# FACULTY OF ENGINEERING
### B.E. 4/4 (Civil) II – Semester (Main) Examination, May / June 2015
### Subject: Groundwater Hydrology (Elective – III)

**Time: 3 Hours**          **Max.Marks: 75**

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

## PART – A (25 Marks)

1  Define Permeability and Storage Coefficient.    2
2  Explain, types of aquifers and clearly distinguish them.    2
3  Discuss with sketches the Image Well theory.    2
4  Mention the factors governing artificial recharge of groundwater.    2
5  Explain the concept involved in Electrical Resistivity method.    2
6  Write about groundwater analog models.    3
7  Explain the chow's method of solution.    3
8  What is the nature of groundwater flow? State the law governing the flow with limitations if any.    3
9  Explain the concept of steady radial flow in leaky artesian aquifers.    3
10 Obtain Ghyben Herzberg relation for sea water.    3

## PART – B (5x10 = 50 Marks)

11 a) Explain the mechanism responsible for seawater intrusion.    4
    b) How do you prevent and control seawater intrusion.    6

12 From an alluvial basin having an area of 150 km$^2$ in a years time 140 Mm$^3$ of groundwater pumped, resulting in a drop of groundwater table by 7.5 m. Estimate the specific yield of the aquifer, if there is no replenishment, calculate the porosity of the soil, if specific retention is 9%.    10

13 A tube well in a coastal aquifer pumps at a rate of 4.7 m$^3$/min. An observation well located at 40 m recording the following drawdowns. Compute aquifer parameters by Chow method analysis.    10

14 a) With the aid of neat sketches, discuss in detail Electric Analog models and Sand models.    6
    b) Discuss briefly about Hydrologic balance equation.    4

15 a) Mention the various methods of surface investigations carried for groundwater. Describe seismic refraction method and magnetic methods.    6
    b) How do you interprete well log. Describe briefly.    4

16 a) State the objectives of model studies.    4
    b) Explain numerical analysis of models.    6

17 Write short notes on Two of the following:    10
    a) Partially penetrating wells
    b) Equation for steady flow with uniform recharge
    c) Conjunctive use of surface and groundwater.

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# FACULTY OF ENGINEERING

**B.E. 4/4 (Civil) II – Semester (Main) Examination, May / June 2015**

**Subject: Finite Element Methods (Elective – III)**

**Time: 3 Hours**                                      **Max.Marks: 75**

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

## PART – A (25 Marks)

1  Distinguish between the Rayleigh Ritz method and Galerkin method.          2
2  Derive the constitutive relation matrix D for a plane stress problem.          3
3  What is meant by iso-parametric formulation?          2
4  Derive the strain-displacement matrix B for a 1-D 2-node bar element.          3
5  Briefly explain about the volume coordinates.          2
6  A 2-D 3-node triangle element has coordinates in cm: 1 (2,2), 2 (5,4) and 3 (1,6). Evaluate the shape functions N at an interior point P (3,4).          3
7  Write the element stiffness matrix k for a beam element.          2
8  Using one-point Gauss quadrature techniques, evaluate the integral $I=\int[2e^{x+}x^{3-} \cos x]\, dx$ from -1 to 1. Compare the results with exact solution.          3
9  Draw a master cube of 3-D tetrahedral element in local coordinate system and write the co-ordinate values.          2
10  Explain the uses of a Jacobian matrix $J$.          3

## PART – B (5x10 = 50 Marks)

11  For the 1-D 2-noded bar shown in Fig. 1, determine the nodal displacements, element stresses and reaction forces using the penalty approach.          10



Steel
$L$ = 200 mm        300 mm
$A$ = 1800 mm$^2$   600 mm$^2$
$E$ = 200 GPa       70 GPa
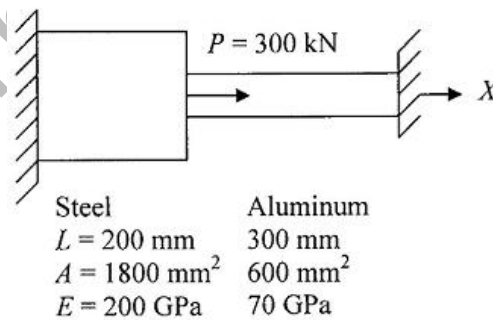
Fig. 1

12  Determine the nodal displacements Q, stresses in elements 2 and 3, and reaction force at node 2 using the elimination approach for 2-D truss shown in Fig. 2. Take A=1000 mm$^2$ and E=200 GPa for each member.          10
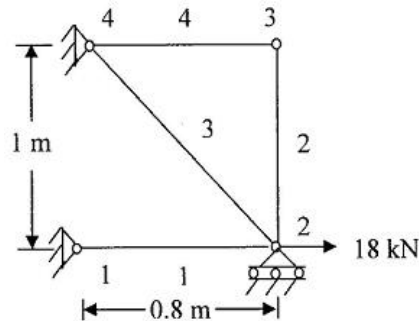


Fig. 2

..2

13 Derive the strain-displacement matrix B for a 2-D CST element. 10

14 The (x,y) coordinates of nodes of a 2-D 4-node quadrilateral element shown in Fig. 3 in cm are: 1 (1, 1), 2 (5, 1), 3 (6, 6) and 4 (1, 4). The element displacement vector $q = [0, 0, 0.20, 0, 0.15, 0.10, 0, 0.05]^T$. Find (i) the x, y coordinates of a point $P$ whose location in the master element is given by $\xi = 0.5$ and $\eta = 0.5$ and (ii) the u, $v$ displacements of the point $P$. 10
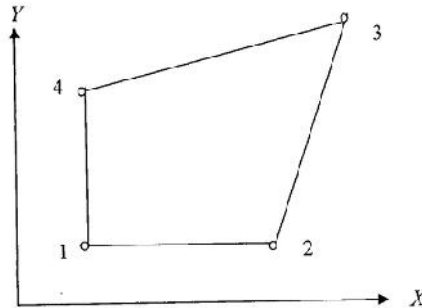


Fig. 3

15 Derive the strain-displacement matrix B for an axi-symmetric element. 10

16 For the beam shown in Fig. 4, determine the slopes at 1 and 2 and the vertical displacement at the midpoint of the concentrated load. Take $E$ = 200 GPa and $I = 6 \times 10^6$ mm$^4$ for both members. 10



Fig. 4

17 Write notes on any three of the following: (10)

   a) Iso-parametric, sub-parametric and super-parametric elements

   b) convergence criteria for selection of displacement model

   c) Plane stress and plane strain analysis with examples

   d) Rayleigh-Ritz method.

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# FACULTY OF ENGINEERING

**B.E. 4/4 (Civil / ECE / CSE) II – Semester (Main) Examination, May / June 2015**

**Subject: Intellectual Property Rights (Elective – III)**

Time: 3 Hours                                                                                    Max. Marks: 75
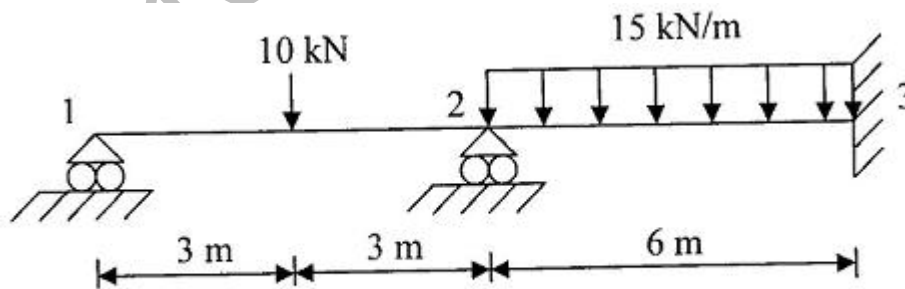
*Note: Answer all questions from Part A. Answer any five questions from Part B.*

## PART – A (25 Marks)

**I.   Multiple Choice:**                                                                         (3x1=3)

1   An invention is protected by means of                                               (      )

   a) Copyright        b) Patent        c) Trademark        d) Geographical Indication

2   Which of the following IPRs is compulsorily registrable?                          (      )

   a) Copyright        b) Trademark    c) Industrial Design    d) Traditional knowledge

3   Complete specification of an invention has to be filed within _____ months from the date of filing the patent application.                                             (      )

   a) 6 Months        b) 12 months    c) 24 months    d) 48 months

**II   Fill in the Blanks:**                                                                       (3x1=3)

1   A Trademark if registered is initially protected for a period of _____ years

2   A Geographical indication of goods registered from Andhra Pradesh is _____

3   The term of patent of addition is _____ with the term of the main patent.

**III   True or False:**                                                                          (3x1=3)

1   All the forms of intellectual property are compulsorily registrable.              (T/F)

2   A patent once registered can be kept in private domain forever.                  (T/F)

3   Well-known trademarks are recognized and protected under the trademark law of India                                                                                (T/F)

**IV   Match the following:**                                                                    (3x1=3)

1   Basmati                            a) Well-known trademark

2   Tata                               b) Copyright protection

3   Computer programs                  c) Design protection

                                       d) Geographical indication

                                       e) Layout designs

**V  Problem based questions:**                                           **(3x1=3)**

1  A Non-Governmental Organization (NGO) working for the welfare of disabled welfare seeks compulsory licensing of a copyrighted literary work. Can it be given?

2  A farmer comes out with a new farmer's variety of rice. Can it be protected?

4  An Indian Shoe-manufacturer uses the trademark 'Nike-India' without any understanding with Nike Company. Has it infringed any IPR?

**VI  Short notes:**                                                      **(5x2=10)**

1  Industrial property

2  Product patent

3  Database right

4  Patent of Addition

5  Broadcast Reproduction Right

## PART – B (5x10 = 50 Marks)

1  Explain the meaning, nature and classification of Intellectual Property.

2  Discuss the role of World Intellectual Property Organization (WIPO) in promotion and protection of IPRs.

3  Explain the patentable subject matter and the essential conditions for patenting it.

4  Define an Industrial Design. Explain the rights of design holders.

5  Discuss the classification of trademarks. Also explain their functional value.

6  Explain Assignment of Copyright in India.

7  Explain the procedure to obtain patent in India.

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# FACULTY OF ENGINEERING

### B.E. 4/4 (Civil) II – Semester (Main) Examination, May / June 2015

### Subject: Infrastructure Engineering (Elective – III)

**Time: 3 Hours**          **Max.Marks: 75**

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

### PART – A (25 Marks)

| | |
|---|---|
| 1  State the significance of infrastructure. | 3 |
| 2  List out the players in the field of infrastructure. | 2 |
| 3  Explain the "Concept of life cycle". | 3 |
| 4  State the infrastructure needs of rail transportation. | 3 |
| 5  Mention the challenges in Infrastructure privatization. | 3 |
| 6  Specify various methods of power generation. | 2 |
| 7  What are the risks associated with Infrastructure projects? | 2 |
| 8  State some prestigious road transportation Infrastructure in India. | 2 |
| 9  Distinguish between BOOT and PPP projects. | 3 |
| 10 Mention the strategies for successful implementation of Infrastructure projects. | 2 |

### PART – B (5x10 = 50 Marks)

11 a) Describe the significance of "Special Economic Zones" (SEZs).    5
    b) Present an overview of Infrastructure projects in power sector.    5

12 a) Narrate the consequences lead to Infrastructure privatization.    5
    b) Mention the possible problems with Infrastructure privatization.    5

13 a) State the Indian Government regulations of Telecommunication Sector.    5
    b) Discuss on Environmental laws and regulations.    5

14 a) Write about mapping and facing the landscape.    5
    b) Discuss a case study for the implementation of an Infrastructure project.    5

15 a) Mention the attributes and parameters for Environmental Impact Assessment of infrastructure projects.    5
    b) Describe the considerations involved in land and water interrelationships.    5

16 a) Explain the risk management framework for Infrastructure projects.    5
    b) Describe the strategies for shaping the planning phase of infrastructure projects.    5

17 Write short notes on any four of the following:
    a) Issues in Telecom Sector
    b) Feasibility Report
    c) Benefits of Infrastructure privatization
    d) Contractual issues in Infrastructure
    e) Socio-Environmental Risks
    f) BOT Projects

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# FACULTY OF ENGINEERING

### B.E. 4/4 (Civil) II – Semester (Main) Examination, May / June 2015

### Subject: Information Security (Elective – III)

Time: 3 Hours                                                              Max.Marks: 75

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

### PART – A (25 Marks)

| | | |
|---|---|---|
| 1 | What is CIA Triangle? | 2 |
| 2 | List out the critical characteristics of Information | 3 |
| 3 | Define Risk Management. What are its components? | 3 |
| 4 | Differentiate between Law and Policy. | 2 |
| 5 | What are the various spheres of security? | 3 |
| 6 | Define Virtual Private Network. | 2 |
| 7 | Explain Symmetric Encryption with a figure. | 3 |
| 8 | What is a Digital Signature? | 2 |
| 9 | List three major steps in executing the project plan. | 3 |
| 10 | Define Digital Forensics. | 2 |

### PART – B (5x10 = 50 Marks)

11 a) Differentiate between a threat and an attack                           3
   b) Explain SecSDLC in detail.                                             7

12 Explain the process of Risk Identification.                              10

13 a)  Explain Security Design Architecture.                                5
   b) Discuss how VPN's are used in protection of remote connections.       5

14 Explain Firewall categorization based on processing modes.              10

15 With a diagram, explain Asymmetric Encryption in detail using an example.  10

16. Discuss Information Security project management.                        10

17 Write short notes on the following:

   a) Timing Attack                                                         3
   b) Vernam Cipher                                                         3
   c) Public Key Infrastructure                                            4

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# FACULTY OF ENGINEERING

### B.E. 4/4 (EEE/Inst.) II - Semester (Main) Examination, May / June 2015

### Subject : Renewable Energy Sources  (Elective – III)

**Time : 3 Hours**  **Max. Marks: 75**

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A (25 Marks)

1  Discuss briefly about the limitations of renewable energy sources. (2)
2  What are the prospects of non-conventional energy sources in India? (3)
3  Define the following terms: (3)
   (a) Solar Attitude angle
   (b) Zenith angle
   (c) Declination angle
4  Distinguish between Flat plate and concentrating collectors. (2)
5  Define the terms Lift and Drag with reference to wind energy conversion. (2)
6  Derive the expression for power developed due to wind. (3)
7  Give principle of tapping geothermal energy. (2)
8  How are Gasifiers classified? What is Pyrolysis? (3)
9  Distinguish between tidal and wave power generation. (2)
10 Discuss briefly the impact of OTEC on environment. (3)

## PART – B (50 Marks)

11  Describe the conventional and non-conventional energy sources with reference
to Indian context. Highlight their merits and demerits. (10)

12 (a) Explain the working of a Paraboloidal type of solar collector. (5)
   (b) Discuss the working principle of Brayton engine. (5)

13  What is the principle of solar photovoltaic power generation? Explain the main
elements of a PV system with the help of a block diagram? Mention the advantages
and disadvantages of photovoltaic solar energy conversion. (10)

14 (a) Compare VAWTs and HAWTs. (3)
   (b) From first principles, develop equation for maximum power generation by wind
power and show that maximum power $P_{max}$ is 0.595 of $P_{total}$. 7)

15 (a) Explain the binary cycle system for liquid dominated hydrothermal convective
system. (5)
   (b) Explain the usage of biogas for chullas and various types of chullas for rural
energy needs. (5)

16 (a) Explain with the help of a neat diagram, the principle of closed cycle OTEC
systems. (5)
   (b) Discuss the principle of operation of wave power generation. (5)

17  Write short notes on the following:
   (a) Induction Generator (3)
   (b) Wind power plant (4)
   (c) Fixed dome type Biogas plant (3)

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# FACULTY OF ENGINEERING

### B.E. 4/4 (EEE) II - Semester (Main) Examination, May / June 2015

### Subject : Electronic Instrumentation Systems  (Elective – III)

Time : 3 Hours                                                                 Max. Marks: 75

***Note: Answer all questions of Part - A and answer any five questions from Part-B.***

## PART – A (25 Marks)

1   Differentiate Active and Passive Transducers.                                  (2)
2   Mention the characteristics of Instrumentation amplifiers.                      (3)
3   Write the principle of 'Dual slope ADC'.                                        (3)
4   Write the important specification of DACs and ADCs.                             (2)
5   Draw a current to voltage converter circuit.                                    (2)
6   Write the principle of 'True RMS' meter.                                         (3)
7   Explain the principle of Harmonic distortion Analyzers.                          (3)
8   Write the features of IEEE 488 electric interface.                              (3)
9   Explain the importance of 'Time Base" generator in a CRO.                        (2)
10  Explain the basic principle of "Magnetic Records".                              (2)

## PART – B (50 Marks)

11 (a) Draw the circuit of an instrumentation amplifier using opamp, explain the working
        and derive the expression for output.                                       (7)
   (b) A 5 – bit R – 2R  ladder network with reference voltage of 10V. Find:         (3)
        (i)  Full scale output voltage
        (ii) Analog output due to LSB change
        (iii) Analog output for digital input 11001

12 (a) Explain the working of dual slope type digital voltmeter, with the help of a neat
        diagram.                                                                    (7)
   (b) A 4 ½ voltmeter is used for voltage measurements.                            (3)
        (i)  Find its resolution
        (ii) How would 12.98 V be displayed on a 10V range
        (iii) How would 0.6973 V be displayed on 1V range

13 (a) Explain the working of spectrum analyzer with neat diagram.                   (7)
   (b) Mention the differences between wave analyzer and spectrum analyzer.          (3)

14     With suitable diagrams explain the following:
   (a) Direct synthesis type frequency synthesizer                                  (6)
   (b) Synthesized signal generator interface with IEEE 488 bus                     (4)

15 (a) Explain the operation of vertical amplifier used in CRO with the help of block
        diagram.                                                                    (6)
   (b) Explain the basic operation of a digital storage oscilloscope.               (4)

16 (a) Explain flash ADC with suitable diagram and example.                          (7)
   (b) Explain the specifications of microprocessor compatible ADCs.                 (3)

17     Write short notes on the following:
   (a) Radio receiver instruments                                                   (3)
   (b) Programmable instruments                                                     (3)
   (c) Automatic instrumentation                                                    (4)

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# FACULTY OF ENGINEERING

### B.E. 4/4 (EEE) II - Semester (Main) Examination, May / June 2015

### Subject : Transducers (Elective – III)

Time : 3 Hours                                                             Max. Marks: 75

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A (25 Marks)

1  Define : (a) Accuracy   (b) Precision                                      (2)
2  Define dynamic characteristics of measurement system.                      (3)
3  Explain the sinusoidal Transfer function.                                  (2)
4  Give example of second order system.                                       (3)
5  What are the materials used for strain gauges?                             (2)
6  What are the basic requirements of Electrical Transducer?                  (3)
7  Give classification of Resistive type temperature Measuring Transducer.    (2)
8  Define Piezo Electric Transducer.                                          (3)
9  Mention the special features of Semiconductors Sensors.                    (3)
10 Explain the principle of Fibre Optic Sensor.                               (2)

## PART – B (50 Marks)

11    Draw the block diagram of Generalized Instrumentation System and explain in
      detail each stage. Also define Hysteresis and threshold with an example.     (10)

12    Derive the expression for time response of a Second order under damped system
      when subjected to a unit impulse input. Sketch the response characteristics.  (10)

13 (a) Define gauge for Factor. Derive the expression for Electrical strain gauge.   (5)
   (b) Write short notes on Wire gauges.                                             (5)

14 (a) Explain with a neat sketch the working principle of a Potentiometer.          (5)
   (b) List the limitations of Potentiometer.                                        (5)

15 (a) Discuss in detail the Semiconductor transducer.                               (5)
   (b) Explain the working of Electro-Optic sensor transducer.                       (5)

16    Write short notes on :                                                         (10)
      (a) Eddy Current Sensors     (b) Thermocouple

17 (a) Explain the principle of LVDT and RVDT.                                        (5)
   (b) Write short notes on Hall effect Sensors.                                      (5)

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# FACULTY OF ENGINEERING

### B.E. 4/4 (Inst.) II - Semester (Main) Examination, May / June 2015

### Subject : Robotics

### (Elective – III)

Time : 3 Hours            Max. Marks: 75

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A (25 Marks)

1  Distinguish between Accuracy and Repeatability of a Manipulator and specify the factors affecting them. (3)
2  Mention the specifications of a manipulator used in spray painting of Automobiles. (2)
3  If R represents a rotation of 45 deg about $y_0$ followed by a rotation of 60 deg about $z_1$. Find the equivalent axis / angle representation to represent R. Sketch the initial and final frames and the equivalent axis vector 'k'. (3)
4  For a 2 link RR planar manipulator, if the first link is twice the second link, sketch the reachable workspace if the joint range limits are given as (3)
   $0 < \theta_1 < 210^o$, $-60 < \theta_2 < 90^o$
5  What is meant by singularities of a manipulator and explain the effect of singularity on the kinematic and dynamic control of a manipulator. (3)
6  Differentiate between the Lagrange-Euler and Newton-Euler form of dynamic analysis of robot manipulator. (2)
7  Explain briefly what is meant by Computed torque control method. (2)
8  Enumerate the relative merits and demerits of joint space over Cartesian space trajectory planning of robots. (3)
9  Explain any one type of Proximity sensor with a neat sketch. (2)
10 A robotic vision system is used to aid the robot to pick red ripe apples from apple garden. The apple trees are assumed to be placed randomly in the garden, what information the vision system must acquire from the image to make the robot work intelligently. (2)

## PART – B (50 Marks)

11 (a) Classify the manipulators according to the kinematic configuration and sketch their respective workspaces. (6)
   (b) The coordinates of a point P are given in a reference frame as $(3, 7, 5)^T$. The moving coordinate frame is obtained by translation along X-axis by 4 units followed by rotation about Z-axis by 60o. Obtain the coordinates of P in the moving coordinate frame. (4)

12 Obtain the inverse kinematic model of a 3 DoF cylindrical robot. (10)

13 Derive the dynamical equations of a 2 DOF RR type of planar manipulator, consider the masses to be lumped at the end of the links. (10)

14 Explain in detail the process of robot vision in Robotics. (10)

15   For the given robot configuration in figure 1, obtain the overall transformation
     matrix using DH conventions.                                                          (10)



Figure 1

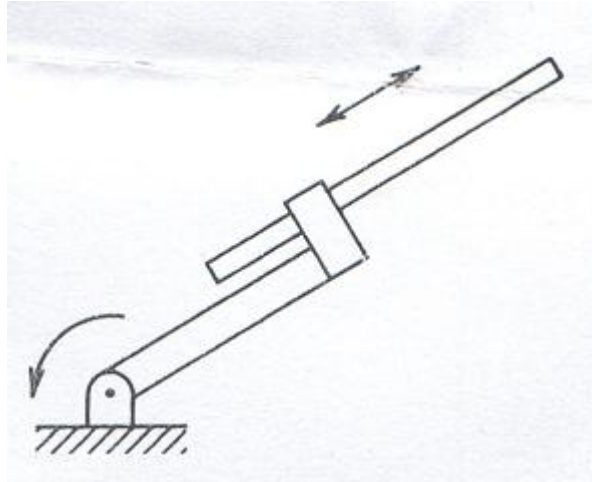16   A planar manipulator arm with one rotary and one prismatic joint is given in
     figure 2.                                                                             (10)
     (a) Compute the Jacobian for the arm.
     (b) What will be the velocities if the endpoint is required to move at a constant
         velocity along a flat surface.



Figure 2
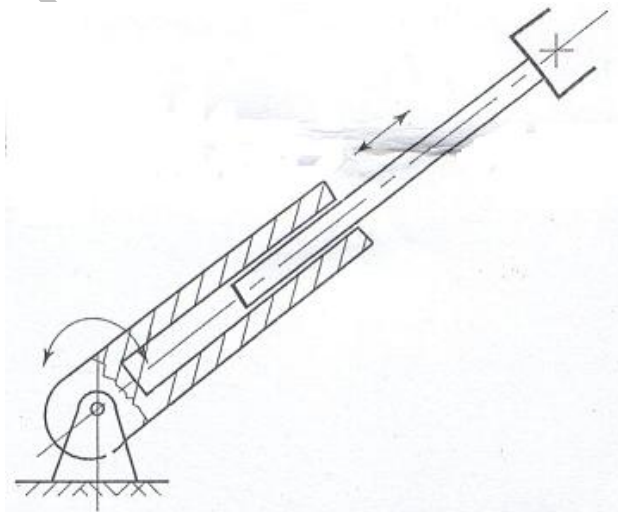
17   Write short notes on:                                                                 (10)
     (a) Properties of Orthonormal Rotation matrices
     (b) Types of robots used in Assembly and Inspection
     (c) PD control of a single link robot

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# FACULTY OF ENGINEERING

### B.E. 4/4 (Inst.) II – Semester (Main) Examination, May / June 2015

### Subject : Process Plan Design and Safety Management     (Elective – III)

Time : 3 hours                                                                                 Max. Marks : 75

**Note:  Answer all questions from Part-A. Answer any FIVE questions from Part-B.**

## PART – A  (25 Marks)

| | | |
|---|---|---|
| 1. | What are the purge system design considerations? | 3 |
| 2. | Give an example of HIIPS justification in PSM. | 3 |
| 3. | Draw the architecture of data historian. | 3 |
| 4. | What is emergency response plan in safety management? | 2 |
| 5. | How is FISCO different from ENTITY concept? | 3 |
| 6. | What is the three "C" criteria for good documentation? | 2 |
| 7. | What is the different between static and dynamic PSI? | 2 |
| 8. | Draw the flow chart of computerized maintenance management system. | 3 |
| 9. | What is securing the network with firewall imply?  Discuss briefly. | 2 |
| 10. | Explain the term workstation hostsand work station up gradation. | 2 |

## PART – B  (50 Marks)

11. What are the elements of process safety management?  Briefly discuss about process hazard analysis.                                                                   10

12. Draw the block diagram of document dependency map of I and C system design project.                                                                                           10

13. What is meant by purging and inerting?  What are the different types of purging systems?                                                                                         10

14. Enumerate the guide lines for auditing a plant for automation system upgrades.     10

15. How is hazardous area classified?  Explain in detail.                              10

16. What are the VR tools for testing control room and its up gradation?              10

17. Write short notes on :                                                             10
    a) HAZOP
    b) Project management

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# FACULTY OF ENGINEERING

### B.E. 4/4 (ECE) II – Semester (Main) Examination, May / June 2015

### Subject : Global Positioning System (Elective – III)

**Time : 3 hours**          **Max. Marks : 75**

*Note:  Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

## PART – A  (25 Marks)

1  What is the relation B/W solar time and sideral time?    3

2  What are the factors affects the DOP?    2

3  Define the geodetic coordinates.    3

4  What is meant by User Equalient Range Error (UERE)?    2

5  Write an expression for Satellite Vehicle (SV) clock correction for C/A code Pseudorange.    3

6  What are the frequencies of GPS signals?    2

7  What is the significance of carrier phase tracking?    2

8  Explain briefly various types of GPS augmentation systems.    3

9  Write orbital inclination for GPS and Galileo systems.    2

10 Write operators for GPS, GLONASS and GALILEO systems.    3

## PART – B  (50 Marks)

11 Explain about how to measure overall uncertainity in a GPS user position solution. And interpret the DOP values.    10

12 Explain about    10
   a) World Geodetic System (WGS-84)
   b) Indian Geodetic System (IGS)

13 Explain in detail about various error sources in GPS.    10

14 Write about carrier phase measurements.    10

15 Explain in detail about Local Area Augumentation System (LAAS).    10

16 Compare GPS, GLONASS and GALILEO.    10

17 Write short notes on GPS integration systems.    10

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# FACULTY OF ENGINEERING

**B.E. 4/4 (ECE) II – Semester (Main) Examination, May / June 2015**

### Subject : Neural Networks and Fuzzy Logic (Elective – III)

**Time : 3 hours**                                             **Max. Marks : 75**

*Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

### PART – A (25 Marks)

| | | |
|---|---|---|
| 1 | Explain Mc.Culloach Pitts model with neat diagram. | 3 |
| 2 | What are excluded Middle laws? | 2 |
| 3 | What are fuzzy integrals? | 3 |
| 4 | Write the limitations of Multi-layer perceptron. | 3 |
| 5 | Explain the applications of Adaline and Madaline networks. | 3 |
| 6 | Write the applications of Fuzzy controllers. | 2 |
| 7 | Justify how Kohonen network is a self-organizing network. | 3 |
| 8 | Define reflexivity and symmetry property of binary relation. | 2 |
| 9 | What is the basis function used in RBF networks (Radial Basis Function). | 2 |
| 10 | Give the applications of Neural networks in Robotics. | 2 |

### PART – B (50 Marks)

11 Explain the Hopfield network with its algorithm, topology and applications.    10

12 Explain in detail the Bi-directional associative memory with its topology and learning algorithm.    10

13 a) Explain with neat diagram the algorithm of Adaline network.    5
     b) Distinguish between various types of learning with suitable examples.    5

14 a) Define Fuzzy set and explain its importance in real world.    5
     b) Given a Fuzzy set A in X and a Fuzzy relation R in X x Y where

$$A = \begin{bmatrix} 0.4 & 0.4 & 0.3 \end{bmatrix} \text{ and } R = \begin{bmatrix} 0.7 & 0.4 & 0.8 \\ 0.6 & 0.6 & 0.3 \\ 0.4 & 0.2 & 0.4 \end{bmatrix}$$

        Find max-min composition of A and R.    5

15 Explain the basic structure and operation of fuzzy logic control system.    10

16 Explain the back-propagation algorithm with a neat diagram.    10

17 Write short notes on the following :
     a) Radial basis function network algorithm    4
     b) Neural networks in communications    3
     c) Fuzzy Measures    3

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# FACULTY OF ENGINEERING

**B.E. 4/4 (Mech. / Prod.) II – Semester (Main) Examination, May / June 2015**

**Subject: Product Design and Process Planning (Elective – III)**

Time: 3 Hours                                                        Max.Marks: 75

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

## PART – A (25 Marks)

1  What are the functions of product design?

2  Explain the need for creativity and innovation

3  What are the risk factors in project?

4  Describe the design with Human Machine Interaction

5  Explain the intellectual property rights

6  What is international code for patents?

7  Explain the steps for introducing the new product

8  What are the various manufacturing processes?

9  Explain group technology

10 Explain the value engineering in product design.

## PART – B (5x10 = 50 Marks)

11 Explain the functions of the product design and process design.

12 What are the factors contributing to successful technological innovation?

13 What is product life cycle and explain various stages of product life cycle?

14 Describe the research and new product development process.

15 What are similarities and interaction between the design and manufacturing?

16 Explain in detail about selection of manufacturing process and estimation of machine time.

17 Write short notes on the following:

   a)  Principles of ergonomics

   b)  New product testing and marketing

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# FACULTY OF ENGINEERING

**B.E. 4/4 (Mech./Prod.) II – Semester (Main) Examination, May / June 2015**

**Subject: Modern Machining and Farming Methods (Elective – III)**

Time: 3 Hours                                                                                   Max.Marks: 75

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

## PART – A (25 Marks)

1  What are various types of transducers used in ultrasonic machining? State their principle of operation.
2  State the effect of abrasive size and nozzle to plate distance on metal removal rate in abrasive jet machining.
3  Why do you supply voltage pulses instead of constant voltage in electro discharge machining? What is the effect of frequency of pulses on surface finish and metal removal rate?
4  What are the functions and desirable characteristics of electrolyte in electrochemical machining process?
5  What are applications of LASER beam machining?
6  What is the difference between transferred and non transferred arcs? State their applications.
7  State the advantages of rubber pad forming over conventional forming.
8  What are the explosive materials used in explosive forming.
9  Compare the merits and demerits of forward and backward spinning processes.
10 What are the applications of hydrostatic forming?

## PART – B (5x10 = 50 Marks)

11 a) Explain about abrasive jet machining process with a neat sketch. State its advantages and limitations.                                                                           5
   b) State the parameters those affect MRR in ultrasonic Machining and explain their effect on MRR with the help of suitable graphs.                                             5

12.(a) What are various types of power circuits used to produce electric pulses in electro discharge machine? Explain about any of them with a circuit diagram along with the pulse shape obtained.                                                                      5
   (b) Find the metal removal rate of a pure metal in electrochemical machining with following data:                                                                              5
        Density of material = 7.8 gr/cm$^3$
        Current = 2000 A
        Atomic wt. = 56 gr/mole
        Valency = 2 and Faraday's constant is 96,500 columbs/mole

13 a) Explain about plasma arc machining in detail along with its relative merits compared to flame cutting.                                                                        5
   b) Explain ion etching process along with its applications. What is the effect of angle of incident on sputtering coefficient?                                                  5

…2.

14 a) Explain about electro hydraulic forming process with a neat sketch.     5
     b) Explain about Guerin process with a neat sketch.     5

15 a) What is the purpose of tube spinning? Explain the effect of various parameters on tube spinning operation.     4
     b) Explain about water hammer forming with a neat sketch.     6

16 Write a brief description on the following:
     a) Abrasive materials and slurry in USM     4
     b) Hot machining     3
     c) High speed machining     3

17 Write a short note on the following:
     a) Comparison of AJM with WJM     3
     b) Cause and remedy of taper cut in EDM     3
     c) Electrochemical grinding.     4

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# FACULTY OF ENGINEERING

**B.E. 4/4 (Mech./Prod.) II – Semester (Main) Examination, May / June 2015**

## Subject : Rapid Prototyping Technologies (Elective – III)

**Time : 3 hours**                                                                                    **Max. Marks : 75**

*Note:  Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

## PART – A  (25 Marks)

1  Explain the need for proto typing.
2  Explain steps involved in RPT.
3  Differentiate between geometrical model and RPT model.
4  Name the method used in powder based RPT systems.
5  What is post processing in RPT?
6  State the limitations of FDM.
7  State LOM specifications.
8  Explain the process of SGC.
9  List solid based models.
10 What are functional models?

## PART – B  (50 Marks)

11 a)  Explain the role 3D modelling in RPT.
   b)  What is the rapid prototyping wheel?

12 a)  Explain the process chain of RPT.
   b)  List FDM models and its limitations.

13 a)  Explain the working principle of photo polymerization and layering technology.
   b)  What are advantages, disadvantages of SGC?

14 Describe the working principles of SLA process.

15 Describe the working principle of LOM and FDM with case studies.

16 a)  Explain the process of selective laser sintering.
   b)  Explain the 3D printing model and specifications.

17 Describe the applications of RPT with reference to
   a)  Medical Models
   b)  The pattern for investment and vacuum casting process

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# FACULTY OF ENGINEERING

**B.E. 4/4 (CSE) II – Semester (Main) Examination, May / June 2015**

### Subject : Information Retrieval Systems (Elective – III)

Time : 3 hours                                                                                            Max. Marks : 75

*Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

## PART – A (25 Marks)

1  Consider the following documents and find term frequency (tf) and inverse document
   frequency (idf) of each term.                                                                            3
      D1 = "computer information retrieval"
      D2 = "computer retrieval"
      D3 = "information"
      D4 = "computer information
      D5 = "information AND retrieval"
      D6 = "information BUT NOT computer"
2  Define precision and recall.                                                                              2
3  What are various query protocols?                                                                         3
4  What are signature files?                                                                                 2
5  Define Query expansion.                                                                                   3
6  What are Boolean Queries?  Give an example                                                                3
7  Define document clustering.                                                                               2
8  How query processing proceeds in a distributed IR system?                                                 3
9  Define Hamming distance.                                                                                  2
10 Define pattern matching.                                                                                  2

## PART – B (50 Marks)

11 a) Define fuzzy set theory.  How is it used in fuzzy information retrieval?                                6
   b) Describe about belief network model.                                                      4

12 a) Explain about structured text retrieval models.                                                        5
   b) Explain about keyword based querying.                                                     5

13 a) Discuss the strategies for building local clusters.                                                    5
   b) Discuss a query expansion model based on a global similarity thesaurus.                   5

14 a) Explain how to eliminate stop words to improve the performance.                                        5
   b) Explain inverted file compression with an example.                                       5

15 a) Explain Boyer-Moore algorithm with an example.                                                         4
   b) Explain the MIMD architecture of parallel IR.                                            6

16 a) Draw and explain the architecture of IR system.                                                        5
   b) Explain the term reweighting for the probabilistic model.                                5

17 Write short notes on :
   a) Markup languages      b) Dictionary methods                 5+5

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# FACULTY OF ENGINEERING

### B.E. 4/4 (CSE) II – Semester (Main) Examination, May / June 2015

### Subject : Advances Data Bases (Elective – III)

Time : 3 hours                                              Max. Marks : 75

*Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

### PART – A (25 Marks)

1  How does the concept of object identity in the object-oriented model differs from the concept of tuple identity in the relational model?
2  State whether the following statements are true/false
   i)  OIDs in an object-oriented database are always the actual disk address of the object ( )
   ii)  Persistence by reachability means that all objects you want to reach are made persistent ( )
3  What is the difference between For clause and Let clause in XQuery?
4  How do you specify foreign key in XML Schema?
5  Consider the materialized view v = r x s and an update to r. How is the incremental view maintenance defined for inserts ($i_r$) and delete ($i_r$) on r?
6  How many left-deep join trees are possible with n relations?
7  What are different types of transparencies that are ensured by DDBMS?
8  What is semi-join?
9  What is five minute rule?
10 What problems can occur in a continuous-media system if data are delivered either too slowly or too fast?

### PART – B (50 Marks)

11 a) How do you use SQL reference type to declare a foreign key? What are its advantages? Illustrate with examples.
   b) Explain the purpose of nesting and unnesting operations with examples.

12 a) Give the DTD for an XML representation of the following nested-relational schema
    *Emp = (ename, ChildrenSet* **setof***(Children), SkillsSet* setoff*(Skills)*
    *Children – (name, Birthday)*
    *Birthday = (day, month, year)*
    *Skills = (type, ExamsSet* **setoff***(Exams)*
    *Exams = (year, city)*
   b) Consider the above schema and write the following queries in XQuery
    i) Find the name of all employees who have a child who has a birthday in March.
    ii) Find those employees who took an examination for the skill type "typing in the city "Dayton".
    iii) List all skill types in *Emp*.

13 a) How do you sort a file of 108 blocks using merge sort, assume 5 buffer blocks are available in main memory?  Also calculate the number of block transfers and seeks.  Show the detailed steps.

    b) How do you find the best join order for natural join of four relations A, B, C, D using dynamic programming algorithm?  Explain the steps in detail.

14 a) What are different data partitioning techniques?  Describe each of these techniques, give example of a query for which that partitioning technique would provide fastest response.

    b) Explain how different types of failure are handled by two-phase commit protocol.

15 a) What are different spatial data indexing structures?  Describe any one of these.

    b) Explain database schema and transaction tuning.

16 a) Explain different techniques to implement parallel join operation.

    b) What are different ways of defining composite attributes in SQL?  How do you access component attributes of a composite attribute in SQL?  Illustrate with examples.

17 Write short notes on :

    a) Mapping of XML

    b) Optimization of correlated sub queries

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# FACULTY OF ENGINEERING

### B.E. 4/4 (CSE) II – Semester (Main) Examination, May / June 2015

### Subject : Cloud Computing (Elective – III)

Time : 3 hours                                                                     Max. Marks : 75

*Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

## PART – A (25 Marks)

| | | |
|---|---|---|
| 1 | Define cloud and list the main features of a cloud. | 3 |
| 2 | Explain briefly about virtual cluster. | 3 |
| 3 | What is live migration? | 2 |
| 4 | What is the (key, value) pair representation that can be used for finding the frequency of words in a given sentence. | 2 |
| 5 | Give examples of storage services available in public cloud. | 2 |
| 6 | What is REST? | 2 |
| 7 | Give two examples of end user access to cloud computing. | 2 |
| 8 | Briefly explain the security attacks CryptDB addresses. | 3 |
| 9 | Explain briefly about Iterative map reduce. | 3 |
| 10 | Explain binary translation. | 3 |

## PART – B (50 Marks)

| | | |
|---|---|---|
| 11 a) | Discuss the cloud service models with examples. | 6 |
| b) | Explain Service Oriented Architecture (SOA). | 4 |
| | | |
| 12 a) | List the levels of virtualization with examples for each level. | 5 |
| b) | Explain memory virtualization. | 5 |
| | | |
| 13 a) | Explain the design of a compute cloud. | 5 |
| b) | Write about the public cloud platform of Google. | 5 |
| | | |
| 14 | Explain how data security is achieved in CryptDB using encryption layers. | 10 |
| | | |
| 15 a) | Explain the system issues for running a typical parallel program in a distributed manner. | 5 |
| b) | Explain about Amazon Simple Storage Service (S3). | 5 |
| | | |
| 16 a) | What is reputation and how is it addressed in a cloud? | 5 |
| b) | Write briefly about any two standards used for messaging. | 5 |
| | | |
| 17 | Write short notes on : | |
| a) | Virtualization in XEN | 5 |
| b) | Homomorphic Encryption | 5 |

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# FACULTY OF INFORMATICS

### B.E. 4/4 (IT) II – Semester (Main) Examination, May / June 2015

### Subject: Human Computer Interaction (Elective – V)

**Time: 3 Hours**                                                    **Max.Marks: 75**

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

### PART – A (25 Marks)

| | | |
|---|---|---|
| 1 | What is interaction style? | 2 |
| 2 | Distinguish between Gulf of execution and Gulf of evaluation. | 3 |
| 3 | What is user centered design? | 2 |
| 4 | What is the main advantage of using interface design standards? | 3 |
| 5 | Give the formula to calculate screen complexity based on information theory | 2 |
| 6 | What are descriptive models? Give examples | 3 |
| 7 | How many colors are shown in a Web Browser, if the monitor is set to 8-bit color? | 3 |
| 8 | What is advantage of using cascading windows over overlapping windows? | 3 |
| 9 | What are two different techniques of dynamic text presentation? | 2 |
| 10 | What are Earcons? | 2 |

### PART – B (5x10 = 50 Marks)

11 a) What is the difference between virtual reality and embodied virtuality? Describe
     different groups of virtual reality technologies.     6
   b) List the advantages and disadvantages of Form-Fill interfaces.     4

12 a) What are the advantages and disadvantages of using semantic networks in
     conceptual design?     5
   b) Explain the usage of wireframes in physical design.     5

13 a) Describe different components of GOMS model.     5
   b) Explain the tradeoff between usability and screen complexity.     5

14 a) List the factors that affect the color perception.     5
   b) Describe the physical attributes that can affect the way we perceive icons.     5

15 Briefly describe the formal guidelines of using auditory icons in interaction design.     10

16 Describe different types of list components in WIMP interfaces.     10

17 Write short notes on:
   a) Nielsen's Heuristics     5
   b) Redundant coding     5

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# FACULTY OF INFORMATICS

### B.E. 4/4 (I.T.) II - Semester (Main) Examination, May / June 2015

### Subject : Software Project Management

### (Elective-V)

**Time : 3 Hours**                                                          **Max. Marks: 75**

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

### PART – A (25 Marks)

| | | |
|---|---|---|
| 1 | What are the five components of software cost models? | (3) |
| 2 | List out the various Management artifacts. | (3) |
| 3 | What are the advantages & Disadvantages of commercial components versus custom software? | (3) |
| 4 | Write Short notes on Modern Project Profiles. | (3) |
| 5 | Define Roundtrip Engineering. | (2) |
| 6 | Explain stake holders Environment. | (3) |
| 7 | Define Process Maturity. | (2) |
| 8 | Define stakeholder cohesion or contention. | (2) |
| 9 | List out the three aspects of architecture from the management perspective. | (2) |
| 10 | List out the seven top-level workflows. | (2) |

### PART-B (50 Marks)

11 List and explain the ten reasons of why conventional software management does not perform satisfactorily. (10)

12 Describe the primary objectives, essential activities & primary evaluation criteria of Elaboration phase. (10)

13 (a) How should the evolutionary WBS be Structured? (6)
(b) Discuss the Iterative Process Planning. (4)

14 (a) What are the four component teams in a default project organization & their responsibilities? (6)
(b) What are the benefits of matching people to roles? (4)

15 (a) Discuss the Management Indicators. (4)
(b) Discuss the Quality Indicators. (6)

16 Explain the following
(a) Domain Experience. (4)
(b) Process Flexibility or Rigor. (3)
(c) Architectural Risk (3)

17 Discuss the Next Generation Software cost Models. (10)

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# FACULTY OF INFORMATICS

### B.E. 4/4 (I.T.) II - Semester (Main) Examination, May / June 2015

### Subject : Entrepreneurship

### (Elective-V)

**Time : 3 Hours**                                                                 **Max. Marks: 75**

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A (25 Marks)

1  List out the areas where linkage is required between small and large scale industries. (2)
2  Briefly explain about partnership enterprises. (3)
3  Who is first generation entrepreneur? Give an example. (3)
4  How an entrepreneur chooses the right technology required for the business? (3)
5  What is the necessity to have formulation of a project? (3)
6  Describe about marketing analysis. (2)
7  Differentiate between CPM and PERT techniques. (3)
8  List out the rules of Network diagram. (2)
9  What are the various determinants of personality? (2)
10 Explain about urgency addiction with an example. (2)

## PART – B (50 Marks)

11 (a) Define Economy of a Nation and explain how it is influenced by entrepreneurs. (5)
   (b) Discuss in detail about small scale industries by highlighting their advantages. (5)

12 (a) Explain various essential qualities of entrepreneurs. (5)
   (b) What are the favourable conditions and challenges for women entrepreneurs in India? (5)

13 Define project formulation and discuss in detail about technical and financial analysis of project formulation. (10)

14 (a) Define Project and mention different objectives of project management. (5)
   (b) Draw Network diagrams and find critical path for the following data: (5)

| Activity | 1-2 | 1-3 | 2-3 | 2-4 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|
| Duration (in days ) | 5 | 3 | 2 | 6 | 4 | 3 |

15 (a) Explain various behavioural aspects of entrepreneurs. (5)
   (b) List out different approaches of Time management and explain any two of them. (5)

16 (a) "Entrepreneurs are made not born" – Give your view. (5)
   (b) Explain the procedure of Project Management. (5)

17    Write short notes on any **three** of the following: (10)
      (a) Indian Industrial Environment
      (b) Assessment of Tax burden
      (c) Sources of finance
      (d) Leadership

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# FACULTY OF INFORMATICS

### B.E. 4/4 (I.T.) II - Semester (Main) Examination, May / June 2015

### Subject : Cloud Computing

**Time : 3 Hours**        **Max. Marks: 75**

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A (25 Marks)

| | | |
|---|---|---|
| 1 | Describe benefits of using a cloud model. | (2) |
| 2 | Explain how a common protocol is established for this internet. | (3) |
| 3 | Describe advantages of communication as a service (Cass). | (2) |
| 4 | Explain basic approach to a data center based service oriented architectures. | (3) |
| 5 | Write down the steps for the 7-zip archive tool. | (3) |
| 6 | Describe how encrypted federation differs from trusted federation. | (2) |
| 7 | Explain standards for messaging. | (3) |
| 8 | Describe hyper text transfer protocol. | (2) |
| 9 | What are the mobile operating systems for smart phones? | (2) |
| 10 | Explain vector processing. | (3) |

## PART – B (50 Marks)

11 (a) Describe internet software evolution.      (5)
   (b) Explain server virtualization.      (5)

12 (a) Describe communication as a service (Caas).      (5)
   (b) What are the layered components of infrastructure as a service (Iaas)?      (5)

13 (a) Explain the evolution from the MSP model to cloud computing.      (5)
   (b) What is the basic approach to a data center based SOA?      (5)

14 (a) Describe Adding a guest OS to Sun xVM virtual Box.      (5)
   (b) Explain down-loading Free Dos as a guest OS.      (5)

15 (a) What are the FOUR LEVELS OR FEDRATION?      (5)
   (b) Describe the interrelation of identify presence and location in the cloud.      (5)

16 (a) Explain the distributed management task force.      (5)
   (b) Describe communication HTTP, SIMPLE and xMPP.      (5)

17 Write short notes on the following:
   (a) Google (Android)      (4)
   (b) Black berry      (3)
   (c) Windows mobile      (3)

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# FACULTY OF ENGINEERING

### B.E. 4/4 (EEE) II – Semester (Main) Examination, May / June 2015

### Subject: Power System Reliability

Time: 3 Hours                                                                                    Max.Marks: 75

*Note: Answer all questions from Part A. Answer any five questions from Part B.*

### PART – A (25 Marks)

1.   Derive mean and variance of a Binomial distribution.                                3
2.   Draw probability density function and cumulative distribution function of a normal
     distribution.                                                                        2
3.   Draw bath-tub curve of (a) electronic components (b) mechanical components.          2
4.   Two units A and B of system with respective reliabilities of 0.905 and 0.85 at the
     end of one year are connected in parallel. Obtain reliability of the system.
5.   What is the basic difference between discrete markov chain and continuous
     markov process?                                                                     2
6.   Obtain state transitional probability matrix for the system.                        3
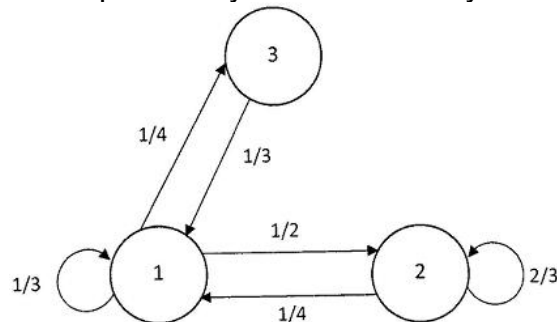


7.   In capacity outage probability table, what is frequency and cumulative frequency?   2
8.   What do you mean two-level daily load representation?                                3
9.   Define (a) SAIDI (b) CAIFI and (c) ASAI.                                            3
10.  Differentiate between temporary failure and transient failure of a distribution
     system.                                                                             2

### PART – B (50 Marks)

11.(a) Enumerate the assumptions and properties of Poisson distribution.                 6
   (b) A large distribution of identical relays have times to first failure that follow a
       Weibull distribution with parameters $\beta=3$ and $\alpha=10$ yrs. What is the probability
       that a relay will survive 5 years without failure and what is the value of MTTF?   4

12.(a) Define failure density, failure rate and reliability of a system and hence derive the
       relation between failure density and reliability.                                 5
   (b) The network of a system along with their component reliabilities is shown in the
       following figure. Calculate the reliability using network reduction technique. Verify
       the result with minimal cut-set method.                                           5

13.(a) Draw and explain state space diagram for two component standby system and write all the differential equations. 5

   (b) The following stochastic transitional matrix P shows the transition rates in per hour of a continuous Markov process. Construct the state space diagram and evaluate the MTTF given that the system starts in state 1. 5

$$P = \begin{array}{c} \\ 1 \\ 2 \end{array} \begin{array}{cc} 1 & 2 \\ \begin{bmatrix} 0.90 & 0.05 \\ 0.05 & 0.95 \end{bmatrix} \end{array}$$

14. A system can residue in one of the three mutually exclusive states in the state space diagram shown below. The values shown are the probabilities of making the related transition at the end of each discrete time interval of 1 hr. States 1 and 2 represent system success and state 3 represents system failure. The system starts in state 1. Calculate (a) the probability of residing in each state after three time intervals. (b) the limiting state availability of the system. 10
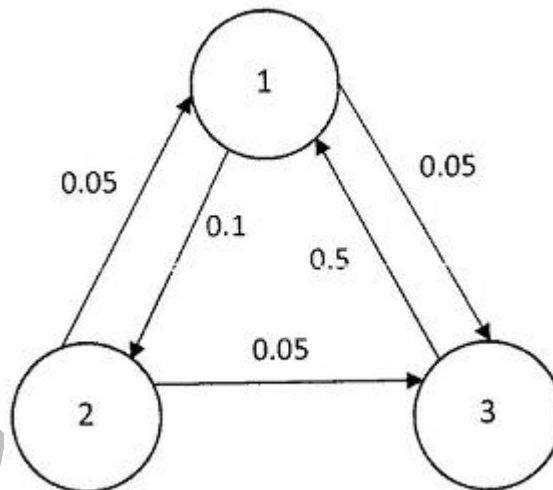


15.(a) Differentiate between outage and interruption. Mention various outages and interruptions. 5

   (b) Prepare a capacity outage probability table for a three 50 MV units system with a failure rate of 0.5 / yr and a repair rate of 9.5 / yr. 5

16.(a) Discuss two-state weather modelling of a distribution system and obtain the expression for failure rate. 3

   (b) Obtain failure rates for four cases of overlapped forced outages, assuming repair cannot be done during adverse weather. 7

17. Discuss any two of the following: 10
   a) Weibull distribution
   b) Frequency and duration method for two identical units
   c) Effect of scheduled maintenance on reliability indices.

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# FACULTY OF ENGINEERING

### B.E. 4/4 (ECE) II-Semester (Main) Examination, May / June 2015

### Subject : Spectral Estimation Techniques

### (Elective-III)

**Time : 3 Hours**  **Max. Marks: 75**

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*
## PART – A  (25 Marks)

1. Define the term Ergodicity and power density spectrum.
2. Define mean Ergodic process and correlation ergodic process.
3. List the steps for the computation of optimum and signal estimators.
4. List the properties of linear signal estimators and predictors.
5. List Non parametric methods
6. Define the Frequency resolution property of the periodogram.
7. List the different methods for AR model parameters.
8. How the selection of an AR model order can be happen?
9. What is the need of Ergen analysis Algorithms for spectrum estimation Technique?
10. Define Pisarenko 'Harmonic decomposition method'.

## PART – B (50 Marks)

11.(a) Consider a system with impulse response $h(n)=\delta(n)=1/4\delta(n-1)$. Determine the impulse response of the Inverse system.

(b) Let x(n) be a real valued random process generated by the system $x(n) = \alpha$ $x(n-1)+w(n)$ $n \geq 0$, $x(-1)=0$, $w(n)$ is stationary random process with mean $\mu_w$ and $r_w(k)=\sigma_w^2\delta(c)$. Determine the mean of x(n) and commutative stationarity.

12.(a) Explain the method of linear mean square error estimation using block diagram.

(b) List the necessary and sufficient conditions to determine linear MMSE estimator.

13.(a) Explain the Blackman Tyney approach method for power spectrum estimation.

(b) Explain the computational requirements and performance characteristics of an estimator.

14. Describe relation between auto correlation sequence and model parameter in detail.

15. Explain the unconstrained least squares method in detail.

16. Explain the Capon's minimum variance method in detail.

17. Write short notes on the following:
    (a) Levinson – Durban Algorithm
    (b) Bartletts method
    (c) Yule – Walker method

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# FACULTY OF ENGINEERING

### B.E. 4/4 (Mech.) II – Semester (Main) Examination, May / June 2015

### Subject: Total Quality Management (Elective – III)

Time: 3 Hours                                                                                   Max.Marks: 75

***Note: Answer all questions from Part A. Answer any five questions from Part B.***

## PART – A (10 x 2.5 = 25 Marks)

1.   What is meant by Strategic Quality Management?
2.   Mention the supplier quality ratings plans.
3.   Define the terms DFMA and FMEA.
4.   What is a bath tub curve?
5.   What is chi square test?
6.   List the controllable and non controllable factors in parameter performance.
7.   Differentiate between QIS and MIS.
8.   What is meant by POKAYOKE?
9.   Mention the difficulties in implementing TQM system.
10.  Write briefly about JIT system.

## PART – B (50 Marks)

11.   Discuss about the (i) Maslow's Hierarchy need theory and (ii) Herzberg two factor theory.                                                                                           10

12.(a) With a neat sketch explain about Bath Tub Curve.                                    5
   (b) If the two reliability functions have the same mean, show that their reliabilities may be different for the same operating time.                                              5

13.(a) Explain about F-test and T-Test as technical tools for quality control.            5
   (b) What is ANOVA? Explain about four factor ANOVA experiment at two levels.          5

14.(a) Discuss the scope of QIS and features of QIS software.                             5
   (b) Explain about AQL and LTPD.                                                        5

15.(a) Explain about importance of proper packaging for customer satisfaction.           5
   (b) Discuss about people side of TQM.                                                  5

16.   The following data shows the values of sample mean $\bar{x}$ and the range $\bar{R}$ for 10 samples of size five each. Calculate the values for centre line and control limits for mean chart and range chart and determine whether the process is under control.                                                                                   10

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| $\bar{x}$ | 11.2 | 11.8 | 10.8 | 11.6 | 11.0 | 9.6 | 10.4 | 9.6 | 10.6 | 10.0 |
| $\bar{R}$ | 7 | 4 | 8 | 5 | 7 | 4 | 8 | 4 | 7 | 9 |

17.   Write short notes on the following:                                                 10
      a)  Theory X, Y and Z
      b)  Brain storming
      c)  Taguchi Tolerance Design
      d)  Weibull Analysis

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