1.1.2 Sample end term (Rajasthan Technical University) examination question papers

(2023-24)

ISI-6, RIICO Institutional Area, Sitapura, Jaipur-302022 (Rajasthan)
• Phone: +91-9829255102, +91-9414728922 • E-mail: principal.pce@poornima.org
• Website: www.pce.poornima.org

1E3105

1E3105

B.Tech. I-Sem. (Main/Back) Exam. - 2024

1FY1-05 / Human Values

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in Form No. 205)

1. ....   2. ....

PART-A   [10x2=20]

(Answer should be given up to 25 words only)
All questions are compulsory

Q.1.   How are values and skills related to each other?

Q.2.   Differentiate between belief and understanding.

Q.3.   How are wealth and prosperity differentiated?

Q.4. What is our basic aspiration?

Q.5. What is the comprehensive human goal?

Q.6. How are technology and values related?

Q.7. Define the term justice.

Q.8. What does universal human order mean?

Q.9. State the meaning of definitiveness of ethical human conduct.

Q.10. Differentiate between glory and gratitude.

PART-B [5x4=20]
(Analytical/Problem solving questions)
Attempt any Five questions

Q.1. Discuss the concept of Sanyam and Swasthya.

Q.2. Explain the importance of right understanding for mutual fulfillment and mutual prosperity.

Q.3. Discuss the basic guidelines for value education.

Q.4. What are the problems that we face today due to preconditioned desires, thoughts and selections?

Q.5. Differentiate between animal consciousness and human consciousness.

Q.6. 'Trust is the foundation value in relationship.' Explain.

Q.7. Examine the issues in professional ethics in current scenario.

(Descriptive/Analytical/Problem Solving/Design question)
Attempt any three questions

Q.1. Self-exploration is the process of dialogue between what you are and what you really want to be. Discuss.

Q.2. Existence = nature submerged in space. Explain.

Q.3. Discuss the broad holistic criteria for the evaluation of technologies, production system and management models.

Q.4. Critically examine the needs and activities of self and body.

Q.5. Discuss the need for value education in technical institutes.

----- ✕ -----

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

1E3102

B.Tech. I-Sem. (Main/Back) Exam. - 2024

1FY2-02/Engineering Physics

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in Form No. 205)

1. ....   2. ....

PART-A   [10×2=20]

(Answer should be given upto 25 words only)
All questions are compulsory

Q.1. Give the physical significance of divergence and curl of a field.

Q.2. Write all four Maxwell's equations in integral form for free space.

Q.3. What do you mean by eigenfunctions and eigen values?

Q.4. When the movable mirror of Michelson's interferometer is shifted by 0.030 mm, the shift of 100 fringes is observed. Calculate the wavelength of light in $\overset{o}{A}$ and state its colour.

Q.5. State Rayleigh's criterion of resolution.

Q.6. Find the lowest energy of an electron confirmed to move in one dimensional potential box of length $1 \overset{o}{A}$.

Q.7. Calculate the numerical aperture and acceptance angle of an optical fiber. Given refractive index of fiber core=1.62 and refractive index of cladding=1.52.

Q.8. Define spatial and temporal coherence.

Q.9. What do you mean by stimulated emission and spontaneous emission?

Q.10. The carrier concentration in n-type semiconductor 10^{19} per m^3. What is the value of Hall coefficient?

PART-B $[5\times4=20]$

(Analytical/Problem solving questions)
Attempt any five questions

Q.1. Give the construction and theory of plane transmission grating and explain the formation of spectra by it.

Q.2. Prove that in high frequency region laser action is not possible.

Q.3. For intrinsic semiconductor with a band gap E_g=0.7 eV, calculate the density of electrons and holes at 300K.

Q.4. A ray of light entres from air into fiber. The refractive index of air is one. The fiber has a core of refractive index 1.5 and cladding of refractive index 1.48. Find the critical angle, the fractional refractive index, acceptance angle and numerical aperture.

Q.5. A plane transmission grating of length 6 cm has 5000 lines/cm. Find the resolving power of grating and the smallest wavelength difference that can be resolved for light of wavelength $5000 \overset{\circ}{A}$.

Q.6. If a potential function is given by the expression, $\phi = xyz$, determine the potential gradient and also prove that the vector is irrotational.

Q.7. Calculate the angles at which the first dark band and the next bright band are formed in the Fraunhofer diffraction pattern of a slit 0.3 mm wide $(\lambda = 5890 \overset{\circ}{A})$.

PART-C   [3×10=30]

(Descriptive/Analytical/Problem Solving/Design Question)
Attempt any three questions

Q.1. In a Newton's ring arrangement with air film observed with light of wavelength 6×10^{-5} cm, the difference of squares of diameters of successive rings is 0.125 cm². What will happen to this quantity if :

(i)   Wavelength of light is changed to 4.5×10^{-5} cm.

(ii)   A liquid of refractive index 1.33 is introduced between the lens and the plate

(iii)   The radius of curvature of the convex surface of the Plano-convex lens is doubled?

Q.2. Explain the terms : Population inversion and optical pumping. Discuss with suitable diagrams the principle, construction and working of Helium-Neon Laser.

1E3102/7440   Page 3 of 4   [P.T.O.]

Q.3. The Hall voltage for the sodium metal is 0.001 mV, measured at I=100 mA, B=2 Tesla, the width of the specimen=0.05 mm and $\sigma = 2.09 \times 10^7 \Omega^{-1} m^{-1}$,

   (a)   calculate the number of carriers per cubic meter in sodium.

   (b)   calculate the mobility of electrons in sodium.

Q.4. State and prove Poynting theorem for the rate of flow of energy in electromagnetic field. What is Poynting vector?

Q.5. Give physical significance of wave function. Derive time dependent and time independent Schrödinger wave equation.

----×----

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

3E1200

3E1200

B.Tech. III-Sem. (Main & Back) Examination, January/February- 2024

Agricultural Engineering

3AG 1-03 Managerial Economics and Financial Accounting

All Branches

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory   **(10×2=20)**

1. Explain Gross Domestic Product (GDP).

2. Draw circular flow of economic activities

3. Draw graph to show

    a)   Perfectly Inelastic Demand

    b)   Perfectly elastic demand   **(1 + 1=2)**

4. What is Giffen Paradox?

5. Give mathematical form of Cobb - Douglas production function.

6. Define Explicit and implicit costs with example.   **(1 +1= 2)**

7. Draw a chart to show different market structures.

8. List four important features of Monopoly market.   **(0.5 × 4 = 2)**

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

9. What is golden rule of accounting for real accounts? **(1 +1 =2)**

10. Define payback period.

PART - B

(Analytical/Problems solving questions)

Attempt any Five questions **(5×4 =20)**

1. Define National Income. Explain steps involved in the estimation of national income by income method. **(1+3=4)**

2. Explain economies and diseconomies of scale with examples. **(2+2=4)**

3. How will you calculate cash flows from operating activities by direct and indirect method. Explain with example. **(2+2=4)**

4. a) Why is the demand curve of a firm under monopolistic competition more elastic than under monopoly? Explain.

   b) Explain 'freedom of entry and exit to firms in industry' feature of monopolistic competition. **(2+2=4)**

5. Explain following with help of suitable graph. **(1×4=4)**

   a) Zero income elasticity

   b) Negative Income elasticity

   c) Unit incom elasticity

   d) Income elasticity greater than unity

6. Give brief answer of following Questions on Balance Sheet: **(1×4=4)**

   a) On balance sheet, accruals, notes payable, and account payable are listed under which category?

   b) Inventories, cash and equivalents, and accounts receivables are listed as?

   c) A firm buys products but does not pay to suppliers instantly. This is recorded as?

   d) In a balance sheet, the total of common stock and retained earnings are denoted as?

7. Explain following ratios: (Formula is must) **(2+2=4)**

   a) Liquidity Ratio

   b) Solvency Ratio

3E1200 (2)

PART - C

(Descriptive/Analytical/Problems Solving/Design question)

Attempt any Three questions   **(3×10=30)**

1   a)   Complete the following table: (0.25×30 =7.5)

QTY (UNITS)	TFC (Rs.)	TVC (Rs.)	TC (Rs.)	AVC (Rs.)	ATC (Rs.)	MC (Rs.)
0	60	.....	.....	.....	.....	.....
1	.....	30	.....	.....	.....	.....
2	.....	.....	100	.....	.....	.....
3	.....	.....	.....	.....	.....	5
4	.....	.....	.....	.....	28.75	.....
5	.....	.....	.....	15	.....	.....

   b)   Draw graph/graphs showing relationship between any five Costs with Quantity (Units).

       You can show them in single graph or in separate five graphs.   **(0.5×5=2.5)**

2.   Calculate and also comment on degree of elasticity: **(4×2.5=10)**

   a)   The price of tea per cup is decreased from Rs. 4 to Rs.3 and the demand of coffee is increased from 2 cups per day to 4 cups per day. Calculate Cross Elasticity of Demand.

   b)   Mr. Gupta's income is raised from Rs. 10,000 to Rs. 15,000 and the demand for good A is raised from 500 to 800 units. Calculate Income Elasticity of Demand.

   c)   The demand of commodity X is raised from 200 to 250 units when price decreased from Rs. 8 to Rs. 6. Calculate Price Elasticity of Demand.

   d)   If the price rises of good A rises from Rs. 20 to Rs. 30. Its supply increases from 200 to 800 units. Calculate Elasticity of Supply.

3.   "Economics is an art." Elaborate this statement by explaining meaning, nature and scope of Economics.   **(2+4+4=10)**

4.   "A competitive firm is not a price maker, but adjustor." Explain this statement with reference to price determination in long and short term under perfect competition.

                                      (4+6=10)

5. From the following balance sheet of Brown and co. Ltd. as on 31ˢᵗ Dec. 2020 and 31ˢᵗDec.2021:

Liabilities	2020 (Rs.)	2021 (Rs)	Asset	2020 (Rs.)	2021 (Rs.)
Share capital	5,00,000	7,00,000	Land & Building	80,000	1,20,000
Profit & loss a/c	1,00,000	1,60,000	Plant & Machinery	5,00,000	8,00,000
General Reserve	50,000	70,000	Stock	1,00,000	75,000
Sundry creditors	1,53,000	1,90,000	Sundry Debtors	1,50,000	1,60,000
Bills payable	40,000	50,000	Cash at Bank	20,000	20,000
Expenses O/S	7,000	5,000			
TOTAL	8,50,000	11,75,000	TOTAL	8,50,000	11,75,000

Additional Information:

a) Rs. 50,000 depreciation has been charged on Plant and Machinery during 2021.

b) A piece of Machinery was sold for Rs. 8,000 during the year 2021. It had cost Rs. 12,000; depreciation of Rs. 7,000 had been provided on it.

Prepare a Schedule of changes in Working Capital and a Statement showing the Sources and Application of Funds for 2021. **(3+3+2+2=10)**

(Show Adjusted Profit & Loss Account and Plant & Machinery Account in working notes.)

_____

3E1209

B.Tech. III-Sem. (Main & Back) Examination, January/February - 2024
Automobile Engg.
3AE4-06 Materials Science and Engineering
AE,ME

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory   **(10×2=20)**

1. Define space lattice. What are its important characteristics?

2. What is hardness?

3. What is elastomer? How do they differ from plastics?

4. Discuss the general effects of tempering the steel.

5. Explain space lattice and unit cell with diagram.

6. Explain Baushinger's effect with diagram.

7. Explain benefits of Imperfection.

8. Explain strain hardening phenomenon.

9. Explain synthesis process of PMMA and PEEK polymers.

10. Define atomic packing Factor.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. (5×4=20)

1. Define Material Science of Engineering. Give classification of Engineering Materials.

2. Define imperfection in crystalline solids. Explain point imperfection in detail with suitable diagrams.

3. Define Recovery, Recrystallization and Grain Growth. Explain their effect on Grain size, Internal Stress and Mechanical Properties with the help of Suitable Diagram.

4. What is meant by the term hardenability? Describe how hardenability of steel can be estimated?

5. Explain the solid to solid phase transformation system with neat sketch.

6. Explain the Bureau of Indian Standards (BIS) standards for steels.

7. Describe Gibb's phase rule. How this rule is applied to pure metals and binary alloys?

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions. (3×10=30)

1. Explain the effect of alloying element with their percentage on properties of steel.

2. Explain TTT diagram in detail with suitable diagram. Explain various phase transformation heat treatment process in it.

3. Explain the system in which two metals are completely soluble in liquid state and as well as solid state. Draw its diagram

4. Define resilience property. Explain the both Methods in detail to determine it with suitable diagrams.

5. Calculate the APF for SC, BCC, and FCC Crystal Structure with neat Diagrams.

_____

3E1250

3E1250

B.Tech. III-Sem. (Main & Back) Examination, January/February - 2024

Agricultural Engineering

3AG1-02/Technical Communication

All Branches

Time : 3 Hours   **Maximum Marks : 70**

Instructions to Candidates:

*Attempt all **Ten** questions from Part A, **Five** questions out of **Seven** questions from Part B and **Three** questions out of **Five** questions from Part C.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

*Use of following supporting material is permitted during examination. (Mentioned in form **No. 205**)*

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.   **(10×2=20)**

1. What are various aspects of technical communication?

2. Write two importance of technical communication.

3. Define style in technical communication.

4. What are various steps to read a technical text?

5. List the benefits of note - making.

6. Name different technical texts.

7. Correct the following sentences.

   i)   Both the sister were seen at the party.

   ii) She is one of the best student in our class.

8. Form two words by using the each prefix - in and - un.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

9. Underline and rewrite the noun phrase in the following sentences.

    i)   The cat with the stripes tried to trip me.

    ii)   My green gym socks are in the hamper.

10. Write a short note on Linguistic Ability.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.   (5×4=20)

1. Explain ERRQ and SQ3R Reading Technique.

2. Reading makes a man complete francis Bacon. How can you develop effective reading skills?

3. What is the process of reading a technical manual?

4. Elaborate various ways to collect information.

5. Enlist various factors which affect designing of a document.

6. What are various types of technical articles? Explain.

7. Enumerate the different characteristics of technical project proposal.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions.   (3×10=30)

1. Explain various types of note-making.

2. Describe various features of style in technical communication.

3. Assume yourself as the cultural secretary, you are organizing an instrument playing programme in your Institute/College/ University. Draft an e-mail informing all the teachers, students and staff members of your College about the event and invite them to attend the event. Invent the necessary details.

4. Assuming yourself a hostler, write minutes of the meeting, which you have attended with the hostel wardern and chief warden to improve the quality of food served in the hostel mess.

5. Prepare a report on the Campus placement Drive organized in your College on 12th Jan. 2023.

_____

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

3E1202

3E1202

B.Tech. III Sem. (Main&Back) Examination, January/February - 2024

Artificial Intelligence & Data Science

3AID4-05 Data Structures and Algorithms

AID, CAI, CS,IT,CCS, CDS,CIT,CSD, CSR

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

ALL questions are Compulsory.   (10×2=20)

1. What is Data structure?

2. Explain Asymptotic Notations?

3. What are linear and non-linear data structural .

4. What is linked list? What are its types?

5. Write applications of stacks.

6. Define complete Binary Tree?

7. Differentiate between static and Dynamic memory allocation.

8. What is the concept of minimum spanning Tree?

9. What is meant by abstract data type?

10. Compare tree and graph.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. (5×4=20)

1. Explain tower of Hanoi problem in detail and write algorithm for that.

2. Calculate the address of the element A[15,25] using row major order and column major order for an array A[-15......10, 15.......40] of elements. It is stored at location 100 and the size of each element is 4 bytes.

3. Write an algorithm to insert a node at specific location in circular linked list.

4. The in-order and pre-order traversal sequence of modes in a binary tree are given below:

   In-order: Q, B, K, C, F, A, G, P, E, D, H, R

   Pre-order: G, B, Q, A, C, K, F, P, D, E, R, H

   Draw the binary tree.

5. What is Priority Queue? How can it be implemented ? Write an applications of priority Queue.

6. Convert the following expression in its equivalent postfix expression.

   A+(B×C - (D/E ^ F) ×G) ×H

7. Differentiate single linked list and circular linked list. Also write the advantage and disadvantages of circular linked list.
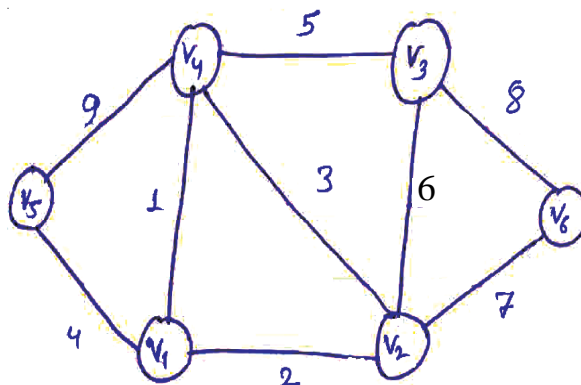
PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any THREE questions. (3×10=30)

1. Define the spanning tree. Write the Kruskal's algorithm to find the minimum cost spanning tree of the following.

2. What is an AVL Tree? Explain the concept of Balancing factor. Create an AVL tree using following sequence. 21,26,30,9,4,14,28,18,15,10,2,3,7

3. What is hashing and collision ? Discuss the advantages and disadvantages of hashing over other searching techniques.

4. Write an algorithm of Insertion sort. Sort the following elements using Insertion sort: 68,17,26,54,77,93,31,44,55,20

5. Write down the algorithm for following operations of doubly linked list :-

   a) Insertion of a node in the middle location.

   b) Delete a node from last location.

———————————————

3E1214

3E1214

B.Tech. III-Sem. (Main and Back) Examination, January/February- 2024

Civil Engg.

3CE4-06 Fluid Mechanics

Time : 3 Hours   **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.   **(10×2=20)**

1. Define fluid. What is fluid continuum?

2. Differentiate between Newtonian and non-Newtonian fluids.

3. Differentiate between specific weight and specific gravity.

4. What is difference between Gauge pressure and Vacuum pressure?

5. Define total pressure and centre of pressure.

6. Explain the conditions of equilibrium for floating and submerged bodies.

7. Define and discuss types of fluid flow.

8. What do you mean by discharge?

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

9. Define

    i)   Displacement thickness and

    ii)   Momentum thickness.

10. What is a siphon?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.   **(5×4=20)**

1. The shear stress at a point in oil of density 800 kg/m³ is 0.25 N/m² and the rate of shear strain at that point is 0.15 per second, Determine its kinematic viscosity in stoke.

2. A simple u-tube manometer is installed across an orifice -meter. the manometer is filled with mercury (Specific gravity = 13.6) and the liquid above mercury is carbon tetrachloride. (specific gravity = 1.6). If the manometer reads 200 mm, then determine the pressum difference over the manometer.

3. A 10mm water jet leaves the tip of the nozzle fitted at the end of a pipe with 10 m/s velocity in the vertically upward direction. If there is no energy loss and jet remains circular, then determine its diameter at a point 3m above the nozzle tip.

4. Define and obtain an expression for continuity equation in a 3-D flow .

5. Derive Euler's equation of motion.

6. State and derive impulse-momentum equation for steady flow.

7. Obtain an expression for the Hagen poiseuille equation.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions.   **(3×10=30)**

1. Derive Navier-stokes equations.

2. A crude oil of viscosity 0.14 Ns/m² and relative density 0.92 flows through a 25 mm diameter vertical pipe. If the pressure gauge fixed at 15m apart measure 540 kN/m² and 180 kN/m², the lower value of the gauge is at the higher level then determine the direction and rate of flow through pipe.

3. Write short notes on the following.

    i)   Venturi-meter

    ii)   Orificemeter

    iii)   Vorticity and circulation

    iv)   Laminar and turbulent flow.

4. Define buoyancy, centre of buoyancy metacentre and metacentric height.

5. State and prove Bernoulli's equation. Also give assumptions, limitations and its applications.

_____

3E1203

3E1203

B.Tech. III-Sem. (Main/Back) Examination, January/February - 2024

Artificial Intelligence and Data Science

3AID3-04 Digital Electronics

AID, CAI, CS,IT,CCS, CDS,CIT,CSD,CSR

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates:

*Attempt all **Ten** questions from Part A, **Five** questions out of **Seven** questions from Part B and **Three** questions out of **Five** questions from Part C.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ Calculated must be stated clearly.

*Use of following supporting material is permitted during examination. (Mentioned in form **No.205**)*

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.   (10×2=20)

1. List the different types of flip flops.   **(2)**

2. Define reflective codes.   **(2)**

3. State De Morgan's theorem.   **(2)**

4. Convert $(10101101)_B \rightarrow (\quad)_G$ **(2)**

5. Explain race around condition in JK flip flop.   **(2)**

6. Illustrate Excitation table of SR flip flop.   **(2)**

7. Explain don't care condition.   **(2)**

8. Show the classification of digital logic families.   **(2)**

9. Solve $(0100\ 1000.\ 01111001)xS\text{-}3 = (\quad)_{10}$ **(2)**

10. Calculate the value of x. $(23)_x + (12)_x = (101)_x$.   **(2)**

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.   (5×4=20)

1.   What is multiplexer? Design 4:1 MUX using 2:1 MUX.   **(4)**

2.   Interpret the function f = A+BC in canonical POS form (Product of Sum form). **(4)**

3.   Design full adder circuit using half adders.   **(4)**

4.   Construct CMOS NAND and CMOS NOR gate for two inputs.   **(4)**

5.   Show that

   i) $AB + A'C + BC = AB + A'C$ **(2)**

   ii) $AB+A'C = (A+C)(A'+B)$ **(2)**

6.   Consider two binary numbers X = 1010100 and Y = 1000011, perform the subtraction using 2^xS complement.

   i)   X-Y   **(2)**

   ii)   Y-X   **(2)**

7.   What are decoders? Implement the following boolean function using 3 to 8 decoder $f(A,B,C) = \sum_m (2,4,5,7)$ **(4)**

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.   (3×10=30)

1.   Simplify the following boolean function using quine McCluskey method and verify the result using k-map also. $F(A,B,C,D) = \sum_m (1,2,3,7,8,9,10,11,14,15)$ **(10)**

2.   Design a 3-bit synchronous counter using JK flip flops.   **(10)**

3. Explain the following terms:

    i)   Naise Margin   **(2)**

    ii)   Propagation Delay   **(2)**

    iii) Fan - In   **(2)**

    iv) Fan-out   **(2)**

    v)   Power Dissipiation   **(2)**

4. Design a 4-bit binary to gray code converter and realize it using logic gates.   **(10)**

5. Explain the working of 4-bit serial in parallel -out shift register along with the waveform.

    (10)

_____

Roll No. _____

[Total No. of Pages : 2]

973371

5E1768

5E1768

B.Tech. V-Sem (Main&Back) Examination, January/February - 2024
Electrical Engineering
5EE4-05 Electrical Machine Design

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (as mentioned in form No.205)

PART A
(Answer should be given up to 25 words only).
All questions are compulsory.   (10×2=20)

1. What are the advantages of using open slots?

2. What is Cogging?

3. Define specific electric loading.

4. Define short circuit current of induction motor.

5. What is the use of damper winding in synchronous machine?

6. What are the functions of frames in induction motor?

7. Define "run away speed" in synchronous machine.

8. Why are machines with large dimensions are more efficient.

9. What are the categories of transformers used in Power systems?

10. What is "Gap expansion factor"?

PART - B
(Analytical/Problem solving questions)

Attempt any Five questions. (5×4=20)

1. Write a short note on "Specific permeance of deep bar rotor slots".

2. State and derive the KVA output equation of single phase transformer.

3. Which factors should be considered when estimating the length of the airgap of induction motor? Why the airgaps should be as small as possible?

4. What are the factors to be considered for selection of armature slots?

5. Explain the construction of synchronous machine with neat diagram.

6. Write a short note on "FEM based design"

7. Find the main dimensions of a 15 KW, 3 Phase, 400V, 50Hz, 2810 r.p.m squirrel cage induction motor having an efficiency of 0.88 and a full load power factor of 0.9. Assume:

   Specific magnetic loading = 0.5 Wb/m²

   Specific electrical loading = 25000 A/m

   Take the rotor peripheral speed as approximately 20 m/s at synchronous speed.

PART - C
(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. (3×10=30)

1. Derive the expressions for design of rotor and rings of squirrel cage.

2. Explain the various steps of determination for Core, Yoke and window of a transformer.

3. Explain the design of turbo-alternators with design of damper winding.

4. Calculate the main dimensions and winding details of a 100 KVA 2000/400 volt; 50Hz; single phase shell type oil immersed, self cooled transformer. Assume: voltage per turn, 10V flux density in core, 1.1 W/b m²; current density, A/mm² window space factor, 0.33.
   The ratio of window hight to window width and ratio of core depth to width of central limb = 2.5. The stacking factor is 0.9.

5. Explain the various approaches used in computer aided design with the help of suitable flowcharts?

5E1756

5E1756

B.Tech. V-Sem. (Main) Examination, January/February - 2024
Computer Sc. and Engg. (IOT)
5CIT4-11 Wireless Communication (Elective - I)
CS, IT, CIT, CSD

Time : 3 Hours   **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.(Mentioned form No.205

PART - A

(Answer should be given up to 25 words only).

All questions are compulsory.   **(10×2=20)**

1. What is Scope and objective of Wirelsss Communication.

2. Explain Doppler shift?

3. What are requirements of a MIMO system?

4. Explain Cyclic Prefix?

5. Explain Principles of offset QPSK?

6. Explain Link budget Design.

7. Define Cellular concept.

8. Explain linear Equalization?

9. Define Duplening

10. What is fading in Wireless channels?

[Contd....

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

PART - B
(Analytical/Problem solving questions)
Attempt any Five questions.   **(5×4=20)**

1. Describe zero forcing and LMS Algorithm?

2. Explain in detail hand off and situation for triggering hand off?

3. Explain Doppler spread and Coherence time in detail.

4. Explain Beam forming in multiple antenna technique?

5. Describe fast fading and slow fading?

6. Explain OFDM and its working.

7. Explain Spatial Multiplexing in detail?

PART - C
(Descriptive/Analytical/Problem Solving/Design question)
Attempt any Three questions.   **(3×10=30)**

1. Describe Gaussian Minimum shift Keying? Differentiate between QPSK and MSK?

2. Describe the following in detail
    a) Adaptive Equalization
    b) Micro-Macro Diversity
    c) Rake Receiver.

3. Differentiate between FDMA, CDMA and TDMA. Also Explain their working.

4. Describe Large Scale Path loss. Also define path loss models.

5. Explain Error Probability in fading channels with diversity reception.

_____

Roll No. _____   [Total No. of Pages : 2]

7E1824

B.Tech. VII-Sem. (Main) Examination, December - 2023
Information Technology
7IT4-01 Big Data Analytics

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates:

Attempt **All Ten** questions from **Part A, Five** questions out of **Seven** from **Part B** and **Three** questions out of **Five questions** from **Part C**.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are Compulsory.   (10×2=20)

1. What is Big Data? How does it works?

2. What are the different platforms to deal with Big Data?

3. What is the necessity of driver code?

4. List the components of a map reduce application that we can develop

5. Define the following wrappers Null writable, Object writable

6. Define the significance of comparator.

7. Define the basic syntax of a pig.

8. What are the three key design principles pig latin?

9. What is Hive Data Manipulation Language.?

10. Write at least two differences between pig and hive.

7E1824/2023   (1)

PART-B

(Analytical/Problem Solving questions)

Attempt any Five questions. (5×4=20)

1. Discuss the problems with traditional large scale systems along with features of big data.

2. What is a Data Node? How many instances of Data Node run on a Hadoop Cluster.

3. Explain the role of combiner, record reader and partitioner within a map reduce program model of Hadoop

4. Explain the Writable class hierarchy with a neat sketch.

5. Explain with an example, how Hadoop uses scale out feature to improve the performance.

6. Explain the four data types of Pig's data model with an example.

7. How can we install the Apache Hive on the system-Explain

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. (3×10=30)

1. Discuss the google file system and Hadoop Distributed File System in detail.

2. Explain about the implementation of map reduce concept with an example.

3. Explain the significance of writable interface along with writable comparable and comparators w.t.to implementing the serialization

4. Discuss about the operators supported by PIG along with PIG commands

5. Draw the architecture of Hive and explain about the various data types supported by HIVEQL with an example.