FACULTY OF ENGINEERING

BE 4/4 (Civil) II Semester (Main & Backlog) Examination, May/June 2019

Subject: Ground Water Hydrology (Elective – III)

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

Note: Answer all Questions from Part-A, & Any Five Questions from Part-B.

Part – A (25 Marks)

1) Explain about the different types of aquifers.   (3M)

2) List the factors affecting permeability.   (2M)

3) Explain the chow's method of solution.   (3M)

4) State the Dupuits assumptions for steady flow.   (2M)

5) Explain the concept of electrical resistivity method.   (3M)

6) Explain the mechanism responsible for sea-water intrusion.   (3M)

7) Write & explain the Ghyben-Herzberg equation.   (2M)

8) Explain the different methods of groundwater recharge.   (3M)

9) List the various surface geophysical techniques.   (2M)

10) Write about the sand model.   (2M)

Part – B (50 Marks)

11) a) Derive the equation for a steady radial flow in a confined aquifer.   (4M)

    b) From an alluvial basin having an area of 300 Km^2 in a years time, 200 M m^3 of ground water was pumped, resulting in a drop of ground water table by 9 m. Estimate the specific yield of the aquifer. If there is no replenishment, calculate the porosity f the soil, assuming the specific retention as 10%.   (6M)

12) A pumping test was performed in a confined homogenous and isotropic aquifer of infinite areal extent. The constant pumping rate was 200 m^3 / hr. The following draw downs were observed in an observation well located at 500m from the pumping well. Determine the aquifer parameters by Jacob's method.   (10M)

Time(hrs)	0.1	0.6	1.6	5	16	100
Drawdown (m)	0.4	0.5	0.9	1.35	1.66	1.71

13) A 30cm well fully penetrates a confined aquifer of thickness 30cm. When the well is pumped at a rate of 300 lit/min, the steady state drawdown in the two observation wells located at 12m and 120m distance from the pumping well are found to be 45m and 0.15m respectively. Calculate the permeability and transmissibility of the aquifer. (10M)

14) a) State the objectives of the model studies. (4M)

b) Explain the principle and working of viscous fluid models and membrane models.

(6M)

15) a) Explain in detail the seismic refraction method and magnetic method. (6M)

b) How do you interpret well log. Describe briefly. (4M)

16) a) Explain the numerical analysis of models. (6M)

b) Discuss briefly about the hydrologic balance equation. (4M)

17) Write short notes on (10M)

a) Image wells

b) Conjunctive use of surface and ground water.

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FACULTY OF ENGINEERING
BE 4/4 (Civil) II Semester (Old) Examination, May/June 2019

Sub: Finite Element Methods (Elective-III)

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

Note: Answer All Questions From Part-A, & Any Five Questions From Part-B.

PART – A (25 Marks)

1. What is meant by node or joint?   2M
2. What is meant by degrees of freedom   2M
3. What is Rayleigh-Ritz method?   3M
4. What is natural coordinates? Write down the expression of shape function N and displacement u for one dimensional bar element.   3M
5. What are the characteristic of shape function?   3M
6. How do you calculate the size of the global stiffness matrix?   2M
7. Write down the expression of stiffness matrix for truss element.   2M
8. State the principles of virtual energy?   2M
9. What is LST element?   3M
10. Write down the shape functions for 4 nodded rectangular elements using natural coordinate system.   3M

PART – B(50 Marks)

11. Find the approximate deflection of a simply supported beam under a uniformly distributed load 'P' throughout its span. By applying Galerking Method.   10M

12. Consider the bar shown in figure axial force P = 30 KN is applied as shown. Determine the nodal displacement, Stresses in each element and reaction force.   10 M
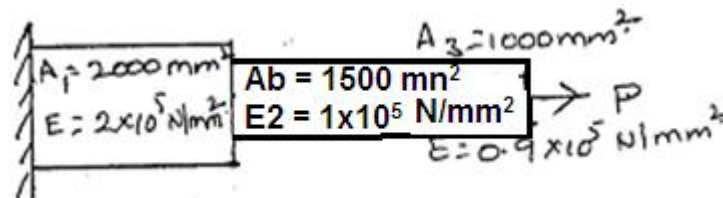

13. The (x, y) coordinate of nodes i, j, and k of triangular elements are given by (0,0), (3,0) and (1.5, 4) mm respectively. Evaluate the shape functions N1, N2, and N3 at an interior point P(2,2.5) mm for the element, obtain the strain displacement relation matrix B.   10M

14. Calculate the force in the members of the truss as shown in fig. Take E= 200 GPa   10M
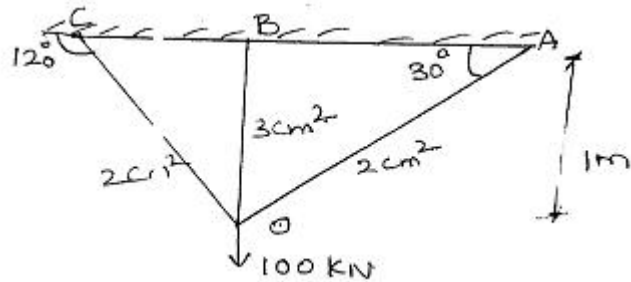
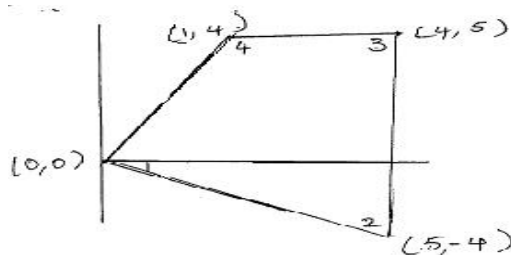15. For the four nodded quadrilateral element shown in fig determine the Jacobian and evaluate its value at the point (1/2, ½)   10M
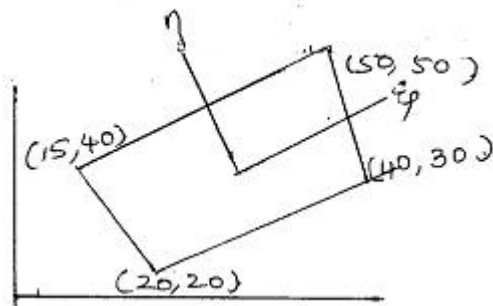
16. Find the integral $I = \int_{-1}^{1} (2x^3 + 5x^2 + 6) dx$ using Gaussian quadrature method with

2 point scheme. The Gauss points are $\pm$ 0.5774 and the weight at the two points are equal to unity.   10M

17. For the element shown in fig. Calculate the Jacobian matrix   10M

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FACULTY OF ENGINEERING

B.E. 4/4 (Civil) II – Semester (Main & Backlog) Examination, May / June 2019

Subject: Infrastructure Engineering (Elective – III)

Time: 3 Hours   Max.Marks: 75

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

PART – A (25 Marks)

1	What is the special economic zone?	3
2	What is life cycle analysis?	2
3	State any three important rail transportation sectors in India.	3
4	What are the problems of infrastructure privatization?	2
5	Write any three mapping and facing the landscape risks in infrastructure projects.	3
6	State any two socio-environmental risks in infrastructure projects.	2
7	Distinguish between B-O-T and BOOT projects.	3
8	Write any two environmental laws to be followed for environmental impact assessment.	2
9	Write any two government roles in infrastructure implementation.	3
10	What do you mean by planning phase of infrastructure projects?	2

PART – B (50 Marks)

11 a) What are the different players in the field of the infrastructure? Discuss them in detail.   5
   b) What is Special Economic Zone? Write its significances.   5

12 a) Narrate the consequences lead to infrastructure privatization.   5
   b) Write in detail the public sector role in infrastructure development.   5

13 a) What are the core economic and demand risk in international infrastructure projects.   5
   b) Write in detail the legal issues in infrastructure projects   5

14 a) Specify the environmental and social impacts in assessing the infrastructure projects.   5
   b) Mention the special considerations involving land and water inter relationships for infrastructure planning.   5

15 a) Discuss the strategies for successful implementation of infrastructure projects   5
   b) Write in detail about the infrastructure management system   5

16 a) What is infrastructure? Write the types of infrastructure and explain them briefly.   5
   b) Write in brief historical overview of infrastructure privatization.   5

17 Write a detail note on any **TWO** of the following topics   10
   a) Cultural risk international infrastructure projects
   b) Environmental impact over project cycle
   c) BOOT projects.

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FACULTY OF ENGINEERING

B.E. 4/4 (EEE) II – Semester (Main & Backlog) Examination, May/June 2019

Subject: Electrical Power Distribution Engineering (E-II)

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 Diversity Factor, Significance of Diversity factor on cost of Generation? (2)
2. Draw the Single line diagram of a Typical Radial Distribution System and name all parts of Distribution System? (3)
3. What is substation? List the components in substation? (3)
4. What is meant by Back feed? (2)
5. Arrange the Voltage level starts from distribution substation to consumer point. (2)
6. Explain the Advantages of Shunt Capacitors? (3)
7. Why (R/X) in electrical distribution system is greater than 1.0. (2)
8. Explain about Total Annual Cost (TAC)? (2)
9. What is SCADA, why it helps electrical distribution system? (3)
10. What is consumer information service (CIS) in electrical distribution system? (3)

PART – B (5 x 10 = 50 Marks)

11. a. Discuss various types of loads and their characteristics? (5)
    b. Explain rate structure of domestic Industrial and commercial Consumers? (5)

12. a. Distribution substation experiences an annual peak load of 5,500 kW. The total annual energy Supplied to the primary feeder circuit is 107kWh. Find the annual average power and annual Load Factor. (6)
    b. What is load curve? Explain with an Example. (4)

13. a. Mention the different constraints considered in designing the distribution system. (4)
    b. Derive the Voltage drop Equation for a Square-Shaped distribution service area. (6)

14. a. Explain different functions of consumer information service package. (5)
    b. Draw the Line diagram of Typical Primary distribution feeders. (5)

15. a. Explain the types of distribution transformers. (4)
    b. What are the Factors effecting the Selection of a Primary feeder rating? (6)

16. a. What is Secondary Banking? (5)
    b. What is meant by Express Feeder? (5)

17. Short notes on the following:
    (a) Automatic meter reading (4)
    (b) Autotransformer (3)
    (c) Customer Billing (3)

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FACULTY OF ENGINEERING

B.E.4/4 (EIE) II – Semester (Main & Backlog) Examination, May / June 2019
Subject: Advanced PLC Programming

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. Write the steps to program a PLC.   2m
2. List some electrical devices connected to PLC output modules?   2m
3. What is the difference between Normally closed and Normally open input instruction?   3m
4. Write a PLC program to for the statement "When the start buton is depressed the coil is energized, when button is released the coil remains ON. If the stop button is depressed the coil goes OFF and stays OFF".   3m
5. Convert the word description: "For output H to be ON, input A must be ON and both inputs C and D must be OFF. In addition, one or more of inputs E,F, and G must be OFF", into equivalent Ladder diagram.   3m
6. Write the types of PLC Timer functions.   3m
7. What is use of coil in ADD and Sub PLC function?   3m
8. Write a program to demonstrate the use of MCR function.   2m
9. Write the classification of data MOVE function.   2m
10. What is analogue PLC signal processing?   2m

PART – B (50 Marks)

11. What are the programming ladder arrangement rules for one of the models chosen for analysis? What format arrangements will not be accepted by the CPU?   10m

12. Solve any big process problem using the 9 steps planning sequence?   10m

13. List the five major types of PLC registers. Use a block diagram to show where each type fits into the PLC scheme of operation.   10m

14. a) Using suitable example define 6 different types of compare instruction used in PLC programming.   7m
     b) Construct a PLC compare function for the following:
       An output is ON, if the input count is less than 34 (or) more than 41.   3m

15. a) Write a Ladder program to find how many parts are going past a certain process point in a minute (PPM) using Counter.   5m
     b) Explain the need of repetitive clock used for arithmetic instruction in a PLC programming.   5m

16. Using a suitable block diagram and necessary calculation show how analog input signal is processed in input as well as in output side of PLC system.   10m

17. Write short notes on:
     a) PID control of continuous process b) PLC data Handling functions

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FACULTY OF ENGINEERING

B.E. 4/4 (ECE) II – Semester (Old) Examination, May 2019

Sub: 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

1. What is the function of Control Segment in GPS system?

2. Define various Keplarian elements.

3. Explain about UERE.

4. Explain briefly about ECEF Coordinate system ?

5. Explain about C/A and P Codes.

6. Explain about GPS signal structure.

7. What are the drawbacks of DGPS ?

8. Write briefly about WAAS Concept.

9. Discuss GPS applications in marine, air and land navigation.

10. Write briefly on GPS / GIS integration.

PART – B

11. Explain the basic operating principles of GPS and its architecture with the help of various segments and neat diagrams. [10]

12. (a) List out the errors that are associated with absolute GPS positioning. What is meant by intentional degradation of satellite signal and why ? [6]
    (b) Explain geodetic coordinates with the help of neat sketch. [4]

13. (a) Draw and explain block diagram for generation of C/A and P codes for GPS ? [5]
    (b) Explain the concept of spoofing and antispoofing. [5]

14. Explain in detail about Indian GPS augmentation system with architecture. [10]

15. (a) What are three real applications of GPS that you come across in your life. Explain. [6]
    (b) Differentiate between GLONASS and Galileo systems. [4]

16. (a) With the help of mathematical expressions, explain about carrier phase observation and pseudo-range observation. [5]
    (b) Discuss the architecture of WAAS (Wide Area Augmentation System) with the help of a neat block diagram. [5]

17. Write Short notes on: [10]
    (a) Ellipsoid
    (b) LAAS Vs WAAS
    (c) GPS integration

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BE 4/4 (Mech./Prod.) II – Semester (Main & Backlog) Examination, May / June 2019

Subject: Machine Tool Design (Elective – II)

Time: 3 Hrs   **Max Marks: 75**

Note: Answer all questions from PART – A & answer any FIVE questions from Part- B

PART – A (25 Marks)

1. State the application of special purpose machines.
2. State the basic geometrics produced by machine tool in machining.
3. Differentiate between stepless and stepped machine tool drives.
4. State the principle of rigidity of the machine structure.
5. State the principle of strength of the machine structure.
6. What are the tools used to test functional accuracy of machine tool.
7. State the factors considered in the location of journal bearing in the spindle.
8. State the forces acting in the rotating spindle.
9. State the functions of check values in machine control.
10. State the functions of power pack used in machine tools.

PART – B (50 Marks)

11. (a) Sketch five mechanisms used in machine tool to convert rotary to translator motions.   5
    (b) Explain (i) elementary (ii) complex (iii) compound kinematic structures.   5

12. (a) Derive the spindle speed equation $R_N = R_v \times R_D$ 5
    (b) Explain the basic rules for sliding cluster gear transmission.   5

13. (a) Discuss the various methods to improve the rigidity of machine tool structures.   5
    (b) Explain how the functional accuracy of machine is assessed-explain with an example for lathe machine.   5

14. a) Explain the general methods of increasing rigidity in machine tool structures.   5
    b) Derive safe design of spindle of 'd' diameter subjected to torsion loads.   5

15. a) Explain the working of hydraulic throttle circuit with forward lines and back pressure Line.   5
    b) Explain the working of hydraulic servo control for positioning.   5

16. a) Derive the Goodman diagram for fluctuating stress acting on the machine tool spindles.   5
    b) Explain the basic principles of design of strength of machine tool structures.   5

17. a) Explain the working of tracer controlled hydraulic single edge .   5
    b) Explain the machine tool motion with respect to   5
       (i) tracing
       (ii) enveloping
       (iii) forming
       (iv) generating

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FACULTY OF ENGINEERING

B.E. 4/4(Mech./Prod.) II – Semester (Main & Backlog) Examination, May/June 2019

Subject: Power Plant Engineering (Elective – III)

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

Note: Answer all questions from Part A & any five questions from Part B

PART – A (25 Marks)

1. Name sources of energy available in India.
2. Why ash handling system is necessary in steam power plant?
3. Differentiate between the overfeed and underfeed fuel bed with neat sketch?
4. With a neat sketch name the parts of cooling lower.
5. Explain hydrogical cycle with neat diagram.
6. What is storage? And what is Pondage?
7. What is fertile material? Name few used in nuclear power plant.
8. What is moderation? Name few material used as a moderator.
9. Name few methods of pollution control.
10. What is effluents from power plant?

PART – B (5 x10 = 50 Marks)

11. Explain with neat sketch working of different circuits used in steam power plant?
12. a) Explain the working principle of cyclone furnace with neat diagram.

    b) With neat sketch, explain pulverized fuel burning?

13. a) Discuss flow measurement in a hydroelectric power plant?

    b) What is spillways? Explain.

14. a) Explain the working principle of PWR in nuclear power plant.

    b) Discuss various methods of radioactive waste disposal.

15. Explain the following term related to the power plant.

    a) Load curve

    b) Load factor

    c) Delivery factor.

16. Write a brief note on retort stroker and draught system in steam power plant.

17. a) Classify gas turbine power plant.

    b) Sketch general arrangement of power distribution system.

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FACULTY OF ENGINEERING

B.E. 4/4(A.E) II – Semester (Main & Backlog) Examination, May/June 2019

Subject: Vehicle Body Engineering (Elective – II)

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

Note: Answer all questions from Part A and any five questions from Part B

PART – A (25 Marks)

1. Write the classification of Car bodies.
2. What is the influence of the floor height in the bus body layout?
3. What are the benefits and importance of Aerodynamic study?
4. What are the methods of reducing air resistance?
5. Define Asymmetric loud.
6. Write note on body shell analysis.
7. Define active safety and Passive safety as applied to Vehicle.
8. Write note on visibility. What is significant role in its vehicle design?
9. Explain the term bondenizing.
10. What are functions compositions of paint?

PART – B (5 x10 = 50 Marks)

11. Explain with neat sketch different types of Bus body styles.
12. Explain the methods of reducing Air resistance in vehicle bodies.
13. Explain load distribution and stress analysis of structure. (Vehicle body)
14. Describe in detail the usage of safety equipment in car.
15. Explain different types of materials used in vehicle body construction.
16. a) How do you optimize the front end of vehicle for minimum drag?
    b) Write note on car door and window regulator.
17. a) Explain briefly air flow visualization test.
    b) Explain corrosion and anti corrosion method of painting.

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FACULTY OF ENGINEERING
BE 4/4 (CSE) II Semester (Main & Backlog) Examination, May/June 2019

Subject: Information Retrieval Systems (Elective-III)

Time: 3 Hours   Max. Marks: 75

Note: Answer all questions from Part – A & any five questions from Part - B
Part – A (25 Marks)

1.	What are the characteristics of an IR Model?	2
2.	Define a Bayesian Network.	2
3.	Define fuzzy set Model. What are the Operations defined on fuzzy sets?	3
4.	Define Pattern Matching.	3
5.	Define metric clusters.	2
6.	How does query processing proceed in a distributed IR system?	3
7.	What are suffix trees and suffix Arrays?	3
8.	What is metadata?	2
9.	Define recall and precision.	3
10.	List the taxonomy of parallel architectures.	2

Part – B (50 Marks)

11.	Explain about any two classical IR Models.	10
12.	Explain about structured text retrieval models.	10
13.	Explain query expansion through local clustering and through global analysis.	10
14.	Explain in detail the steps of document preprocessing.	10
15.	Explain text compression using Huffman coding.	10
16.	a) Explain about sequential searching in an IR system.	5
	b) Write short notes on dictionary methods.	5
17.	Explain about MIMD and SIMD Architectures.	10

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FACULTY OF ENGINEERING
B E 4/4(CSE) II – Semester(Main & Backlog) Examination, May/June 2019

Subject: Advanced Databases (Elective – III)

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

Note: Answer all questions from Part – A, & any five questions from Part – B.

PART – A (25 Marks)

1. What is the advantage of constructor functions model? How can you declare the Constructor
    function?　　　　　　　　　　　　　　　　　　　　　　　　　　　　[3]
2. What is the difference between Object oriented and Object relational model?　　[3]
3. What is hardware Swizzling?　　　　　　　　　　　　　　　　　　　[2]
4. What is the advantage of using SAX API over DOM API in processing XML documents?[3]
5. What are the three major components of disk I/O cost? Which of these Components are considered in I/O cost estimation of query processing algorithms?　　　　[3]
6. What is the main drawback of hash join algorithm?　　　　　　　　　[2]
7. What are the different types of transparencies that are ensured by DDBMS?　[2]
8. Give Examples for some popular Cloud base data storage systems?　　　[3]
9. What is a "valid time" database?　　　　　　　　　　　　　　　　[2]
10. What are the two broad classes of applications handled by database systems?　[2]

PART – B (50 Marks)

11. a) How do you store Composite Attributes in object relational databases using SQL? Illustrate with example?　　　　　　　　　　　　　　　　　　　[4]

    b) Consider the relational schema below.　　　　　　　　　　　　　[6]
    　　employee (person_ name, street, city)
    　　works (person_ name, company_ name, salary)
    　　company (company_ name, city)
    　　manages (person_ name, manager_ name)
    　　　　i. Give a schema definition in SQL-2003 corresponding to the relational schema, but using references to express foreign-key relationships.
    　　　　ii. Use the above schema definition and express the following queries in SQL-2003.
    　　　　　　a. Find all Employees in the database, who live in the same city and on the same street as do their managers.
    　　　　　　b. Find the names of all employees in this database who do not work for "First Bank Corporation".

    　　　　　　c. Find the names of all employees in this database who earn more than every employee of "Small Bank Corporation".

12. Write DTD and XML schema for the supplier –parts data base which stores　　[10]
    　　a) A list of parts(part name and id)
    　　b) A list of suppliers (suppliers name and id)
    　　c) A list of projects: for each project element, a nested list of sub elements that represent the parts used in that project. Include the information on who supplies that part and in what quantity.

13. How do you sort a file of 108 blocks using merge sort .Assume 5 buffer blocks are available in main memory? Also calculate the no .of block transfers and seeks. Show the detailed steps? [10]

14. What factors could result in Skew when a relation is partitioned on one of its attributes by

    i) Hash Partitioning

    ii) Range Partitioning, In each case, what can be done to reduce the skew? [10]

15. Explain how K-D tree is used to index spatial data consisting of two or more dimensions? [10]

16. How do you write aggregate queries that requires grouping of results in XQuery? Illustrate with an example. [10]

17. Write short notes on [10]
    a) Object relational mapping
    b) Cost based Query optimization

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FACULTY OF ENGINEERING
BE 4/4 (I.T) II Semester (Main & Backlog) Examination, May/June 2019

Subject: Information Retrieval Systems

Time: 3 Hours   Max. Marks: 75

Note: Answer all questions from Part – A & any five questions from Part - B

Part – A (25 Marks)

1	Differentiate Retrieval and Browsing.	2
2	Write down the formula for cosine similarity between query **q** and document **d**	2
3	List the three major parts of TREC collections.	3
4	Write down Harmonic Mean and E Measure for evaluating retrieval performance.	2
5	What are the advantages of user relevant feedback for query reformulation	3
6	What is edit distance? Explain with an example.	3
7	Define Unary, Elias- , and Elias – coding schemes. Give examples of each	3
8	What are the steps of searching algorithm on an Inverted Index?	2
9	Does the portioned parallel processing on a MIMD machine improve query response time or throughput? Justify your answer.	3
10	What is false drop problem in signature files	2

Part – B (50 Marks)

11	Explain Belief network model of information retrieval	10
12	Describe the following	
	(a) Model based on Non-Overlapping Lists for structural retrieval	5
	(b) Types of Browsing	5
13	(a) Explain Query formulations based on Pattern matching	6
	(b) Assume the following:	
	A system contains80 documents on a particular topic. A search was conducted on that Topic and 60 documents were retrieved. Of 60 documents retrieved 45 were relevant. Calculate the precision and recall scores for the search.	4
14	(a) Briefly explain query expansion through local clustering	5
	(b) Briefly explain Query expansion based on a statistical thesaurus	5
15	Discuss the various steps in document preprocessing	10
16	Discuss distributed information retrieval	10
17	Write a short notes on the following	
	(a) Boyer-Moore text search algorithm	6
	(b) Signature Files	4

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Faculty of ENGINEERING
BE V Semester (CBCS) (Civil) (Suppl.) Examination, May/June 2019

Subject: Hydraulic Machines

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

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

PART – A (20 Marks)

1. Draw the inlet and outlet triangles for Pelton wheel turbine. (2)
2. Draw the neat diagram of centrifugal pump and explain components of centrifugal pump (2)
3. Explain why draft tube necessary in reaction turbines? (2)
4. Define suction specific speed. (2)
5. Explain why Priming is needed in pumps. (2)
6. For laminar flow in a pipe , the drop in pressure p is a function of the pipe length L , its diameter D, mean velocity V, and dynamic viscosity μ. Using Rayleigh's method, develop an expression for p. (2)
7. Discuss the dynamic forces of the jet impinged in different situations. (2)
8. Describe classification of turbines. (2)
9. Define manometric and mechanical efficiency of a centrifugal pump. (2)
10. What do you understand by net positive suction head (NPSH). (2)

PART B (50 Marks)

11. a) The head loss h_L due to fluid friction in a pipe depends on diameter D, length L, roughness (k) velocity V, gravity g and fluid density and viscosity μ. Derive the expression h_L in dimensionless form. (5)

   b) 1: 6 scale model of a passenger car is to be tested in a wind tunnel. The prototype velocity is 60 Kmph. If the model drag is 250N, what is the drag and power required to overcome the drag in the prototype. The air in the model and prototype can be assumed to have same properties. (5)

12. a) A jet of water having a velocity of 35 m/s on a series of vanes moving with a velocity of 20 m/s. The jet makes an angle of 30 ^{0} to the direction of motion of vanes when entering and leaves at an angle of 120 ^{0} . Draw the triangles of velocities at inlet and outlet and find.
    i) The angles of vanes tips so that water enters and leaves without shock
    ii) The work done per N of water entering the vanes and
    iii) Efficiency. (5)
  b) Discuss the dynamic forces of the jet impinged in different types of vanes. (5)

13 a) Derive the draft tube efficiency formula in case of reaction turbine and state the functions (5)

   b) Explain the characteristic curves of turbine with neat diagrams. (5)

14 a) A horizontal shaft centrifugal pump lifts water at 65^0C. The suction nozzle is one meter below pump centerline. The pressure at this point is equal to 200 kPa gauge and velocity is 3 m/s. Steam tables show saturation pressure at 65^0C is 25 kPa, and specific volume of the saturated liquid is 0.0010 m^3/kg. Determine the Net Positive Suction Head (NPSH) in meters. (Fig 1) (5)
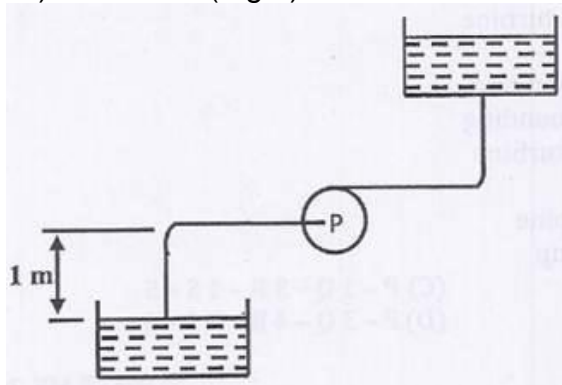

Fig 1.

   b) Explain the functions of air vessels in a reciprocating pump. (5)

15 a) A double acting reciprocating pump having piston area 0.2 m^2 has a stroke 0.5 m long. The pump is discharging 3.4 m^3 per minute at 45 rpm through a height of 10 m. Find the slip of the pump and power required to drive the pump. [5]

   b) Draw the indicator diagram for reciprocating pumps considering the acceleration and friction. [5]

16 Write Short notes on the following: [10]

   a) Derive specific Equation for turbines

   b) Describe Rayleigh method

   c) Reciprocating pump features

17 a) Explain under which conditions multistage pumps are needed with neat sketch with relevant equations. (5)

   b) Discuss the efficiency and design principles of Pelton wheel turbine. (5)

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FACULTY OF ENGINEERING

B.E. V – Semester (EEE/Inst.) (CBCS)(Supple.) Examination, May / June 2019

Subject: Linear Control Systems

Time: 3 Hours   Max. Marks: 70

Note: Answer all questions from Part A & any Five questions from Part B.

PART – A (20 Marks)

1) Define forward path, loop and non touching loop. [3]

2) Why synchro receiver rotor is designed to be cylindrical? [1]

3) Which of the following system is most desirable for practical applications? Why? [2]

   i) Overdamped system

   ii) Underdamped system

   iii) Undamped system

4) What is the effect of increasing system gain on steady state error? [1]

5) Examine the stability of the system whose characteristic equation is
   $S^5 + 4S^4 - 8S + 11S^2 + 6S + 4 = 0$ using Routh Hurwitz criterion. [3]

6) How does root locus useful in stability studies? [2]

7) Draw the polar plot for the following system [2]

$$G(s) = \frac{10}{(s+1)(s+2)}$$

8) How to choose state variables in a system? [2]

9) Define observability. [2]

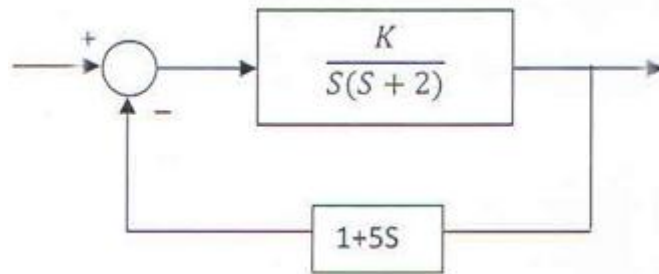10) What applications do the Bode diagram more suitable? [2]

PART – B (5 x 10 = 50 Marks)

11. Determine the transfer function C(s)/R(s) of the system shown in Figure below by
    using (i) Block diagram reduction technique.(ii) Manson's gain formula. [10]
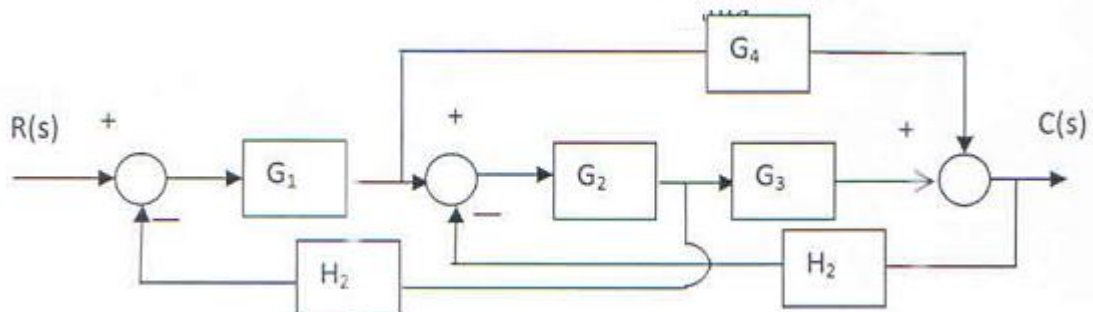
12. (i) Determine the K value so that steady error of the following system is 6 when it is excited with a ramp input. [5]

(ii) Explain the effects of P,I and D controllers on system response. [5]

13. Draw the root locus of the unity feedback system whose open loop Transfer function

is $$G(s) = \frac{K}{s(s+4)(s^2 + 8s + 32)}$$

Determine and mark the centroid, break away points, angle of departure and intersection of imaginary axis on the plot. [10]

14. Sketch the Nyquist plot for the open loop transfer function given below. Determine the range of value of K for closed loop system stability. $GH(s) = \frac{K(2s+1)(s+1)}{(5s+1)(s-1)}$ [10]

15. Sketch the Bode Magnitude plot for the transfer function. [10]

$$GH(s) = \frac{Ks^2}{(1+0.2s)(1=0.02s)}$$

Determine 'K' such that gain cross over frequency is 5 rad/sec.

16. (a) Obtain controllable canonical form and diagonal form state models for the system whose transfer function is given below.

$$\frac{C(s)}{U(s)} = \frac{(2s+3)}{(s+1)(s+2)(s+3)}.$$ [5]

(b) $A = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix}$, Determine the state transition matrix? [5]

17. a) Discuss how synchro used as an error detector [5]

b) List the steps to design a Lag compensator. [5]

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FACULTY OF ENGINEERING

B.E. (ECE) V – Semester (CBCS) (Suppl.) Examination, May / June 2019

Subject: Automatic Control Systems

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

### Note: Answer all questions from Part-A, & Any FIVE questions from Part-B.

PART – A (20 Marks)

1. Differentiate Open-loop and Closed-loop systems

2. Define: Peak time, settling time, with respect to transient response

3. Define Source, Sink , as in SFG

4. Define: Order of a system and Type of a system

5. Why Signal flow graph are preferred over Bode plots

6. What are Break-in point and Break-away point in Root-locus plots?

7. Define gain cross over frequency and phase cross over frequency in Bode plots

8. Explain briefly the different types of controllers

9. Explain the need for   compensating Networks?

10. Write any four advantages of a Digital Control System

PART – B (5x10 = 50 Marks)

11 a) Determine the overall transfer function using block diagram reduction
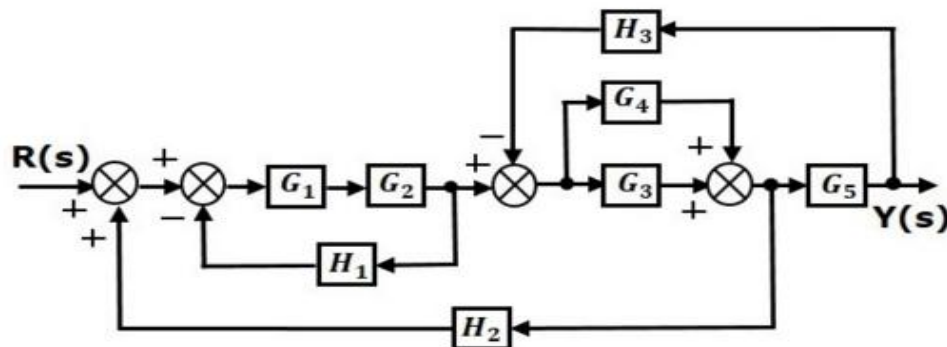
   b) State and explain Masons gain formula

12 a) Using Routh Criterion, state the stability of the system represented by the characteristic equation: $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$

   b) Determine the steady-state errors for unit-step, unit-ramp, unit-parabolic inputs, for given open loop transfer function: $G(S) = \dfrac{1}{S(0.5S + 1)(0.2S + 1)}$

..2

13 a) Construct the Root Locus for the given open Loop transfer Function,

$$G(S) = \frac{K}{S(S+1)(S+2)}$$

b) Derive transfer functions of P, I and D controllers .

14 Sketch the Bode plot and calculate the gain cross over frequency and phase cross over frequency for the given open loop transfer function, $G(S) = \dfrac{20(S+4)}{S(S+1)(S+2)}$.

15 a) . Explain the block diagram of digital Control System

   b) Describe the concept of stability in Discrete control system

16 a) Discuss the state controllability of the system

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & 1.5 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 4 \end{bmatrix} u$$

   b) Obtain the state space representation of the system

$$\frac{C(s)}{U(s)} = \frac{10(s+2)}{s^3+3s^2+5s+15}$$

17 Write short notes (Any two)

   a) Principle of argument & Nyquist stability criterion.

   b) PID Controller

   c) Compensators

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FACULTY OF ENGINEERING

BE (M/P) V-Semester (CBCS) (Suppl.)Examination, May / June 2019

Subject : Machine Design

Time: 3 HOURS   **Max. Marks:70**

Note: Answer all questions from Part-A & any five questions from Part-B

Part-A (20 Marks)

1. How to avoid buckling in compression springs.

2. What are the different types of springs and where are the springs of non circular cross sections used.

3. Write two preventive measures to avoid gear tooth failure.

4. What is herringbone gear? Draw a neat sketch and explain.

5. Define the terms (a) equivalent bearing load (b) reliability related to Rolling contact bearings.

6. Compare journal bearings with antifriction bearings.

7. What is the function of the flywheel and mention two applications?

8. What is the function of a valve spring in an I.C. Engine.

9. Mention the criteria for the design of C- clamp.

10. Write the relationship between moment and curvature for trapezoidal section.

PART-B (50 Marks)

11. A bumper consisting of two helical steel springs of circular section brings to rest a rail wagon of mass 1500 kg and moving at 1.2 m/s, while doing so the springs are compresses by 150mm. The mean diameter of coils is 6 times to the wire diameter. The permissible shear stress is 400 Mpa. Determine (a) Max. Force on each spring (b) Wire diameter of the spring(c) Mean diameter of the coils and (d) Number of active coils. Take $G = 0.84 \times 10^5$ Mpa.

12. A pair of bevel gears is required to transmit 12 KW power at 500 rpm from a motor shaft to a machine shaft. The speed reduction is 4:1 and the shafts are inclined at 60° .The pinion is to have 24 teeth with pressure angle 20° and is made of cast iron gear with static stress of 55 N/mm^2.The pinion is mounted mid way on the shaft which is supported between two bearings having a span of 200 mm. Design the gear drive.

13. A full journal bearing of 50 mm diameter and 100 mm long has bearing pressure of 1.5 Mpa the speed of the journal is 1000rpm,ratio of journal diameter to diametric clearance(d/c) is 1000.The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be 0.11 kg/mt-sec. Determine (i)amount if the artificial cooling required (ii) the mass of the lubricating oil required if the temperature difference is 12° C, specific heat of the oil 1900 j/kg/^{o}C. Take heat dissipation coefficient as 500 W/m^2/^{o}C.

…2

14. A ball bearing is operating on a work cycle consists of three parts as follows. A radial load of 2500N at 1200 rpm for one quarter cycle. A radial load of 4500N at 900 rpm for on half cycle and Radial load of 2000N at 1440 rpm for the remaining cycle. The Expected life of the bearing is 12000 hr. calculate the dynamic load carrying capacity of the bearing.

15. Design a plain carbon steel centre crank shaft for a single acting 4 stroke single cylinder engine for the following data;
Bore 400mm, stroke 600mm, Engine speed 200 rpm, mean effective pressure 0.5 MPa, max. Combustible pressure 2.5 MPa, Weight of the Flywheel used as pulley 50KN, Total belt pull 6.5 KN.
When the crank has turned through 35^0 from TDC the pressure on the piston is 1 MPa and the torque on the crank is maximum. The ratio of connecting rod length to the crank radius is 5.Assume any other data required for the design.

16. The bed diameter of a crane hook is 90mm.The cross section of the hook is trapezoidal with depth equal to 180mm.The width of the section at the larger end is 120mm and at the smaller end is 90mm.The load on the hook is 150KN.Determine the Maximum stresses in tension and compression.

17. Write short notes on
    i) Design considerations for a gear drive
    ii) Theory of bending in different sections with sketches.
    iii) Piston skirt.

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FACULTY OF ENGINEERING

B.E. (A.E) V – Semester (CBCS) (Suppl.) Examination, May / June 2019

Subject: Design of Machine Components

Time: 3 Hours   Max.Marks: 70

Note: Answer all questions from Part-A and any five questions from Part-B

PART – A (10x2 = 20 Marks)

1   State the features of 'Adaptive design'.
2   What is factor of safety? Explain briefly about the importance of factor of safety.
3   What is eccentric loading and list out some applications of eccentric loading?
4   What is meant by Cumulative fatigue damage?
5   State theories of failure are applied in shaft design?
6   What are the standard dimensions of sunk key with respect to the shaft diameter? Sketch the sunk key.
7   Give four examples for locking devices with neat diagrams.
8   What strengths of rivets are considered for the design of riveted joint?
9   Derive the strength of transverse fillet welded joints with neat sketches.
10 Difference between differential screw and compound screw with suitable diagrams.

PART – B (5x10 = 50 Marks)

11 A cylindrical shaft made of steel of yield strength 700MPa is subjected to static loads consisting of bending moment 10kN-m and a torsional moment 30kN-m. Determine the diameter of the shaft using two different theories of failure, and assuming a factor of safety of 2. Take E = 210GPa and poisson's ratio = 0.25.

12 A pulley is keyed to a shaft midway between two bearings. The shaft is made of cold drawn steel for which the ultimate strength is 550MPa and the yield strength is 400MPa. The bending moment at the pulley varies from – 150N-m to + 400 N-m as the torque on the shaft varies from – 50N-m to + 150N-m. Obtain the diameter of the shaft for an indefinite life. The stress concentration factors for the keyway at the pulley in bending and in torsion are 1.6 and 1.3 respectively.
Take the following values:
Factor of safety = 1.5
Load correction factors = 1.0 in bending, and 0.6 in torsion
Size effect factor = 0.85
Surface effect factor = 0.88

13 Two lengths of mild steel tie rod having width 200mm and thickness 12.5mm are to be connected by means of a butt joint with double cover plates. Design the lozenge joint if the permissible stresses are 80MPa in tension, 65MPa in shear and 160MPa in crushing. Make a sketch of the joint.

14 A 200 × 150 × 10 mm angle is to be welded to a steel plate by fillet welds as shown in figure. If the angle is subjected to a static load of 200kN, find the length of weld at the top and bottom. The allowable shear stress for static loading may be taken as 75MPa.
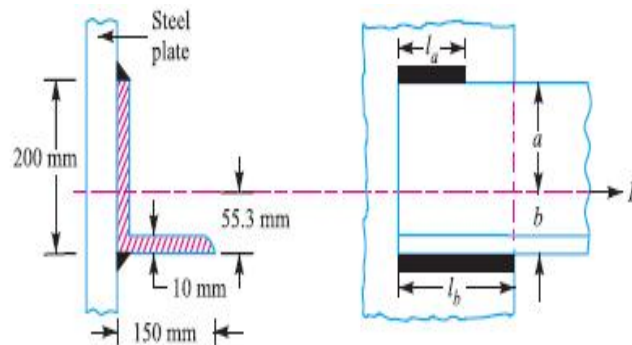
15 For supporting the travelling crane in a workshop, the brackets are fixed on steel columns as shown in figure. The maximum load that comes on the bracket is 12kN acting vertically at a distance of 400mm from the face of the column. The vertical face of the bracket is secured to a column by four bolts, in two rows (two in each row) at a distance of 50mm from the lower edge of the bracket. Determine the size of the bolts if the permissible value of the tensile stress for the bolt material is 84MPa. Also find the cross-section of the arm of the bracket which is rectangular.
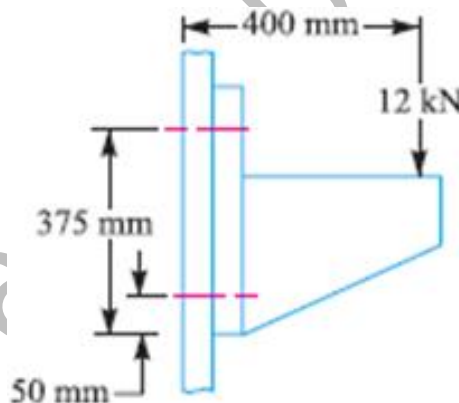
16. Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 32kW at 960r.p.m. The overall torque is 20 percent more than mean torque. The material properties are as follows:
a) The allowable shear and crushing stress for shaft and key material is 40MPa and 80 MPa respectively.
b) The allowable shear stress of cast iron is 15MPa.
c) The allowable bearing pressure for rubber bush is 0.8 N/mm^2.
d) The material of the pin is same as that of shaft and key.
Draw neat sketch of the coupling.

17 Design a knuckle joint for a tie rod of a circular section to sustain a maximum pull of 70kN. The ultimate strength of the material of the rod against tearing is 420MPa. The ultimate tensile and shearing strength of the pin material are 510MPa and 396MPa respectively. Determine the tie rod section and pin section. Take factor of safety = 6.

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FACULTY OF ENGINEERING

B.E. V – Semester (CBCS) (CSE) (Supple.) Examination, May / June 2019

Subject: Operating Systems

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

Note: Answer all questions from Part – A, & Any five questions from Part – B.

PART – A (20 Marks)

1. Define Operating system.

2. Draw the process state transition diagram.

3. What is race condition?

4. State the necessary conditions for the deadlock to occur.

5. What is Thrashing?

6. What is fragmentation problem?

7. Why file name extensions are used?

8. Write about P threads.

9. What is the need for User authentication?

10. List the design goals of LINUX.

PART – B (50 Marks)

11. (a) What is critical section problem? (4)

   (b) What is Semaphore? Explain how it is used to solve the critical section problem with example. (6)

12. Consider the following set of processes. (10)

Process	Burst time	Priority	Arrival time
P1	10	3	0
P2	3	2	2
P3	1	1	1
P4	5	4	1
P5	7	2	1

(i) Draw the Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a larger priority number implies a higher priority), and RR (quantum = 2).

(ii) Calculate the turnaround time and waiting time of each of the process for each of the algorithm.

Contd..2

13. (a) Write the banker's algorithm for deadloack avoidance (5)

(b) Consider the following snapshot of a system: (5)

	Allocation A B CD	Max ABCD	Available ABCD
P0	2001	4212	3321
P1	3121	5252	
P2	2103	2316	
P3	1312	1424	
P4	1432	3665	

   Illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.

14. Consider the following page-reference string 10

7,0,2,1,3,4,2,1,0,2,1,4,3,2,1,0,0,1,2,1.

Calculate the number of page faults that would occur for the following algorithms

assuming frame size as 3.

(i) FIFO   (ii) Optimal   (iii) LRU   (iv) MRU   (v) LFU   (vi) MFU

15. Explain RAID structure. 10

16. a) Explain different program threats. 4

 b) Explain how firewall can be used to protect systems and networks? 6

17. Write short notes on: 10

(a) Free space allocation techniques.

(b) Inverted paging.

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FACULTY OF ENGINEERING

B.E. (IT) V-Semester (CBCS) (Suppl.) Examination, May / June 2019

Subject : Operating Systems

Time : 3 hours   **Max. Marks : 70**

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

PART – A (10x 2 = 20 Marks)

1 Mention the advantages of dual mode operating systems.
2 What is the difference between wait( ) and signal signal( ) operations?
3 List the necessary conditions for deadlock occurance.
4 What is a PCB? Draw its structure.
5 List the various operating system services.
6 What is multithreading? Give an example.
7 Write a brief note on working set model.
8 What is meant by starvation?
9 Define seek time and rotational latency with respect to disk structure.
10 Draw a neat diagram showing the levels of RAID.

PART – B (5 x 10 = 50 Marks)

11 a) Explain briefly about the layered approach used in operating system structure.   4
   b) What are system calls? Explain briefly various types of system calls.   6

12 a) Describe the idea about critical-section problem.   5
   b) What is a semaphore?   Explain about bounded buffer problem using semaphores.   5

13 a) What is the difference between preemptive scheduling and non-preemptive scheduling?   5
   b) Explain multilevel queue scheduling and multilevel feedback queue scheduling.   5

14 Discuss the various page replacement algorithms by describing method of finding the page faults with a suitable example.   10

15 a) Discuss about file allocation methods.   5
   b) Explain about various disk scheduling strategies with a suitable example.   5

16 a) Explain how cryptography is used as security troll.   6
   b) Explain the characteristics of dual time systems.   4

17 Write short notes :
   a) Access Matrix   5
   b) Fire walling   5

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