power coefficient and also mention its units.

8 What are the applications of synchronous condenser.

9 What are the constructional differences between salient pole type alternator and cylindrical rotor type alternator ?

10 Mention the factors that influence the choice of specific electric and magnetic loadings in a synchronous machine.

(8 × 5 = 40 marks)

Turn over

Part B

Answer any **four** *questions.*
Each question carries 15 marks.

II. 1 i) Explain in detail the distributed and concentrated windings and how the performance of the machine can get affected by the windings construction.

   ii) Explain the principle of operation of a synchronous generator.

Or

2 i) Explain the concept of armature reaction in synchronous machines.

   ii) Explain the two-reaction theory of salient pole synchronous machine.

3 i) Explain the EMF method of determining the regulation of an alternator.

   ii) A 3-phase, 16-pole alternator has the following data :

   Number of slots = 192 ; conductors/slot = 8 ; coil span = 160 electrical degrees ; speed of the alternator = 375 r.p.m ; flux/pole = 55 mWb ; Calculate the phase and line voltages.

Or

4 i) Explain the effect of increasing excitation of one of the alternators when two alternators are connected in parallel.

   ii) Discuss in detail about load sharing in parallel generators.

5 i) Explain in detail about the concept of Hunting and how to overcome it in a synchronous motor.

   ii) A 2000V, 3-phase, 4-pole, Y- connected synchronous motor runs at 1500 r.p.m. The excitation is constant and corresponds to an open circuit voltage of 2000 V. The resistance is negligible as compared to a reactance of 3Ω per phase.Determine the power input, power factor and torque developed for an armature current of 200A.

Or

6 i) Explain the significance of V curves and inverted V-curves ?

   ii) Explain the various starting methods of synchronous motor.

7 Determine the main dimensions for a 1000KVA, 50Hz, 3 phase, 375 r.p.m. alternator. The average air gap flux density is $0.55Wb/m^2$ and the ampere conductors per metre are 28,000. Use rectangular poles and assume a suitable value for ratio of core length to pole pitch in order that bolted on pole construction is used for which the maximum permissible peripheral speed is 50m/s. the runaway speed is 1.8 times the synchronous speed.

Or

8 Find main dimension of 100 MVA, 11 KV, 50 Hz, 150 rpm, three phase water wheel generator. The average gap density = 0.65 wb/m^2 and ampere conductors / m are 40000. The peripheral speed should not exceed 65 m/s at normal running speed in order to limit runaway peripheral speed.

(4 × 15 = 60 marks)

D 13956

(Pages : 2)

Name..

Reg. No................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Information Technology

CS/IT 14 503—OPERATING SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer **eight** questions.*
Each question carries 5 marks.

1. Distinguish among the following terminologies :

    (i) Multiprogramming systems. (ii) Multitasking Systems.

    (iii) Multiprocessor systems.

2. Differentiate between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of using multiprocessor systems ?

3. What are system calls? Explain the different categories of the system calls.

4. Explain direct and indirect communications of message passing systems.

5. What are client server systems and Peer-to-Peer systems ?

6. Explain the difference between long term, short term and medium term schedulers.

7. What are the major activities of an operating system with regard to memory management ?

8. Write a note on file system structure.

9. What is meant by Access matrix and how is it implemented ?

10. Define firewall. Why it is used ?

(8 × 5 = 40 marks)

Part B

*Answer **all** question.*
Each question carries 15 marks.

11. (A) Explain about the operating system structure in detail.

Or

    (B) Explain in detail about the working of virtual machines.

Turn over

12. (A) Given 3 processes A, B and C, three resources x, y and z and following events :

(i) A requests x ; (ii) A requests y ; (iii) B requests y ; (iv) B requests z ; (v) C requests z (vi) C requests x ; (vii) C requests y. Assume that requested resources should always be allocated to the request process if it is available. Draw the resource allocation graph for the sequences. And also mention whether it is a deadlock ? If so, how to recover from the deadlock ?

Or

(B) Five batch jobs A, B, C, D and E arrive at a computer centre at almost at the same time. They have estimated running times of 10, 6, 2, 4 and 8 minutes. Their priorities are 3, 5, 2, 1 and 4 respectively, with 5 being the highest priority. For each of the following scheduling algorithm determine the turn-around time of each process and waiting time of each process. Ignore process switching overhead. Mention which algorithm results in minimal average waiting time.

(i) Round Robin ; (ii) Priority scheduling ; (iii) First come first served ; and (iv) Shortest job first.

For case (i) Assume that system is multiprocessing and each job gets its fair share of the CPU.(time quantum 2 minutes). For cases (ii), (iii) and (iv) assume that only one job runs at a time, until it finishes. All jobs are completely CPU bound.

13. (A) Consider the reference stream 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults will occur while using FCFS page replacement and LRU page replacement algorithms using 3 frames ?

Or

(B) Name the different file allocation methods. Explain the linked allocation and indexed allocation file implementation techniques with its merits and demerits.

14. (A) Explain any *three* disk scheduling algorithms with suitable examples.

Or

(B) Briefly explain the various kinds of program threats, network threats and system threats.

(4 × 15 = 60 marks)

(Pages : 2)

Name....................................

Reg. No...............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Mechanical Engineering

ME 14 503—HEAT AND MASS TRANSFER

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Explain the various factors affecting thermal conductivity of solids.

2. Define thermal diffusivity. What is the significance of the term in conduction ?

3. What is the importance of time constant of a system ?

4. What is hydrodynamic boundary layer and thermal boundary layer.

5. What is the difference between film wise and drop wise condensation process ?

6. Define the term spectral emissive power and total emissive power.

7. Define effectiveness of a heat exchanger.

8. Derive an expression for equimolar counter diffusion.

9. Define Schmidt number and Sherwood number in mass transfer. Explain their significance.

10. Explain the analogy between heat and mass transfer.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*

11. Derive the expression for general three dimensional conduction heat transfer. Hence derive the expression for steady state heat transfer from plate edge without heat generation.

Or

12. A copper rod of diameter 5mm is heated by flow of current. The surface of the rod is maintained at 175°C while it is dissipating heat by convection (with heat transfer co-efficient of ambient is 150w/m^2 k) into ambient air at 25°C. If the rod is convered with 1mm thick coating (k = 0.6 w/mk). What will be the effect of heat loss with this insulation compared to without insulation.

Turn over

13. Air at 1atm and 27° C flows across a 12mm diameter sphere at a velocity of 4 m/s. A small heater inside the sphere maintains the surface temperature at 77° C. Calculate the rate of heat loss from the sphere.

Or

14. Explain the boiling curve with neat sketch what are the various regimes in boiling curve.

15. a) Define Wein's displacement law. (5 marks)

b) An enclosure measures 1.5 m × 1.7 m with height of 2 m. The walls and ceiling are maintained at 250° C and floor at 130° C. The walls and ceiling have an emissivity of 0.82 and 0.7 respectively. Determine the net radiation to the floor.

(10 marks)

Or

16. A window glass 0.3 cm thick has a monochromatic transmissivity of 0.9 in the range of 0.3 μm to 2.5 μm and nearly zero elsewhere. Estimate the total transmissivity of the window for :

a) Near black solar radiation at 5800 k.

b) Black room radiation at 300 k.

17. Water at 225 kg/hr is to be heated from 35° C to 95° C by means of concentric tube heat exchanger. Oil at 225 kg/hr and 210° C with a specific heat of 2095 J/kg k is to be used as hot fluid. If the overall heat transfer co-efficient based on outer diameter of inner tube is 550 w/m²k. Determine the length of heat exchanger, if the outer diameter is 100 mm.

Or

18. a) What is diffusion co-efficient ? What are the parameters deciding diffusion co-efficient.

(5 marks)

b) Hydrogen gas diffuses through a steel wall of 2mm thickness. The molar concentration of hydrogen at interface is 1.5 kg mol/m³ and it is zero on the outerface. Calculate diffusion rate of hydrogen, if diffusion co-efficient is 0.3×10^{-12} m²/s.

(10 marks)

[4 × 15 = 60 marks]

D 13977

(Pages : 2)

Name..

Reg. No..

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Printing Technology

PT 14 503—OFFSET MACHINERY—II

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. Explain about gusset wrinkle, printing couple, BTB, perfecting and non-perfecting.

2. Describe about plate, blanket and impression cylinders.

3. Describe in brief the different categories of dampening systems.

4. Explain the rollers and their coverings of a conventional dampening system. How do you control the dampening flow ?

5. Describe the types of roll stands used for unwinding the web.

6. Describe the jaw folding mechanism.

7. Explain the principle of pattern gluing, and backbone gluing with examples of applications.

8. What are web pre-conditioners and sheet cleaners ? Explain them with their purposes.

9. Explain the principles of stroboscope and synchroscope.

10. Explain the horizontal BTB press with neat diagram.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 marks.

11. i) Explain the intermittent flow inking unit of a web offset press with neat diagram.

    ii) Explain the methods of setting the ink rollers.

(10 + 5 = 15 marks)

Or

12. With neat diagrams, explain the various configurations of BTB press.

Turn over

13. What are the ingredients of dampening solution ? Explain each of them with their functions. Describe the importance of maintaining pH and conductivity of dampening solution.

(10 + 5 = 15 marks)

Or

14. What are the types of continuous dampening systems ? Explain each with neat diagram.

15. Explain the devices and components of unwind and infeed unit of a web offset press.

Or

16. Write an account of dryers and chill roll units on web offset presses with their importance and working principles.

17. What are the different types of automatic blanket washers used ? Explain with neat diagrams. Explain the fountain solution refrigeration and mixing system.

(10 + 5 = 15 marks)

Or

18. What do you mean by relative print width and relative print length ? Explain with respect to web offset printing. Explain fan-out and controlling fan-out on web offset press.

(10 + 5 = 15 marks)

[4 × 15 = 60 marks]

D 13934

(Pages : 2)

Name.......................................

Reg. No...................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electronics and Communication Engineering

EC 14 504—ELECTROMAGNETIC FIELD THEORY

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Explain Cartesian and spherical co-ordinate system.

2. State and explain Gauss's law.

3. From the principle of conservation of charge, derive the continuity equation.

4. In free space, $E = 20 \cos (\omega t - 50x) a$, V / m, calculate : (a) J_d ; (b) H ; and (c) ω.

5. In air, $E = \dfrac{\sin \theta}{r} \cos \left(6 \times 10^7 t - \beta r\right) a_o$ V / m. Find β and H.

6. State and explain Poynting theorem.

7. In free space, $H = 0.2 \cos (\omega t - \beta x) a_z$, A/m. Find the total power passing through a circular disk of radius 5 cm on plane $x = 1$.

8. The attenuation constant of a plane wave propagating through the dielectric is 0.2887 Np/m. Find the skin depth.

9. Give the expressions for the cut-off wavelength and propagation constant of TM waves.

10. What is degenerate mode in rectangular waveguide ?

(8 × 5 = 40 marks)

Part B

11. a) Derive in magnetic boundary conditions between two magnetic media.

Or

b) State and explain Ampere's circuital law.

Turn over

12.　a)　Explain linear, circular and elliptical polarization.

Or

　　b)　i)　State and explain uniqueness theorem.　　　　　　　　　　　　　　　　(7 marks)

　　　　ii)　Explain conducting current and displacement current.　　　　　　　(8 marks)

13.　a)　A plane wave in a non-magnetic medium has $E = 50 \sin\left(10^3 t + 2z\right) a_y$, V/m. Find :

　　　　　　i)　The direction of wave propagation.

　　　　　　ii)　λ and f.

　　　　　　iii)　H.

$(3 \times 5 = 15$ marks$)$

Or

　　b)　Explain the reflection of a plane wave at :

　　　　　　i)　Normal incidence.

　　　　　　ii)　Oblique incidence.

$(7 + 8 = 15$ marks$)$

14.　a)　Explain :

　　　　　　i)　TE mode and

　　　　　　ii)　TM mode propagation.

Or

　　b)　i)　Explain group velocity and phase velocity.　　　　　　　　　　　　(8 marks)

　　　　ii)　Explain Skin effect.　　　　　　　　　　　　　　　　　　　　　　(7 marks)

$[4 \times 15 = 60$ marks$]$

D 13940

(Pages : 2)

Name.....................................

Reg. No................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electrical and Electronics Engineering

EE 14 504—ANALOG AND DIGITAL COMMUNICATION

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

I. 1. Why do you need modulation in communication systems ?

2. Illustrate the concepts of sensitivity and selectivity in AM receiver.

3. Draw the block diagram of a method for generating a narrow band FM.

4. Describe mean, autocorrelation and covariance of a random process.

5. Express the autocorrelation function and power spectral density of white noise.

6. Point out the properties of Gaussian process.

7. Illustrate the use of pre-filtering done before sampling.

8. Compare the matched filter and correlation receiver.

9. List the methods to improve coverage and capacity in cellular systems.

10. Give the standards of wireless communication system.

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*

II. 1 (i) Write the working of low level and high level AM Transmitters with the help of a neat block diagram.

(ii) Obtain the types of AM modulators based on their placement in a transmitter circuit.

Or

2 Explain the principle of indirect method of generating a wideband FM signal.

3 (i) For ergodic process show that mean of the time average is equal to ensemble mean.

(ii) Differentiate the strict-sense stationary with that of wide sense stationary process.

Or

Turn over

4 (i) When is a random process said to be Strict Sense Stationary (SSS), Wide Sense Stationary (WSS) and Ergodic process.

   (ii) Let $X(t) = A \cos(\omega t + \Phi)$ and $Y(t) = A \sin(\omega t + \Phi)$, where A and ω are constants and is a uniform random variables $[0, 2\pi]$. Solve the cross correlation of $x(t)$ and $y(t)$.

5 (i) Describe PCM system with neat block diagram.

   (ii) Illustrate the principle of quantization and obtain the expression for the signal to quantization noise ratio in PCM system.

Or

6 Explain the generation and detection of a coherent binary PSK signal and derive the power spectral density of binary PSK signal and plot it.

7 (i) Describe about wideband CDMA in detail ii) Write the concept of cellular system.

Or

8. i) Write short notes on PLCC.

    ii) Compare and contrast packet switching and circuit switching.

(4 × 15 = 60 marks)

(Pages : 2)

Name...

Reg. No...................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Information Technology

CS/IT 14 504—DATABASE MANAGEMENT SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any **eight** questions.*

Each question carries 5 marks.

1. List various users of DBMS and specify the roles. Explain Application of DBMS.

2. Describe the structure of DBMS in detail.

3. Explain the codd's rules for relational database design.

4. Draw the ER diagram for a company 'that needs to store information about employees (identified by ssn, with salary and phone as attributes), departments (identified by dno, with dname and budget as attributes), and children of employees (with name and age as attributes). Employees work in departments, each department is managed by an employee, a child must be identified uniquely by name when the parent(who is an employee ; assume that only one parent works for the company) is known.Information about a child need not be considered once the parent leaves.

5. Explain various types of joins with example.

6. What is data integrity ? Explain its types.

7. What is constraint in database ? Explain types of constraints with suitable example.

8. Define functional dependency. List the inference rules for functional dependencies. Give suitable examples.

9. Explain the concept of Deadlock avoidance and prevention.

10. What is Transaction ? Explain its four important Properties.

(8 × 5 = 40 marks)

Part B

*Answer **all** questions.*

Each question carries 15 marks.

11. Draw the structure of DBMS and explain its components in detail.

Or

12. What is Data Abstraction ? Explain about different views of data.

Turn over

13. Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.

Or

14. List various Aggregate functions. Explain any one with example.

15. Consider the following Relational Database.

  • Doctor (dno, dname, dcity)

  • Patient (opdno, pat_name,addr,disease)

  • The relation between patient and Doctor is many to many.

Create a RDB in 3NF and solve the following.

   i) Insert a row in Doctor Table.

   ii) Find names of patient who are treated by 'Dr.Guru.

   iii) Display names, of doctors who live in 'Amritsar' city.

   iv) Count number of patients suffering from 'Covid-19'.

   v) Add 'Discharge Date' Column to patient table.

   vi) Display total no. of patients treated by each doctor.

Or

16. What do you mean by Normalization ? Explain BCNF, 3NF and 2NF with a suitable.

17. Explain concurrency control with lock based protocols.

Or

18. Explain three type of actions to be taken for recovery from deadlock.

(4 × 15 = 60 marks)

D 13963

(Pages : 4)

Name...

Reg. No..

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Mechanical Engineering

ME 14 504—MECHANICS OF MACHINERY

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Explain the working of Hooke's joint.

2. With neat sketch explain the Geneva mechanism.

3. State and explain Kennedy's theorem.

4. Draw velocity, acceleration diagram when the follower moves with SHM.

5. Define the following terms of cam :

    (a) Base circle ; (b) Pitch circle ; and (c) Pitch curve.

6. Explain the law of gearing with neat sketch.

7. What are cycloidal teeth profile and involute teeth profile ?

8. Explain the term interchangeability of gear.

9. Explain the over lay method for the graphical synthesis of mechanism.

10. What is the need of Freudenstein equation in mechanism synthesis ?
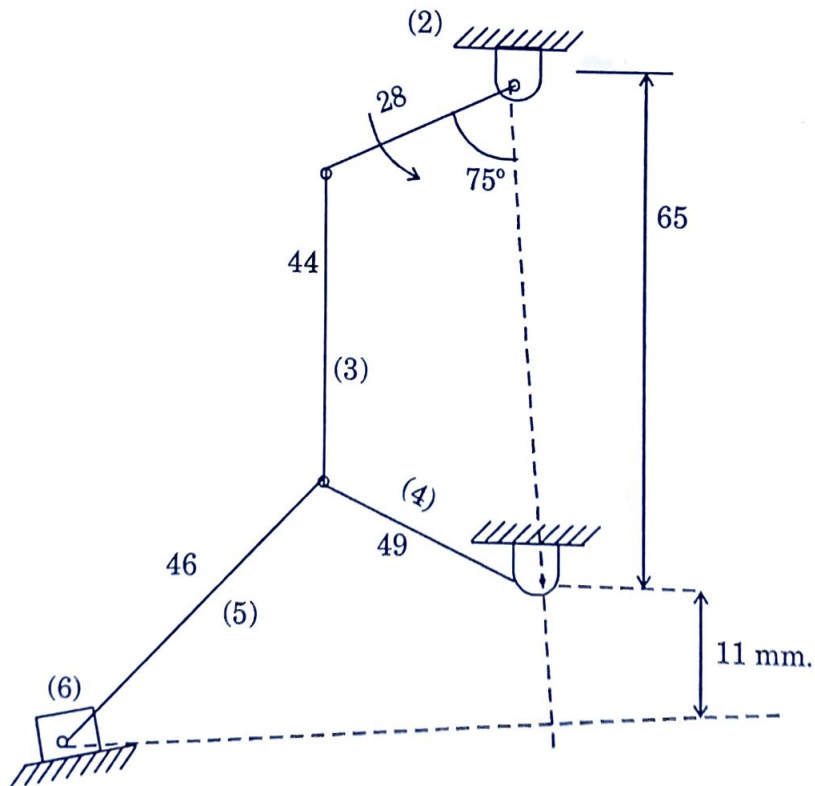
(8 × 5 = 40 marks)

Turn over

Part B

Answer all questions.

11. In figure given below, angular velocity of crank OA is 600 r.p.m. Determine the linear velocity of slider (6) and angular velocity of link (5), when the crank is inclined at an angle of 75° to vertical. OA = 28 mm, AB = 44 mm, BC = 49 mm, BD = 46 mm. Distance between O and C is 65 mm. Path of travel of slider 11 mm vertically below fixed point C.

Or

12. a) Explain the Hart's straight line mechanism with neat sketch.

(7 marks)

b) Explain Ackermann steering mechanism with neat sketch. Derive expression for steering.

(8 marks)

13. Draw the profile of the cam with flat faced follower to the following specification :

    1   Follower to move outward through distance of 25 mm during 120° of cam rotation.

    2   Follower to dwell for 30° of cam rotation.

    3   Follower to return to its initial position during 120° of cam rotation.

    4   Follower to dwell for the remaining period of cam rotation. The minimum radius of cam is 20 mm. Outward and return stroke are to take place with SHM and with uniform acceleration and retardation respectively.

Or

14. In a symmetrical tangent cam with roller reciprocating follower, the minimum radius of cam is 25 mm and the roller diameter is 25 mm. The angle of ascent is 60°, and the total lift is 12.5 mm. The cam shaft speed is 100 rad/s. Determine :

    (a)   Dimensions of cam.

    (b)   Velocity and acceleration at the beginning of lift.

    (c)   Velocity and acceleration of the follower at point where the flank merges with circular nose.

    (d)   The acceleration at the apex of the circular nose.

    Assume no dwell period between the ascent and descent.

15. A pair of gears have 14 and 16 teeth and module is 12.5 mm. The addendum is also 12.5 mm. The angle of obliquity is 14½. Show that gears have interference. Determine the portions by which addendum of gears must be reduced to avoid the interference. Determine length of path of contact of the reduced addendum.

Or

16. An epicyclic gear train is arranged as shown in figure. How many revolutions does the arm, to which pinion B and C are attached make.

    (i)   When A makes one revolution clockwise and D makes half revolution anticlockwise and

    (ii)   When A makes one revolution clockwise and D is stationary. The no. of teeth in wheel A and D are 40 and 90 respectively.

Turn over

17. Determine Chebyshev spacing for the function $y = e^x$ for $0 \le x \le 4$ and specify three precision points. Using Chebyshev spacing determine :

    (a) x_1, x_2 and x_3.

    (b) ψ_2, ψ_3, ϕ_2 and ϕ_3 for $D\phi = 80°$ and $\Delta\psi = 110°$.

Or

18. Synthesis a four bar linkage with the following data $l_1 = -1.0 + 0.0\,i$:

$w_2 = 1\ \text{rad / sec}\,;\ w_3 = -2\ \text{rad / sec}\,;\ w_4 = 3\ \text{rad / sec}$

$\alpha_2 = 3\ \text{rad / sec}^2\,;\ \alpha_3 = 1\ \text{rad / sec}^2\,;\ \alpha_4 = 2\ \text{rad / sec}^2.$

(4 × 15 = 60 marks)

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, NOVEMBER 2021

Printing Technology

PT 14 504—MARKETING MANAGEMENT

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Discuss the influence of psychological factors on consumer's buying behavior.

2. Write notes on production concept.

3. Discuss consumer and business markets.

4. What are the components of MIS ?

5. Explain the importance of identifying the competitors and their strategies.

6. What are the objectives and features of market challenger strategies ?

7. Discuss various factors contributing new product development.

8. What are the advantages of direct marketing ?

9. Explain about major decisions in direct marketing.

10. What are the steps in marketing-profitability analysis ? Brief.

(8 × 5 = 40 marks)

Part B

11. a) Discuss marketing concept. (5 marks)

    b) Discuss 10 types of marketing entities in which marketing people are involved. (10 marks)

Or

12. a) Discuss the adoption of marketing management in business sector. (5 marks)

    b) Explain different stages of business strategy planning. (10 marks)

13. a) Explain different stages of buying-decision process.   (10 marks)

     b) Compare industry concept and market concept of competition.   (5 marks)

Or

14. Discuss the 5 steps involved in marketing research process.

(15 marks)

15. Explain different stages of new product development process.

(15 marks)

Or

16. a) Discuss various methods of estimating future market demand.   (7 marks)

     b) What are the factors contributing new product development ? Discuss. (8 marks)

17. What steps can a company take to build a stronger customer-focused culture ? Explain.

(15 marks)

Or

18. How do customer databases support direct marketing ? Discuss.

(15 marks)

[4 × 15 = 60 marks]

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electronics and Communication Engineering

EC 14 505—MICROPROCESSORS AND MICROCONTROLLERS

Time : Three Hours　　　　　　　　　　　　　　　Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. With an example, explain the function of a stack.

2. Explain the applications of MASM.

3. List various registers available in 8086 and give the function of each one.

4. Explain the configuration of a Coprocessor in a microprocessor based system with a conceptual block diagram.

5. List the control signals required for I/O interfacing and explain the role of each one.

6. Explain the memory address decoding process in 8086 with suitable examples.

7. Draw internal block diagram of 8253.

8. Explain addressing modes in 8051 microcontroller.

9. What are the timer modes available in 8051. Explain.

10. Explain the function of Barrel Shifter in ARM processors.

(8 × 5 = 40 marks)

Part B

Answer any **one** *question from each module.*

11. Explain the data transfer, arithmetic and branch instructions of 8086 microprocessor with examples.

Or

12. (i) Distinguish between call and jump instructions.

(7 marks)

(ii) With examples explain the 8086 instructions :

AAA, CWD, JZ JNBE, LAHF, RCL, ROL and SAHF.

(8 marks)

Turn over

13. Describe about the signals involved in minimum mode operation of 8086 with a microprocessor based system with the timing diagrams.

Or

14. Draw and explain the timing diagram of memory read and memory write operations of 8086 microprocessor in maximum mode.

15. Give the internal block diagram of 8253 and 8255. Explain in detail.

Or

16. Give the internal architecture of 8251 and 8259 and explain in detail.

17. (i) Give PSW of 8051 and describe the uses of each bit.   (7 marks)

    (ii) Describe the functions of the following signals in 8051 :

        RST, EA, PSEN and ALE.   (8 marks)

Or

18. Discuss the internal memory organization of 8051 microcontroller. Discuss about any 2 SFRs.

[4 × 15 = 60 marks]

D 13941

(Pages : 2)

Name..

Reg. No..

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, NOVEMBER 2021

Electrical and Electronics Engineering

EE 14 505—DIGITAL SYSTEM DESIGN

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

I. 1 List out the essential features of VHDL language.

2 Differentiate between libraries and packages in VHDL.

3 Describe about structural design elements.

4 State the rules to perform bubble-to-bubble logic.

5 What is propagation delay ? Explain.

6 Give the excitation table for D flip flop along with their characteristic equations.

7 Write short note on state assignment.

8 Explain feedback sequential circuit in brief.

9 Draw the ASM chart for MOD-5 counter.

10 Describe about Xilinx XC 4000 in brief.

(8 × 5 = 40 marks)

Part B

Answer any **four** *questions.*

II. 1 Explain in detail about types, constants and arrays.

Or

2 With suitable example discuss the various data flow design elements.

3 Write the VHDL code to realize a 4-bit magnitude comparator.

Or

4 Discuss the salient features of circuit timing and timing specification.

Turn over

5 Design a synchronous sequential circuit that functions as a sequence detector to detect a sequence of 0110 using JK flip flop.

Or

6 Design a sequential circuit with two DFFs A and B, and one input x. When $x = 0$ the state of the circuit remains the same. When $x = 1$, the circuit goes through the state transition from 00 to 01 to 11 to 10 and back to 00 and repeats.

7 Discuss the analysis of circuits with multiple feedback loops with examples.

Or

8 Explain the features of Xilinx XC 9500 CPLD family.

(4 × 15 = 60 marks)

D 13960

(Pages : 2)

Name..

Reg. No...................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION NOVEMBER 2021

Information Technology Engineering

IT 14 505—INTRODUCTION TO MICROPROCESSOR SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any **eight** questions.*
Each question carries 5 marks.

1. Explain the purpose of segment registers in 8086.

2. Brief about the general definitions of mini computers.

3. List the salient features of 8086 architecture.

4. List the various addressing modes present in 8086.

5. State the significance of LOCK signal in 8086.

6. What do you mean by assembly directive ? Explain.

7. What are the features used in mode 0 in 8255 ?

8. Brief about how to interface and display an LCD with microcontroller.

9. Discuss about the various uses of instruction set.

10. Explain in brief about RISC-CISC trade-offs.

(8 × 5 = 40 marks)

Part B

*Answer **all** questions.*

11. Explain about micro-controllers and digital signal processors.

Or

12. Describe about the operations of signals and pins of 8086 microprocessor.

Turn over

13. 10 numbers are stored from location 1000 onwards. Write an 8086 assembly language programme count the number of odd numbers in these. Draw the flow chart also.

Or

14. Explain in detail the function of assembly directives.

15. Explain the function of programmable peripheral interface-intel 8255.

Or

16. Explain in detail about the functions and internal architecture of 8259.

17. Explain ARM7TDMI organization.

Or

18. Write a detailed note on ARM microprocessors.

(4 × 15 = 60 marks)

D 13964

(Pages : 3)

Name.......................................

Reg. No.................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, NOVEMBER 2021

Mechanical Engineering

ME 14 505—INTERNAL COMBUSTION ENGINES

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. How are heat engines classified ?

2. Distinguish between spark ignition and compression ignition engines.

3. What are the assumptions made in analysing the air standard cycle ?

4. Explain the effect of supercharging.

5. What is a stratified engine ? Explain.

6. What are the requirements of a good combustion chamber ?

7. Give an account of important performance characteristics of I.C. engines.

8. Explain merits and demerits of alcohol as an alternate fuel.

9. Write brief note on autoignition.

10. Discuss the variables affecting delay period.

(8 × 5 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 15 marks.

11. a) Discuss the difference between actual and ideal valve timing diagram of four stroke petrol engine.

(10 marks)

b) Describe a Duel combustion cycle with the help of P-V and T-S diagrams.

(5 marks)

Or

Turn over

12. a) Derive the expression for the efficiency of Diesel cycle. Hence show that efficiency of Diesel cycle is lower the efficiency of Otto cycle for the same compression ratio.

(10 marks)

b) Explain the effect of dissociation on maximum temperature and brake power.

(5 marks)

13. a) Describe different components in the fuel system of a diesel engine.   (10 marks)

b) With a neat sketch explain the working of a magneto ignition system.   (5 marks)

Or

14. a) Describe briefly the MPFI and CRDI injection systems.   (10 marks)

b) With the help of a diagram explain the working of a Wankel engine.   (5 marks)

15. a) The output of an engine is measured by a rope brake dynamometer. The diameter of the pulley is 800 mm and rope diameter is 60 mm. The dead load on the tight side of the rope is 500 N and the spring balance reading is 100 N. The engine consumes 4.2 kg/hr of fuel at rated speed of 1000 r.p.m. The calorific value of fuel is 43000kJ/kg. Calculate

   (i) Brake thermal efficiency.

   (ii) Brake specific fuel consumption.

(10 marks)

b) Explain Morse test.   (5 marks)

Or

16. a) Explain Octane number and Cetane number. Briefly describe different types of alternate fuels for IC engines.

(10 marks)

b) Mention important characteristics of SI engine fuels.   (5 marks)

17. a) What you understand by knocking in SI engines ? How does the knock in SI engine differ from knock in CI engines ?

(10 marks)

b) What do you mean by pre-ignition ? How it can be detected ?

(5 marks)

Or

18. a) Explain stages of combustion in a CI engine. Discuss the effect of engine variables on diesel knock.

(10 marks)

b) What are the methods used in CI engine to create turbulence in the combustion chamber.

(5 marks)

[4 × 15 = 60 marks]

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Printing Technology

PT 14 505—THEORY OF MECHANISM

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

1. Differentiate between :

   a) Machine and mechanism ; and

   b) Constrained motion and successfully constrained motion.

2. Differentiate between a) Base circle and prime circle ; and b) Cam angle and pressure angle.

3. Differentiate whitworth quick-return mechanism and crank and slotted lever mechanism.

4. A pinion having 18 teeth of involute profile, 20° pressure angle and 6 mm module drives a gear having 44 teeth. Find : (i) The length of path of contact ; and (ii) Contact ratio.

5. With a neat sketch explain the Reverted gear train and mention its use.

6. Explain with neat sketch open and crossed belt drive.

7. What is static and dynamic balancing ? What are necessary conditions to achieve them ?

8. With standard notations, for a flat belt prove, $T1/T2 = e^{\mu\theta}$.

9. Explain over damping and under damping.

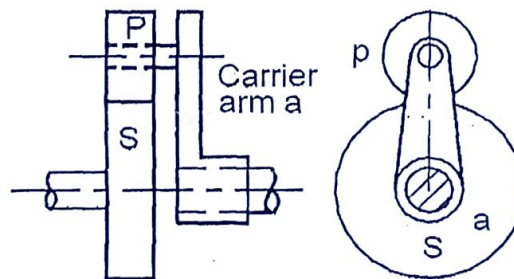10. Explain different types of free vibration.

(8 × 5 = 40 marks)

Part B

Answer all questions.
Each question carries 15 marks.

11. a) Explain with examples the different types of kinematic pairs classified on the basis of the nature of contact and the type of relative motion between the links.

Or

b) Draw the cam profile from the following data if the radial follower moves with simple harmonic motion during ascent and uniform acceleration and deceleration during descent : lift = 50 mm, least radius of cam = 60 mm, angle of ascent = 45°, Dwell = 40°, angle of descent = 70°, roller diameter = 25 mm.

12. a) Define an epicyclic gear train. Also derive an expression to determine the r.p.m. of all gears in an epicyclic gear train as shown in figure using tabular method.

Figure

Or

b) What is path of contact ? With a neat sketch derive relation for its magnitude. The number of teeth on a 20° Full Depth Involute gear is 31 and module is 2 mm. Calculate the pitch circle radius, thickness of the tooth at the pitch circle, base circle radius and thickness of tooth at the base circle.

13. a) Derive an expression for the velocity ratio of a belt drive considering the thickness of the belt. A leather belt transmits 10 kW from a motor running at 600 r.p.m. by an open belt drive to a pump. The diameter of the pump pulley is 350 mm, centre distance between the pulleys is 3 m and speed of the motor pulley is 250 r.p.m. The belt weighs 1 100 kg/m³ and the maximum allowable tension in the belt is 2.5 N/mm². Co-efficient of friction = 0.25. Find the width of the belt assuming the thickness to be 10 mm. Neglect the belt thickness to calculate the velocities.

Or

b) A shaft carries four masses A, B, C and D placed in parallel planes perpendicular to the shaft axis and in this order along the shaft. The masses B and C are 40 kg and 28 kg and both are at 160mm radius. While the masses in planes A and D are at 200 mm radius. Angle between B and C is 100°, B and A is 190°, both angles measured in the same sense. Planes A and B are 250 mm apart, B and C are 500 mm apart. If the shaft is to be in complete balance, determine (i) masses in planes A and D ; (ii) distance between planes C and D ; and (iii) angular position of mass D.

14. a) A machine of 75 kg is mounted on springs and is fitted with a dashpot to damp out vibrations. There are three springs of stiffness 10 N/mm and it is found that the amplitude of vibration diminishes from 38.4 mm to 6.4 mm in two complete oscillations. Assuming that the damping force varies as the velocity; determine : (i) The resistance of the dashpot at unit velocity ; (ii) The ratio of the frequency of the damped vibration to the frequency of the undamped vibration ; and (iii) The periodic time of the damped vibration.

Or

b) The mass of a single degree damped vibrating system is 7.5 kg and makes 24 free oscillations in 14 seconds when disturbed from its equilibrium position. The amplitude of vibration reduces to 0.25 of its initial value after five oscillations. Determine : (i) Stiffness of the spring ; (ii) Logarithmic decrement ; and (iii) Damping factor.

(4 × 15 = 60 marks)

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electronics and Communication Engineering

EC 14 506—QUANTITATIVE TECHNIQUES AND MANAGERIAL DECISIONS

Time : Three Hours   Maximum : 100 Marks

Part A

*Answer any **eight** questions.*
Each question carries 5 marks.

I. (a) What are the elements used for decision-making ?

   (b) Draw the decision tree for the tennis shop owner's problem.

   (c) What is Critical Path Method ?

   (d) What is EOQ in inventory ?

   (e) What is holding cost in connection with inventory ?

   (f) What are the major assumptions in Linear Programming ?

   (g) Solve graphically :

   Minimize $z = 3x_1 + 2x_2$
   subject to $7x_1 + 2x_2 \geq 30$
                   $5x_1 + 4x_2 \geq 20$
                   $2x_1 + 8x_2 \geq 16$
                   $x_1, x_2 \geq 0.$

   (h) What is Duality in LPP ?

   (i) Define a transportation Problem with an example.

   (j) Briefly discuss about Degeneracy in transportation problem.

                                                    $(8 \times 5 = 40$ marks$)$

                                                    Turn over

Part B

Answer **all** *questions.*

Each question carries 15 marks.

II. (A) Consider a project with eight jobs A, B, C, D, E, F, G and H having the following job sequence : $A \to C, B \to D, C \to H, A \to E, D \to F, B \to E, F \to G, E \to G, G \to H$. Draw the project network.

Or

(B) "PERT Analysis assumes Beta distribution". Illustrate with appropriate example.

III. (A) "The EOQ was never intended to apply to situations in which demand is other than completely predictable." Illustrate about the statement with relevant examples.

Or

(B) A vending machine dispenses sandwiches. Each morning, fresh sandwiches are put in, and the excess, if any, from the previous day were removed. Sandwiches cost the vendor Rs. 25, and are sold at Rs. 45. A day-old sandwiches are sold at Rs.10 a piece to a soup Kitchen. Assuming that daily demand is Poisson distributed with a mean of 15, determine the number of sandwiches to put into machine each day.

IV. (A) An electrical appliances company manufactures two products, Refrigerators and Ranges. The production takes place in two separate departments. Refrigerators are produced in Department I and Ranges are in Department II. The weekly production cannot exceed 25 Refrigerators and 35 Ranges. The company employs a total of 60 workers in the two Departments. A Refrigerator requires 2 man-week of labour while Range requires 1 man-week labour. A Refrigerator contributes a profit of Rs. 600, and Range with a profit of Rs. 400. Formulate the Problems as LPP.

Or

(B) Solve the Linear Programming Problem :

Maximize $z = 2x_1 + 4x_2$

subject to $2x_1 + x_2 \leq 10$

$2x_1 + 2x_2 \leq 6$

$2x_1 + 2x_2 \geq -4$

$-2x_1 + x_2 \leq 1$, and

$x_1, x_2 \geq 0$.

V. (A) Illustrate the concept of stepping-stone algorithm with an example.

Or

(B) Discuss the way in which a digital computer might be used for solving transportation problem by the UV method.

(4 × 15 = 60 marks)

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Electrical and Electronics Engineering

EE 14 506—ELECTRICAL MATERIAL SCIENCE

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 marks.

I. 1 State the principle of Mettalic conduction.

2 Explain Curie-Wiess law.

3 Compare hard and soft magnetic materials.

4 Define the terms (i) Dielectric constant ; and (ii) Dipole moment.

5 Derive Claussius-mosotti relation.

6 What are the types of dielectric materials ?

7 Distinguish between the solid breakdown and dielectric breakdown.

8 Explain electric discharge ?

9 Explain photo thermal conversion.

10 Discuss the I-V curve for dark and illuminated junction.

$(8 \times 5 = 40 \text{ marks})$

Part B

Answer any **four** *questions.*
Each question carries 15 marks.

II. 1 Explain the properties of magnetic materials. Also discuss in detail about the magnetic material used in electrical apparatus.

Or

2 i) Explain Weiss theory of ferromagnetism with their applications.

ii) Describe the materials for resistances in brief.

Turn over

3 What is meant by dielectric polarization under static fields in detail with the derivation ?

Or

4 i) Explain about spontaneous polarization.

   ii) State about ferroelectric materials and their properties.

5 i) Explain streamer theory of breakdown in gases.

   ii) Discuss the avalanche mechanism in the breakdown of dielectric.

Or

6 i) Describe the theories employed for breakdown in liquids in detail.

   ii) What is meant by aging of insulators.

7 Discuss briefly about any *two* types of coatings used in photo thermal conversion system.

Or

8 i) Explain photo voltaic conversion in detail.

   ii) What are the materials used in solar cells ? Discuss their electrical properties.

(4 × 15 = 60 marks)

12. Construct DFA from two languages L1 and L2 given by the regular expressions $(0+1)*0$ and $1(0+1)*$. Find DFA and regular expressions for $L1 \cap L2$, complement L2 and reversal of L2.

13. Given the following grammar G :

S → AABB
A → AA | a
B → BB | b.

     i)   Remove all left recursions from G

    ii)   Write G in Greibach Normal Form.

   iii)   Construct a PDA that accepts the language generated by G from GNF.

   iv)   Show the actions of the parser for a sample input.

Or

14. Write CFG for defining palindrome over $\Sigma = \{a, b\}$. Construct a PDA to accept palindromes defined over the alphabet set $\Sigma = \{a, b\}$. Is the constructed PDA deterministic ? Justify.

15. Construct a Turing machine that accepts the language L= {SS | S ∈ {a,b}*}. Trace the string "aba" and "aa".

Or

16. Design a Turing Machine to reverse a given string in $\Sigma = \{a, b\}$. Test for an input string "baba".

17. State Post Correspondence problem. Prove that Post Correspondence problem is undecidable. Assuming $\Sigma = \{0, 1\}$ check whether the following Turing machine accepts string '10' and convert it into a MPCP instance

Or

18. Explain CLIQUE and SAT problem. Show how CLIQUE problem is polynomial time reducible to SAT.

(4 × 15 = 60 marks)

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Name..

Reg. No...................................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Mechanical Engineering

ME 14 506—COMPUTATIONAL METHODS IN ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. State Langrange's interpolation formula for unequal intervals.

2. Classify the PDE $y_{xx} - xu_{yy} = 0$.

3. What are the advantages of iterative methods over direct methods for solving a system of linear equations.

4. State Newton's backward difference formula.

5. Find the value of y (0.1) if $\dfrac{dy}{dx} = 1 + y$ and $y(0) = 1$, using Tylor series method.

6. Using Euler's method, find the solution of initial value problem $\dfrac{dy}{dx} = \log(x + y)$; $y(0) = 2$ at $x = 0.2$ by assuming $h = 0.2$.

7. Solve the equation $x + 2y = 1$ and $3x - 2y = 7$ by Gauss elimination method.

8. What is the use of power method ?

9. Write down the conditions for convergence of Newton-Raphson method for $f(x) = 0$.

10. Explain Crank Nicholson's scheme. State whether Crank Nicholson's scheme is explicit or implicit.

(8 × 5 = 40 marks)

Turn over

Part B

Answer **all** *questions.*

11. Solve the equation $x^3 + x^2 - 1 = 0$ or the positive root by iteration method, correct to four decimal places.

Or

12. Find the root of an equation $f(x) = x^3 - x - 1$. Using Muller method.

13. Solve by Gauss-Jacobi method, the following system of equation :

$$28x + 4y - z = 32$$
$$x + 3y + 10z = 24$$
$$2x + 17y + 4z = 35.$$

Or

14. Find all the Eigen values of matrix A using power method :

$$A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}.$$

15. From the following data, find $f(x)$ as a polynomial in x, using Newton's divided difference formula. Hence find $f(z)$:

x :	-4	-1	0	2	5
$f(x)$:	1245	35	5	9	1335

Or

16. From the following data, fit a cubic spline :

x :	1	2	3
y :	-8	-1	18

and hence compute :

(i) $y(1.5)$; and

(ii) $y'(1)$.

17. Solve $y'' - y = 0$ with boundary conditions $y(0) = 0$ and $y(1) = 1$.

Or

18. Solve $\nabla^2 = 8x^2y^2$ over square $x = -2$, $x = +2$, $y = -2$, $y = 2$ with $u = 0$ on the boundary and mesh length $h = 1$.

(4 × 15 = 60 marks)

(Pages : 2)

Name...................................

Reg. No..............................

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME] EXAMINATION, NOVEMBER 2021

Information Technology

CS/IT 14 506—THEORY OF COMPUTATION

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Construct the ε-NFA, NFA, DFA and minimized DFA for the regular expression $a + b^* a$. Trace the action of the automaton for the input string "bbba".

2. Prove using direct, contrapositive and contradiction methods. There are no integers x and y such that $x^2 = 4y + 2$.

3. Discuss the applications of finite automata.

4. Prove that, if L is accepted by an NFA with ε transitions, then L is accepted by NFA without ε transitions.

5. Prove the equivalence of NFA and DFA using subset construction.

6. Discuss the closure properties of regular languages.

7. Explain Turing machines as a computer of integer functions with an example.

8. Prove that for two recursive languages L1 and L2 their union and intersection is recursive.

9. Explain about undecidability of PCP

10. Describe halting problem.

$(8 \times 5 = 40$ marks)

Part B

Answer **all** *questions.*

11. Consider the regular expression $1 (01 + 10)^* 0$ defined over $\Sigma = \{0, 1\}$. Use Thompson's construction method to draw a ε-NFA for the above regular expression and convert it into a DFA. Trace the string "10100" and "00".

Or

12. Construct DFA from two languages L1 and L2 given by the regular expressions (0+1)*0 and 1(0+1)*. Find DFA and regular expressions for L1∩L2, complement L2 and reversal of L2.

13. Given the following grammar G :

S → AABB
A → AA|a
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    i)   Remove all left recursions from G

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Or

18. Explain CLIQUE and SAT problem. Show how CLIQUE problem is polynomial time reducible to SAT.

(4 × 15 = 60 marks)