12/5/2

ARKAJAIN University
Jharkhand

8th Semester End Term Examination: May, 2023.

Subject : EIA **Roll No: .....**
Course : BTECH (CIVIL ENGINEERING)
Full Marks : 70 **Time: 3 Hours.**

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; **Don't Write On The 1st Page Backside**.
- Question Paper is divided into Three Parts -A, B & C.
- **Part-A** is containing **Twelve** multiple choice questions.
- **Part- B** containing **SIX** questions out of which **FOUR** questions are to be answered.
- **Part C** containing **FOUR** questions out of which **TWO** questions are to be answered.
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PART – A

Multiple Choice Questions [12x1=12]

1.(i) What is the purpose of Environmental Impact Assessment (EIA)?

a) To ensure that development projects do not harm the environment.
b) To stop development projects from being approved.
c) To promote economic development at the expense of the environment.
d) To assess the impact of environmental policies on development project.

(ii). The concept of environmental impact assessment (EIA) emerged in

a) USA
b) Netherlands
c) UN
d) Australia

(iii) The goals of EIA are

a) Potential environmental impacts
b) evaluate their significance,
c) a & b
d) None

(iv) How many types of impact assessments are there?

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

(v). A short term environment impact assessment(EIA) has a time period of

a)2-5years b)10-15 years
c) 5-10 years d)5-7years

(vi).EIAs commenced in the year.

a)1960s b) 1890s
c)1880s d) 1950s

(vii)Which one of the following is the apex organization in the country in the field of pollution control?

a)Water pollution control b) central pollution control
c) Air pollution control d) State pollution control

(viii)Environment Impact assessment(EIA) is done

a)Before the project b) After the project
c) During the poject d)Any time in life cycle of project

(ix) Which of the ISO 14000 series of standards focuses on evaluation of environmental performance?

a) 14010 b)14020
c) 14030 d) 14031

(x)In a food chain animals constitute the:

a)first trophic level b)second trophic level
c) intermediate trophic level d)ultimate trophic level

(xi)How many biogeographically zones are there in India

a) 2 b) 4
c)7 d) 10

(xii)Plant species with a wide range of genetic distribution evolve into a local population known as

a)Ecotype b) Population
c) Ecosystem d) Biome

PART - B

Answer any FOUR out of SIX [4x7=28]

2. Elaborate India's EIA Notification.

3. Write the List of benefits and objective of EIA.

4. Write in brief about methodology of preparing EIA.

5. Explain the stages of Environmental Clearance for new projects.

6. State and Explain Environmental Audit and its benefits.

7.Explain in brief Impact assessment Methodology.

PART - C

Answer any TWO out of FOUR [2x15=30]

8. Explain the Environmental Impact assessment (EIA) Process.

9. Explain the benefits of environment audit & special types of audit.

10.Explain the checklist mehod of EIA & limitations of Checklist method.

11.Explain the final report of EIA.

1215

ARKAJAIN University
Jharkhand

8th Semester End Term Examination: May, 2023.

Subject : **Neural Network** **Roll No: .....**

Course : **B.Tech (Electrical and Electronics Engineering)**

Full Marks : **70** **Time** : **3 Hours.**

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PART – A

1. Multiple Choice Questions [12x1=12]

i. What is unsupervised learning?

a. features of group explicitly stated
b. number of groups may be known
c. neither feature & nor number of groups is known
d. none of the mentioned

ii. What are the general tasks that are performed with back-propagation algorithm?

a. pattern mapping
b. function approximation
c. prediction
d. all of the mentioned

iii. What is unsupervised learning?

a. features of group explicitly stated
b. number of groups may be know
c. neither feature & nor number of groups is known
d. none of the mentioned

iv. What is plasticity in neural networks?

a. input pattern keeps on changing
b. input pattern has become static
c. output pattern keeps on changing
d. output is static

v. What is true regarding back-propagation rule?

a. it is also called generalized delta rule
b. error in output is propagated backwards only to determine weight updates
c. there is no feedback of signal at any stage
d. all of the mentioned

vi. What is true regarding back-propagation rule?

a. it is a feedback neural network
b. actual output is determined by computing the outputs of units for each hidden layer
c. hidden layers output is not all important, they are only meant for supporting input and output layers
d. none of the mentioned

vii. What's the main point of difference between human & machine intelligence?

a. human perceive everything as a pattern while machine perceive it merely as data
b. human have emotions
c. human have more IQ & intellect
d. human have sense organs

viii. What is perceptron?

a. a single layer feed-forward neural network with pre-processing
b. an auto-associative neural network
c. a double layer auto-associative neural network
d. a neural network that contains feedback

ix. What is the objective of backpropagation algorithm?

a. to develop learning algorithm for multilayer feedforward neural network
b. to develop learning algorithm for single layer feedforward neural network
c. to develop learning algorithm for multilayer feedforward neural network, so that network can be trained to capture the mapping implicitly
d. none of the mentioned

x. What is supervised learning?

a. weight adjustment based on deviation of desired output from actual output
b. weight adjustment based on desired output only
c. weight adjustment based on actual output only
d. none of the mentioned

xi.. Learning is a?

a. slow process
b. fast process
c. can be slow or fast in general
d. can't say

xii. Feedforward networks are used for?

a. pattern mapping
b. pattern association
c. pattern classification
d. all of the mentioned

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Explain the model of a neuron with proper diagram.
3. Mention the merits and demerits of Back propagation network.
4. Explain Bi-directional Associative memory.
5. What is Associative Memory?
6. Explain MC-Culloch Pitts neuron in Artificial Neural Network.
7. Explain Supervised, Unsupervised and Reinforcement learning.

PART – C

Answer any TWO out of FOUR [2x15=30]

8. Distinguish between Supervisor Learning and Unsupervisor Learning in ANN. 15

9. (a) List the factors that affect the performance of multilayer feed-forward neural network.
   (b) Explain how back propagation network is trained. 8+7

10. (a)Discuss briefly the structure and function of a biological neuron.
    (b) List and explain different learning rules. 8+7

11. Write Short note on the following
    (a) Recurrent neural network
    (b) Self Organizing Maps
    (c) Associative memory network 5+5+5

1215

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8th Semester End Term Examination: May, 2023.

Subject : Total Quality Management **Roll No:** .....
Course : B. TECH (MECHANICAL ENGINEERING)
Full Marks : 70 **Time** : 3 Hours.

Instructions to the Candidates:

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- Part-A is containing 12 multiple choice questions.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
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PART – A

Multiple Choice Questions

[12x1=12]

1. i) Taguchi hails from
   a) US b) France
   c) Japan d) Italy
   ii) Which of the following is responsible for quality objective?
   a) Top level management b) Middle level management
   c) Frontline management d) All of the above
   iii) The combination of Six Sigma and lean manufacturing is known as_____
   a) Lean Sigma b) Six Sigma
   c) Lean Six Sigma d) Lean Three Sigma
   iv) In which country was 5S invented?
   a) India b) Vietnam
   c) Japan d) Norway
   v) The process of involving yourself and influencing others towards the accomplishment of goals is called_____
   a) Leadership b) Dictatorship
   c) Sportsmanship d) Autocracy

vi) Quality Leaders_____ people rather than directing and supervising them.
a) Scold b) Train and coach
c) Threaten d) Fire

vii) Which of the following tool can be used as a risk assessment technique from activity level to system level?
a) Pareto diagram b) Demand forecasting
c) Benchmarking d) Job scheduling

viii) While setting quality objective,_____ to be considered.
a) Market demand b) Customer need
c) Material Quality d) All of the above

ix) Which of the following is related to TQM?
a) Juran b) Kaizen
c) Taguchi d) All of the above

x) ISO 9000 standards are for the_____
a) Quality Management System b) Environmental Management System
c) Administration d) Supply chain

xi) The process mapping is a_____ flow diagram.
a) Audit b) Data flow
c) Work flow d) Circular

xii) Quality control is a
a) Corrective function b) Preventive function
c) Corrective & preventive function d) None of these

PART - B

Answer any FOUR out of SIX [4x7=28]

2. Discuss the role of Senior Management in Total Quality Management (TQM).
3. Describe the term performance appraisal. What are the benefits of performance appraisal?
4. What do you understand by leadership? Describe the characteristics of Quality Leader.
5. Define Quality Circle. What are the basic objectives of Quality Circle?
6. Briefly describe the deming and Juran philosophy.
7. Describe quality function development?

PART - C

Answer any TWO out of FOUR [2x15=30]

8. What is a control chart? How can the control charts be useful for customer? Illustrate the types of control charts.
9. What is quality auditing? Describe the need of ISO 9000, ISO 9001-9008.
10. What are the steps for benchmarking process? Different types of benchmarking. What are advantages of benchmarking?
11. What is failure mode and effect analysis (FMEA)? How to apply? Write the benefits of FMEA.

1215

ARKAJAIN University
Jharkhand

8th Semester End Term Examination May- 2023.

Subject : Digital Signal Processing **Roll No: .....**

Course : B. Tech (CSE)

Full Marks : 70 **Time : 3 Hours.**

Instructions to the Candidates:

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PART – A

1. Multiple Choice Questions [12x1=12]

(i) Circular shift of an N point is equivalent to

a. Circular shift of its periodic extension and its vice versa
b. Linear shift of its periodic extension and its vice versa
c. Circular shift of its aperiodic extension and its vice versa
d. Linear shift of its aperiodic extension and its vice versa

(ii) Frequency selectivity characteristics of DFT refers to

a. Ability to resolve different frequency components from input signal
b. Ability to translate into frequency domain
c. Ability to convert into discrete signal
d. None of the above

(iii) All energy signals will have an average power of _____

a) Infinite
b) Zero
c) Positive
d) Cannot be calculated

(iv) If X(k) is the N-point DFT of a sequence x(n), then what is the DFT of x*(n)?
a) X(N-k) b) X*(k)
c) X*(N-k) d) None of the mentioned

(v) With an increase in the value of M, the height of each side lobe _____
a) Do not vary b) Does not depend on value of M
c) Decreases d) Increases

(vi) The function given by the equation x(n)=1, for n=0; x(n)=0, for n≠0 is a _____
a) Step function b) Ramp function
c) Triangular function d) Impulse function

(vii) Which of the following is the odd component of the signal x(t)=e(jt)?
a) cost b) j*sint
c) j*cost d) sint

(viii) What is the number of filter coefficients that specify the frequency response for h(n) anti-symmetric?
a) (M-1)/2 when M is even and M/2 when M is odd b) (M-1)/2 when M is odd and M/2 when M is even
c) (M+1)/2 when M is even and M/2 when M is odd d) (M+1)/2 when M is odd and M/2 when M is even

(ix) Which of the following methods are used to convert analog filter into digital filter?
a) Approximation of Derivatives b) Bilinear transformation
c) Impulse invariance d) All of the mentioned

(x) For an analog LTI system to be stable, where should the poles of system function H(s) lie?
a) Right half of s-plane b) Left half of s-plane
c) On the imaginary axis d) At origin

(xi) Which of the following justifies the linearity property of z-transform?[x(n)↔X(z)].
a) x(n)+y(n) ↔ X(z)Y(z) b) x(n)+y(n) ↔ X(z)+Y(z)
c) x(n)y(n) ↔ X(z)+Y(z) d) x(n)y(n) ↔ X(z)Y(z)

(xii) If X1(k) and X2(k) are the N-point DFTs of X1(n) and x2(n) respectively, then what is the N-point DFT of x(n)=ax1(n)+bx2(n)?
a) X1(ak)+X2(bk) b) aX1(k)+bX2(k)
c) eakX1(k)+ebkX2(k) d) None of the mentioned

PART - B

Answer any FOUR out of SIX [4x7=28]

2. A signal is given as x(n)=(4, 3, 1, 2, 5). Fold the signal and delay it by 2 units.

3. What is sampling? How aliasing of a signal be avoided?

4. Define mathematically the following signals and plot the same:
   i. Sinc Function
   ii. Unit Ramp Signal
   iii. Unit Step Signal

5. Determine Z-transform of any two of the finite duration signals.

   i. x(n)= {1, 3, 5, 7, 0, 1, 2}
   ↑

   ii. x(n)= {6, 3, 5, 4, 0, 1}

   iii. $x(n)= 2^n u(n-1)$

6. Discuss 5 properties of the DFT.

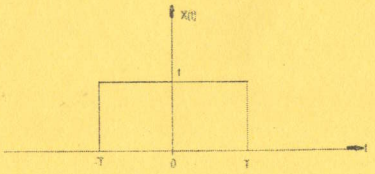
7. What is odd and even signal? Derive an expression for them.

PART - C

Answer any TWO out of FOUR [2x15=30]

8. Find the 4-point DFT of the sequence x(n) = cos nπ/4.

9. Obtain the Fourier transform of a rectangular varying from -T toT with amp of 1



10. Given x(n)= {1, 2, 3, 4, 4, 3, 2, 1}, find X(k) using DIT FFT algorithm.

11. Discuss the properties of Z Transform.

Library

ARKAJAIN University
Jharkhand

1015/23
Morning

8th Semester End Term Examination: May, 2023.

Subject : **PSOC** **Roll No: .....**

Course : **B.Tech (Electrical and Electronics Engineering)**

Full Marks : **70** **Time** : **3 Hours.**

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PART – A

1. Multiple Choice Questions [12x1=12]

i) The curve showing the variation of load on the power station with respect to time is known as_____ .

a) Power curve b) Time curve

c) Load curve d) Potential curve

ii) The greatest demand of load on power Power station during a given period is called _____

a) Half demand b) Partial demand

c) Connected demand d) Maximum demand

iii) The ratio of maximum demand of the power station to its connected load is called_____

a) Maximum factor b) Load factor

c) Demand factor d) Average load

iv) The ratio of average load to the maximum demand during a given period is known as_____.

a) Demand factor
b) Power factor
c) Load factor
d) None of the above

v) The maximum demand on a power station is 100 MW. If the annual load factor is 40 %, calculate the total energy generated in a year.

a) 3020×10^3 kWh
b) 2020×10^3 kWh
c) 3504×10^5 kWh
d) 2020×10^3 kWh

vi) The term used for describe the total amount of generation available is known as _____

a) Potential reserve
b) Load reserve
c) Spinning reserve
d) none of the mentioned

vii) The automatic load frequency control is to control the frequency deviation by maintaining the_____ balance in the system

a) Reactive power
b) real power
c) apparent power
d) Voltage

viii) AGC means _____

a) Automation generation control
b) Automatic generation control
c) Auto generation control
d) None of these

ix) _____ is a combination of net interchange error and frequency

a) Area error
b) Area control error
b)Net error
d)Total error

x) Speed governor senses the_____.

a) Change in voltage
b) change in current
c) change in power
d) change in speed

xi) _____distributes the load among the units such that fuel cost is minimum.

a) economic dispatch control
b) Load dispatch control
c) current dispatch control
d) power dispatch control

xii) SCADA means?

a) upervisor calculation and data account
b) Supervision control and data acknowledgment
c) Supervisory control and data acquisition
d) None of the above

PART - B

Answer any FOUR out of SIX [4x7=28]

2. A generating station has a connected load of 43 MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate the demand factor and load factor.
3. Draw and explain briefly about speed governing mechanism.
4. Write short notes on shunt compensator.
5. Draw and explain briefly about block diagram of automatic load frequency control loop.
6. Describe briefly about ideal series compensator device.
7. Explain briefly about energy management system with neat block diagram.

PART - C

Answer any TWO out of FOUR [2x15=30]

8. Consider two units of a plant that have fuel costs of

$$f_1 = \frac{0.8}{2}P_1^2 + 10P_1 + 25Rs/h$$

$$f_2 = \frac{0.7}{2}P_2^2 + 6P_2 + 20Rs/h$$

If these two units together supply a total of 220 Mw, then calculate the cost of generation.

9. Deduce the expression of transmission loss formula
10. Describe briefly about dynamic response of single area load frequency control.
11. Explain briefly about the communication technologies used for SCADA system.

1015

ARKAJAIN University
Jharkhand

8th Semester End Term Examination: May, 2023

Subject : **Automobile Engineering** **Roll No: .....**

Course : **B.Tech (Mechanical Engineering)**

Full Marks : **70** **Time** : **3 Hours.**

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PART – A

Multiple Choice Questions [12x1=12]

1. i) The instrument used to check specific gravity of acid in a battery is
   a) Hydrometer b) Hygrometer
   c) Anemometer d) Multimeter
   ii) An imbalance wheel during vehicle operation
   a) Makes large noise when its heavy point hits the road surface
   b) Deflects in the vehicle's longitudinal direction
   c) Bounces vertically or deflects from side to side (as seen from front or rear)
   d) Creates a standing wave
   iii) Caster is a
   a) Forward tilt of the kingpin b) Backward tilt of the kingpin
   c) Either 'A' or 'B' d) None of these
   iv) The compression ratio for Diesel engines usually lies in the range of
   a) 6-10 b) 10-15
   c) 15-25 d) 25-40
   v) The natural gas is compressed in a CNG cylinder at a pressure of
   a) 200 bar b) 220 bar
   c) 250 bar d) 300 bar

vi) The firing order for an opposed four-cylinder I.C. engine is

a) 1-2-3-4 b) 1-3-4-2

c) 1-4-3-2 d) 1-3-2-4

vii) The correct way to rectify an imbalanced wheel is to

a) Adjust the tyre pressure

b) Rotate the tyres

c) Adjust the damper spring tension

d) Attach appropriate weights to the wheel at appropriate positions

viii) Two general types of tyres are

a) Tube type and tubeless b) Solid and tubeless

c) Air and pneumatic d) Split rim and drop centre

ix) The basic purpose of providing caster angle on wheels is to

a) Prevent uneven tyre wear

b) Maintain directional control

c) Bring the road contact of the tyre under the point of load

d) Compensate for wear in the steering linkage

x) The coefficient of friction for the clutch facing is approximately

a) 0.1 b) 0.4

c) 0.8 d) 1.2

xi) If a tyre is designated as 175/65 R-14 82-S, then the aspect ratio for the tyre is

a) 175 b) 65

c) 14 d) 82

xii) The basic characteristics of a brake fluid is

a) A high boiling point

b) Low viscosity

c) Compatibility with rubber and metal parts

d) All of these

PART - B

Answer any FOUR out of SIX [4x7=28]

2. Describe CRDI system in detail.
3. Write a short note on electronic control unit.
4. Explain the single plate clutch with neat sketch.
5. Explain the purpose and working of differential unit.
6. Write short note on ABS and Traction control.
7. Briefly explain the different layouts of vehicle construction

PART - C

Answer any TWO out of FOUR [2x15=30]

8. Why differential is used in automobile? Explain working of differential.
9. Differentiate between BoF vs UNI body construction of a Vehicle. Explain integral and semi-integral type vehicle body construction.
10. Sketch and explain various steering geometries. What is the necessity of a steering gear box?
11. Explain the concept of hybrid and CNG vehicles with neat sketch.

1015

ARKAJAIN University
Jharkhand

8th Semester End Term Examination, 2023.

Subject : **Bridge Engineering** **Roll No: .....**

Course : **BTECH (CIVIL ENGINEERING)**

Full Marks : **70** **Time: 3 Hours.**

Instructions to the Candidates:

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PART – A

Multiple Choice Questions **[12x1=12]**

1.(i) Who is considered the "father of modern bridge engineering"?

a) Leonardo da Vinci b) Gustave Eiffel
c) Isambard Kingdom Brunel d) John Roebling

(ii) Which of the following ancient civilizations is known for building sophisticated bridges?

a) Ancient Rome b) Ancient Greece
c) Ancient Egypt d) Ancient China

(iii) What was the first material used for building bridges?

a) Stone b) Wood
c) Steel d) Concrete)

(iv) The component of a bridge that distributes weight from the deck to the piers is called

a) Truss b) Deck
c) Beam d) Arch

(v).The component of a bridge that spans the gap between two piers or abutments is called a:

a) Beam b) Deck
c) Girder d) Beam

(vi).The main function of a bridge pier is to:

a) Provide support for the bridge deck b) Anchor the bridge to the ground
c) Absorb vibration from passing vehicles d) None of the above

(vii).What is the most common type of bridge?

a) Beam bridge b) Arch bridge
c) Suspension bridge d) Cable-stayed bridge

(viii). Which bridge is best suited for large spans?

a) Beam bridge b) Arch bridge
c) Suspension bridge d) Cable-stayed bridge

(ix).Which bridge type is known for its aesthetically pleasing design?

a) Beam bridge b) Arch bridge
c) Suspension bridge d) Cable-stayed bridge

(x). Which bridge type is used for crossing water bodies that have a shipping channel?

a) Beam bridge b) Arch bridge
c) Suspension bridge d) Drawbridge

(xi). Which bridge type is commonly used for railway crossings?

a) Beam bridge b) Arch bridge
c) Suspension bridge d) Truss bridge

(xii).What is the main factor to consider when selecting a bridge site in a seismic zone?

a) Soil type b) Bridge length
c) Bridge height d) Foundation type

PART - B

Answer any FOUR out of SIX **[4x7=28]**

2. Define bridge and explain its components with neat sketch diagram.

3. Explain classification of bridge and what factors it depends.

4. Define the following terms

i) Waterway ii) Afflux
iii) Approaches in bridge iv) Economic span v) Cause way

5. What special consideration should merit attention of bridge engineer for selecting bridge site fixing waterway, size of opening and clearance above HFL

6. List the characteristics of an ideal bridge site and also explain 3Es.

7. Explain Skew alignment and discuss disadvantages that skew Alignment suffer.

PART - C

Answer any TWO out of FOUR **[2x15=30]**

8. What is the essential information required to collected for the design of bridge? Discus briefly the characteristics of an ideal site for bridge.

9. Discuss the Various important consideration for selection of suitable site for a bridge.

10. Explain the Economic Benefits of Bridge facility, also explain bridge facility studies.

11.What do you understand by Bridge alignment Explain its Type.

15/5
(2)

ARKAJAIN University
Jharkhand

8th Semester End Term Examination May- 2023.

Subject : SOFT COMPUTING **Roll No: .....**

Course : B. Tech (CSE)

Full Marks : 70 **Time : 3 Hours.**

Instructions to the Candidates:

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PART – A

Multiple Choice Questions [12x1=12]

1. (i) Fuzzy logic is a form of

a) two valued logic
b) crisp set logic
c) many value logic
d)binary set logic

(ii)Who initiated the idea of Soft Computing?

a)charles darwin
b) rich and berg
c) mc culloch
d) lofti a zadeh

(iii) Artificial Neural Network is used for

a) pattern recognition
b) classification
c) clustering
d)all of the above

(iv)Core of Soft computing

a) fuzzy computing, neural computing, genetic algorithm
b) fuzzy network and artificial intelligence
c) neural science.
d) genetic science

(v) What does a 0 membership value denote in a set

a) the object is fully inside the set
b)the object is not in the set
c)the object is partially present in the set
d) none of the above

(vi)Genetic Algorithm belongs to which area of computing?

a) artifical intelligence area
b) non computer based isolation area
c) complete enumeration family of methods
d) None of these

(vii)Which of the following is/are Fuzzy inference method

a) mamdani
b) rivest
c) only a and b
d)None of these

(viii) The intersection of two fuzzy set is the_____ of each elements from two sets.

a) maximum
b) minimum
c) equal to
d) not equal to

(ix)The union of two fuzzy set is the_____ of each elements from two sets.

a) maximum
b) minimum
c) equal to
d) not equal to

(x) Which are parameters that affects Genetic Algorithm

a) initial population
b) selection process
c) fitness function
d) all of these

(xi) A={1/a,0.3/b,0.2/c,0.8/d,0/e} what is complement of A?

a){0/a,0.7/b,0.8/c,0.2/d,1/e}
b) {0/a,0.9/b,0.7/c,0.2/d,1/e}
c) {0.8/a,0.7/b,0.8/c,0.7/d,1/e}
d) {0/a,0.7/b,0.8/c,0.9/d,1/e}

(xii) Choromosomes are_____

a) line representation.
b) string representation
c) circular representation
d) all of these

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Compare supervised and unsupervised learning approaches in ANN.

3. What are the important characteristics of soft computing?

4. Write three application scope of the Neural Network.

5. Write Mamdani Larsen Rule for fuzzy Interpretation.

6. Define Computing, Soft Computing and Hard Computing.. What are the important characteristics of soft computing?

7. Define Core ,crossover-point of a fuzzy set..

PART – C

Answer any TWO out of FOUR [2x15=30]

8.(a) Describe the features of membership function. [7]

(b) Compare feed forward and feedback networks. [8]

9. What is Back propagation ? Explain with example. [15]

10. (a) Compare and contrast traditional algorithm and genetic algorithm. [8]

(b) Explain various types of crossover techniques. [7]

11. (a)Write a short note on : Genetic Algoritm. [10]

(b) What is a Mutation and why is it programmed into the algorithm? [5]

1515

ARKAJAIN University
Jharkhand

8th Semester End Term Examination: May, 2023.

Subject : VLSI System Design **Roll No:** .....

Course : B.Tech (Electrical and Electronics Engineering)

Full Marks : 70 **Time** : 3 Hours.

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PART – A

1. Multiple Choice Questions [12x1=12]

i) VLSI technology uses _____ to form integrated circuit.
   a) transistors b) switches
   c) diodes d) buffers

ii) P-well is created on _____
   a) p substrate b) n substrate
   c) p & n substrate d) none of the mentioned

iii) The scaling factor of gate area in constant voltage model is:
   a) $1/\alpha^2$ b) $1/\beta^2$
   c) 1 d) All of the mentioned

iv) CMOS inverter has _____ regions of operation.
   a) three b) four
   c) two d) five

v) The scaling factor for the supply voltage VDD is:

a) 1 b) 0

c) $1/\alpha$ d) $1/\beta$

vi) n-well is created on _____

a) p substrate b) n substrate

c) p & n substrate d) none of the mentioned

vii) Stick diagrams are those which convey layer information through?

a) thickness b) color

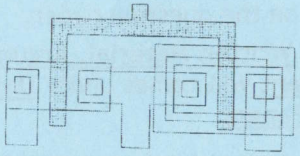
c) shapes d) layers

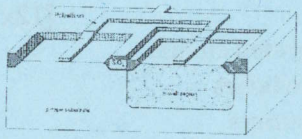
viii) Silicon oxide is patterned on a substrate using _____

a) Physical lithography b) Photolithography

c) Chemical lithography d) Mechanical lithography

ix) Which process is involved in growing the shaded region?





a) Chemical vapor deposition (CVD) b) Sputtering and patterned by etching

c) Chemical vapor deposition (CVD) and patterned by HF acid etching d) Chemical vapor deposition (CVD) and patterned by dry (plasma) etching

x) _____ architecture is used to design VLSI.

a) system on a device b) single open circuit

c) system on a chip d) system on a circuit

xi) Which is the high level representation of VLSI design?

a) problem statement b) logic design

c) HDL program d) functional design

xii) Which type of MOSFET exhibit no current at zero gate voltage?

a) Depletion MOSFET b) Enhancement MOSFET

b) Both a and b d) None of the above

PART – B

Answer any FOUR out of SIX [4x7=28]

2. What is scaling of a MOS? Discuss the parameters used for scaling.
3. Why surface inversion is an essential condition for MOS operation?
4. Explain the condition of channel shortening in a MOSFET.
5. Discuss in detail the concept of floor planning and its various constraint.
6. Draw and explain the layout for CMOS 2-input NAND gate.
7. Explain any two of the following:
   a. Pseudo NMOS
   b. Domino CMOS Logic
   c. Dynamic CMOS Logic

PART – C

Answer any TWO out of FOUR [2x15=30]

8. Describe in details the steps involved in the fabrication of CMOS.
9. Design a resistive load inverter and discuss the VTC curve for the same.
10. Derive an expression for drain current in n-channel MOSFET for saturation mode operation.
11. Draw the circuit diagram; stick diagram and layout for CMOS inverter.

Activities		Time in weeks		
i	j	t_o	t_l	t_p
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

a) Draw the network
b) Calculate the expected variances for each
c) Find the expected project completed time
d) Calculate the probability that the project will be completed at least 3 weeks than expected
e) If the project due date is 18 weeks, what is the probability of not meeting the due date?

11. Maximize $Z=5X_1-4X_2+3X_3$

Subject to

$$2X_1+X_2-6X_3= 20$$
$$6X_1+5X_2+10X_3 \leq 76$$
$$8X_1-3X_2+6X_3 \leq 50$$
$$X_1, X_2, X_3 \geq 0$$

Solve by Simplex method.

ARKAJAIN University
Jharkhand

8Th Semester End Term Examination: May, 2023.

Subject : Operation Research **Roll No:** .....
Course : B.Tech -ME
Full Marks : 70 **Time** : 3 Hours.

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PART – A

Multiple Choice Questions [12x1=12]

1. i) The optimum level of inventory is popularly referred to as the .....
   a) Minimum stock level b) Re-order stock level
   c) Economic Order Quantity d) None
   ii) _____ is a mathematical technique used to solve the problem of allocating limited resource among the competing activities
   a) Linear Programming problem b) Assignment Problem
   c) Replacement Problem d) Nonlinear Programming Problem
   iii) _____are entities whose value is determined from the solution of LPP
   a) Objective function b) Decision variable
   c) Constraints d) Opportunity cost
   iv) The shortest time in the PERT is called _____time
   a) Expected b) Pessimistic
   c) Optimistic d) Most likely
   v) _____ or _____ are used to "balance" an assignment or transportation problem.
   a) Destinations; sources b) Units supplied; units demanded
   c) Dummy rows; dummy columns d) Large cost coefficients; small cost coefficients

vi) Operations Research approach is _____.

a) Multi-disciplinary b) Scientific
c) Intuitive d) Collect essential data

vii) The objective of network analysis is to_____.

a) Minimize total project duration
b) Minimize total project cost
c) Minimize production delays, interruption and conflicts
d) Maximize total project duration

viii) Which of the following is not an inventory?

a) Machines a) Raw material
b) Finished products c) Consumable tools

ix) In a Linear Programming Problem function to be maximized or minimized are called _____.

a) Constraints b) Objective function
c) Basic solution d) Feasible solution

x) Inventory carrying costs consists of ___ and ___.

a) Shipping cost, storage cost
b) Handling cost, storage space cost
c) Vendor cost, physical management cost
d) Storage cost, physical management cost

xi) The solution to a transportation problem with m-sources and n-destinations is feasible if the numbers of allocations are _____.

a) m+n b) mn
c) m-n d) m+n-1

xii) The total time required to complete all the jobs in a job sequence problem is known as _____

a) Processing order b) Idle time
c) Processing time d) Elapsed time

PART – B

Answer any FOUR out of SIX [4x7=28]

2. Explain the steps in PERT method and also write the formula in calculating project variance and estimated time.
3. What are costs that are involved in carrying inventory? Explain them in detail.
4. What is sequencing problem? Explain the following terms in context of sequence problems: i) Total elapsed time and Idle time ii) no passing rule iii) processing order.
5. A machine operator has to perform two operations, turning and threading, on a number of different jobs. The time required to perform these operations in minutes for each job is given. Determine the order in which the jobs should be processed in order to minimize the total time required to turn out all the jobs

Jobs:	1	2	3	4	5	6
Time for turning (in min.)	3	12	5	2	9	11
Time for threading (in min).	8	10	9	6	3	1

6. A producer has to supply 12,000 units of a product per year to his customer. The demand is fixed and known and backlogs are not allowed. The inventory holding cost is Rs.0.20 per unit per month and the set up cost per run is Rs. 350/- per run. Determine (a) the optimal lot size, (b) Optimum scheduling period, (c) Minimum total expected yearly cost.
7. Listed in the table are the activities and sequencing requirements necessary for completing the research project. Find the critical path.

Activity	A	B	C	D	E	F	G	H	I	J	K	L	M
Duration	4	2	1	12	14	2	3	2	4	3	4	2	2
Immediate Predecessor	E	A	B	K	-	E	F	F	F	I,L	C,G,H	D	I,L

PART – C

Answer any TWO out of FOUR [2x15=30]

8. There are 5 jobs each of which is to be processed on three machines A, B, and C in the order ACB. The time required to process in hours is given in the matrix below. Find the optimal sequence, time elapsed and the idle time.

Job:	1	2	3	4	5
Machine A:	3	8	7	5	4
Machine B:	7	9	5	6	10
Machine C:	4	5	1	2	3

9. The matrix given below shows the time required to shift a load from origins to destinations. Formulate a least time schedule. Time given in hours. Solve by north-west corner method

		Destinations (Time in hours)				
		D_1	D_2	D_3	D_4	Avail
Origin	O_1	7	8	4	5	5
	O_2	8	10	2	3	7
	O_3	7	6	17	8	8
	O_4	19	10	11	3	10
	Req	10	5	10	5	

10. A small project is composed of 7 activities whose time estimates are listed below. Activities are being identified by their beginning (i) and ending (j) node numbers.

PART – C

Answer any TWO out of FOUR [2x15=30]

10. Evaluate $\int_0^6 \frac{dx}{1+x} dx$ by using
i) Trapezoidal rule
ii) Simson's 1/3 rule
iii) Simson's 3/8 rule
iv) Widdle's rule and compare the result with actual value.

8. Evaluate the inverse of the matrix

1	1	3
1	3	-3
-2	-4	-4

9. Find the cubic polynomial which takes the following

Values x	0	1	2	3
F(x)	1	2	1	10

Hence evaluate f(4) using newton's formula.

11.Find the polynomial f(x) by using Lagrange's formula and hence find f(3)
For

X:	0	1	2	5
F(x):	2	3	12	147

ARKAJAIN University
Jharkhand

8th Semester End Term Examination, 2023.

Subject	**: ANMCE**	**Roll No:**
Course	**: BTECH(CIVIL)**	
Full Marks	**: 70**	**Time:3 Hours.**

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PART – A

Multiple Choice Questions [12x1=12]

1(i)What is the formula for the Newton forward difference method of numerical interpolation?
a). $f(x0+h) = f(x0) + hf'(x0) + h^2/2\, f''(x0) + h^3/6\, f'''(x0) + ...$
b). $f(x0) = f(x0+h) + hf'(x0) + h^2/2\, f''(x0) + h^3/6\, f'''(x0) + ...$
c). $f(x0+h) = f(x0) + hf(x0) + h^2/2\, f(x0) + h^3/6\, f(x0) + ...$
d). $f(x0)=f(x0+h)+hf(x0)+h^2/2f(x0)+h^3/6f(x0) +$

(ii) Which of the following statements about the Newton-Raphson method is true?
a) It can only be used to find the roots of linear functions.
b) It is an iterative method that uses tangent lines to approach the root of a function.
c) It is a direct method that solves for the root of a function in a single step.
d) It requires the function to be continuous but not necessarily differentiable.

(iii) What is the Taylor series of the function f(x) = ln(x) about x = 1?
a) ln(x) = (x - 1) - (x - 1)^2/2 + (x - 1)^3/3 - .
b) ln(x) = (x - 1) + (x - 1)^2/2 - (x - 1)^3/3 + ...
c) ln(x) = (x + 1) - (x + 1)^2/2 + (x + 1)^3/3 - ...
d) ln(x) = (x + 1) + (x + 1)^2/2 - (x + 1)^3/3 + ...

(iv)What is the Taylor series for the function f(x) = Cos(x) about x = 0?
a) $\cos(x) = 1 + x + x^2/2 - x^3/6 - ...$
b) $\cos(x) = 1 - x/2 + x^4/24 - ...$
c) cos(x) = x - x^3/6 + $x^5/120$ - ...
d) $\cos(x) = x + x^3/3 - x^5/10 + ...$

(v). Which of the following is a condition for applying the Trapezoidal rule?
a) The function must be continuous on the interval of integration.
b) The function must be differentiable on the interval of integration.
c) The function must have a unique root on the interval of integration.
d.The function must be periodic on the interval of integration.

(vi).Which of the following is a disadvantage of the Trapezoidal rule compared to other numerical integration methods?
a). It requires fewer function evaluations.
b). It is more accurate for smooth functions.
c). It is less prone to rounding errors.
d). It has a lower convergence rate.

(vii).What is the Newton's Raphson method used for?
a). Solving ordinary differential equations
b). Finding roots of non-linear equations
c). Numerical integration
d). Interpolating data points

(viii).Which of the following is true about Newton's Backward Interpolation?
a) It requires equally spaced x-values.
b) It involves finding the polynomial that passes through a given set of data points.
c) It is a method for approximating the value of a function at an intermediate point.
d) It is a method for approximating the value of a function at the endpoint of a given interval.

(ix).Which of the following is true about Lagrange's Interpolation Formula?
a) It requires equally spaced x-values.
b) It involves finding the polynomial that passes through a given set of data points.
c) It is a method for approximating the value of a function at an intermediate point.
d) It is a method for approximating the value of a function at the endpoint of a given interval ction at the endpoint of a given interval.

(x) Which of the following is true about finding the inverse of a matrix?
a) A matrix is invertible if and only if its determinant is zero.
b) The inverse of a matrix is unique.
c) The inverse of a matrix always exists.
d) The inverse of a matrix can be found using Gaussian Elimination.

(xi). Which of the following is true about the rank of a matrix?
a) The rank of a matrix is always less than or equal to its number of columns.
b) The rank of a matrix is always less than or equal to its number of rows.
c) The rank of a matrix is equal to the number of non-zero rows in its row echelon form.
d) The rank of a matrix is equal to the number of non-zero columns in its reduced row echelon form.

(xii).Which of the following is type of errors
a) Inherent Errors b) Rounding errors
c) Truncation Errors d) Absolute Relative and percentage errors

a) i only b) i and ii c) i ii and iii d) all of these

PART - B

Answer any FOUR out of SIX [4x7=28]

2. Determine the rank of matrices using following 3x3
Matrices with elements
1, 2, 3
1, 4, 2
2, 6, 5

3. Find the root of the equation by Newton-Raphson method,
f(x)=x 3 -3x+1 correct to 3 decimal places.

4. Solve y'=X+Y, Y(0)=1 by Taylors series method. Hence
Find the value of y at x=0.2 and 0.4

5. From the following table, Estimate the number of students
Who obtained marks between 40 and 45

Marks:	30-40	40-50	50-60	60-70	70-80
No. of Students :	31	42	51	35	31

Using Newton's formulas

6. The function e x solved by Newton's Raphson method initial
value Xo=1.0 the absolute error at second iteration

7. Apply Cramer's Rule to solve the equations 3x+y+2z=3, 2x-3y-z=-3, x+2y+z=4