Time: 3 hrs

Max.Marks:100

Answer any Five Questions
All questions carry equal marks

1. (a) The load flow data for the sample power system are given below. The voltage magnitude at bus 2 is to be maintained at 1.04 p.u. The maximum and minimum reactive power limits of the generator at bus 2 are 0.35 and 0.0 p.u. respectively. Determine the set of load flow equations at the end of first iteration by using Newton -Raphson method.

Impedance for sample system:

Bus code	Impedance	Line charging admittance
1–2	$0.08 + j0.24$	0.0
1–3	$0.02 + j0.06$	0.0
2–3	$0.06 + j0.18$	0.0

Schedule of generation and loads:

Bus code	Assumed voltages	Generation MW	Generation MVAR	Load MW	Load MVAR
1	$1.06 + j0.0$	0	0	0	0
2	$1.0 + j0.0$	0.2	0.0	0.0	0.0
3	$1.0 + j0.$	0	0	0.6	0.25

(b) (i) Write the algorithm for gauss seidal method.
(ii) Compare different solution methods.

2. (a) Explain multi quadrant operation of DC drives with neat sketch.

(b) A 100KW 500V 2000RPM separately excited DC motor is energized from 400V 50HZ 3ph source through a 3 phase full converter the voltage drop in conducting thyristor is 2V, the DC motor parameters are Ra=0.1Ω, Km=1.6 volt-sec/radians, La=8mH, rated armature current=210 A, No load armature current equal to10% of rated current.

(1) Find the no load speed at firing angle 30^0

(2) Find the firing angle for a speed of 2000rpm at rated armature current. Determine also the supply power factor

3. (a) Write about Economic Load dispatch by considering with and without losses.

(b) Assume that all three of the thermal units described below are running. Find the economic dispatch schedules as requested in each part. Use the method and starting conditions given.

Unit Data	Minimum (MW)	Maximum (MW)	Fuel Cost (R/MBtu)
$H_1 = 225+8.4P_1+ 0.0025P_i^2$	45	350	0.80
$H_2 = 729+6.3 P_2+ 0.0081P_2^2$	45	350	1.02
$H_3 = 400+7.5P_3+ 0.0025P_3^2$	47.5	450	0.9

(i) Use the lambda-iteration method to find the economic dispatch for a total demand of 450 MW.

(ii) Use the base-point and participation factor method to find the economic schedule for a demand of 495MW. Start from part i.

4. (a) Find the solution and state transition matrix for the given system

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u$$

$$x_1(0) = 1, \ x_2(0) = 1$$

(b) Verify the stability of a system by using bode plot and determine phase margin and gain margin

$$G(S)H(S) = \frac{100}{S(S+4)(S+16)}$$

5. (a) Derive phase variable, Canonical and Jordan canonical state space models from generalized n^{th} order transfer function.
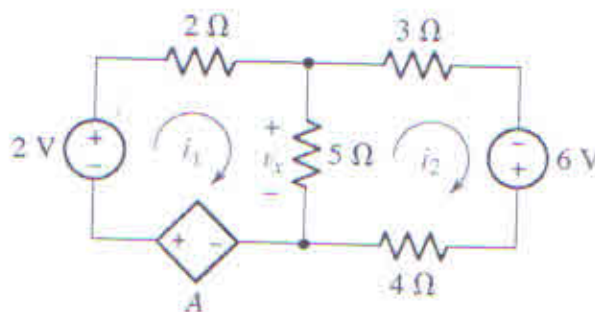
(b) Explain why state variable approach is known as modern control approach.

6. (a) Determine the transfer function for the circuit given below
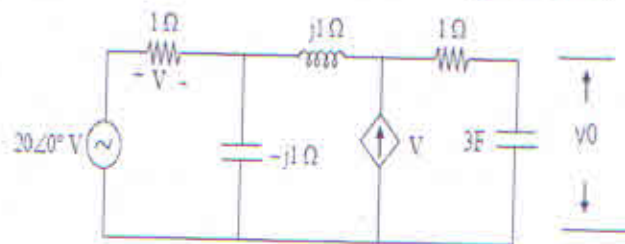
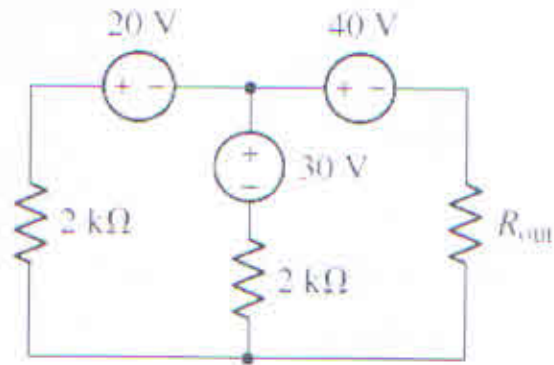(b) Explain clearly the concept of reactive power in Single phase and Three phase circuits.

7. (a) Determine i_1 in the circuit of Fig. below if the controlling quantity A is equal to (1) $2i_2$; (2) $2V_x$

(b) Explain Maximum Power Transfer theorem for different types of loads.

8. (a) Explain Thevinen's theorem with an illustration?

(b) Consider the circuit of below

Find
(a) If Rout =3 kΩ, find the power delivered to it.
(b) What is the maximum power that can be delivered to any Rout?
(c) What two different values of Rout will have exactly 20 mW delivered to them?

*****

Answer any five of the following eight questions

1) Draw typical stress-strain diagrams for high tensile steel and cast iron?

2) The Young's modulus and Poisson's ratio for a material is given by 200 GPa and 0.3. Find the modulus of rigidity and the bulk modulus.

3)

A beam AB is located supported and loaded as shown in Figure 1. Find the reactions at the supports.
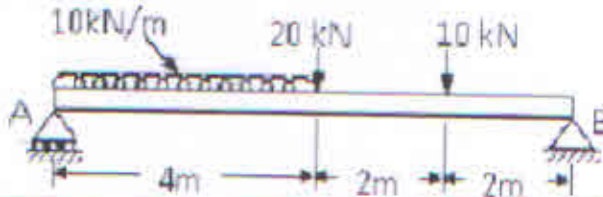
4)

What is valve timing of 4 stroke engine? Explain its significance through a diagram. During the trial of a single-cylinder, four-stroke oil engine, the following results were obtained. Cylinder diameter = 20cm, Stroke = 40 cm, Mean effective pressure = 6 bar, Torque = 407 Nm, Speed = 250 rpm, Oil consumption = 4 kg/h, Calorific value of fuel = 43 MJ/kg, Cooling water flow rate = 4.5 kg/min, Air used per kg of fuel = 30 kg, Rise in cooling water temperature = 45°C , Temperature of exhaust gases = 420°C, Room temperature = 20°C, Mean specific heat of exhaust gas = 1 kJ/kg K, Specific heat of water = 4.18 kJ/kg K. Find the ip, bp, and draw up a heat balance sheet for the test in kJ/h.

5) Explain the functions of modern Industrial manager?.

6) Explain theories of plant location

7) Discuss about different types plant layouts

8) Discuss principles of Motion economy

Prof V.V.S. KESAVARAO
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Board of Studies
Dept. of Mechanical Engineering
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Visakhapatnam-530 003

ANDHRA UNIVERSITY: AU COLLEGE OF ENGINEERING
MODEL PAPER
Qualifying Examination for PhD Submission
for (Full time, Part time and Extra Mural).
NANOTECHNOLOGY

Time: 3 hrs

Max. Marks: 100

Answer any five questions
All questions carry equal marks

1. (a) Discuss in detail about nano materials used in conventional technologies and Compare the properties of nano gold and bulk gold?
   (b) Obtain the relation between the edge of the unit cell and atomic radius for the BCC and FCC lattices?

2. (a) How does size of the material affect the physical, electrical and mechanical properties? Explain with example.
   (b) What are the different synthesis techniques of nanomaterials? Explain each of them with example?

3. (a) Define Nanorod and Quantum well? What are the fundamental techniques for fabrication of thin films and explain with neat sketch?
   (b) Define Nanocomposite and Outline the method of synthesis of nanocomposites through sol-gel process with example?

4. (a) Discuss in detail about the importance of EDS for composition analysis using SEM explain with neat sketch? Write its advantages and disadvantages?
   (b) Write the working principle of XRD? How can we measure Particle size and strain, Orientation, texture and Residual Stress using X – Ray diffraction method?

5. (a) What are different probe techniques? Compare and Differentiate conducting and non conducting probe techniques?

   (b) Explain the methodology of Top – Down and Bottom – Up approaches? Write advantages, disadvantages and applications of these fabrication techniques?

6. Explain the following with example
   a. Aerosol Synthesis
   b. Electrochemical deposition

7. (a) Discuss the importance of Raman spectroscopy for characterizing carbon based materials? Explain with example and neat sketch?
   (b) Discuss in detail about nano materials for heat transfer applications? Explain with example?

8. Define battery and Fuel cell and what are the differences between batteries and fuel cells? How carbon nanotube based composites used in energy storage applications?

Dr. S.V.NAIDU, M.Tech.,Ph.D
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Professor & HE   epartment in
Chemical Enr   epartment
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DEPARTMENT OF GEO-ENGINEERING&RDT
COLLEGE OF ENGINEERING (A),
ANDHRA UNIVERSITY

Model Question paper

Qualifying Examination for Ph.D.

Time: 3Hrs.   Max.Marks:100

Answer any five questions
All questions carry equal marks

1. Explain about principles and stages in Remote Sensing system.

2. Write an essay on classification of aerial photographs, scale and resolutions.

3. What is digital image processing? Explain image rectification and restoration.

4. Describe about data types, data base structures uses in GIS.

5. What is GPS? Explain about GPS system use in Geospatial based study.

6. Explain about point, line and polygon in vector GIS.

7. Give a brief account of spatial data mining and interest GIS.

8. Write short note on any two of the following.

   A) Spectral signature of vegetation, soil and water.

   B) Hyper spectral Remote Sensing.

   C) Mobile GIS.

Prof. P.Jagadeeswara Rao
Chairman, Board of Studies
Dept. of Geo-Engineering
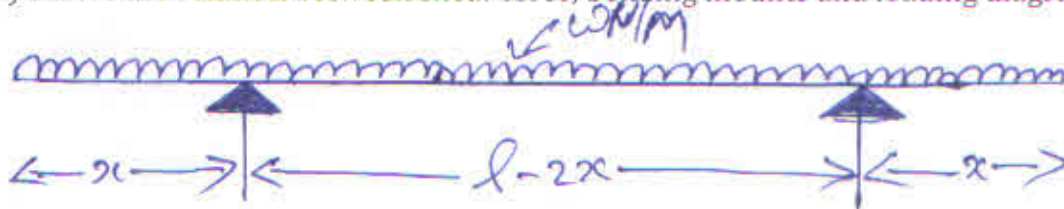College of Engineering (A)
Andhra University
Visakhapatnam-530 003

TIME: 3 HOURS   MAX.MARKS: 100

Answer any FIVE Questions.
All questions carry equal marks.

1. a) Draw shear force and bending diagram for the given loading diagram.
    b) Derive the relation between shear force, bending mounts and loading diagrams.

2. Derive equations for euler's theory of columns of below conditions
    i)   Both ends are fixed
    ii)   Both ends are hinged.

3. a). Derive the Bernoulli's equation, and also mention assumptions made.
    b) State and explain second law of thermodynamics with suitable.

4. a) Describe the working of a simple vapor compression refrigeration cycle with the help of a legible sketch.
    b) For the same compression ratio and heat rejection which cycle is most efficient. Otto, diesel or dual? Explain with PV and TS diagrams.

5. Answer the following

    (a) Explain the difference between Metacentric Height & Metacentric Radius

    (b) Explain the Effect of hull roughness on the resistance of a ship.

    (c) Name various general types of propulsion devices used for ship propulsion.

6. (a) With the help of a neat sketches, define the following terms of a screw

    propeller. (i) Pitch, (ii) Blade area ratio, (iii) skew & (iv) Rake

    b) i. Cavitation in propellers and different types of cavitation

        ii. Composite Materials used in ship building and their merits.

        iii. What is meant by Dynamical Stability and what is its significance?.

7. a). Explain single point cutting tool nomenclature with the help of a diagram.

    b). What are different types of non-traditional machining processes? Explain abrasive jet and Ultrasonic machining working principles

8. a). Define Bauschinger effect and explain its mechanism.
    b). Explain types of Bravais crystal lattice structure with neat sketches.

BOS

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Model Paper
Pre Ph D Exam in Computer Science & Engineering

Answer any 5 questions.
All questions carry equal marks.

Max. Time: 3 Hrs
Max. Marks: 100

1. a) Write a report that gives an overview of the Spiral software lifecycle model, and demonstrate how it might be used to plan, organize, and run new software development projects in commercial enterprises. (10)

   b) Describe the framework of CMM Process model. Outline its capability levels, key process areas and key practices. (10)

2. a) What are the languages and models used for representing requirements? Discuss them.

   b) Explain what is meant by software product complexity, and demonstrate how measures of module coupling, cohesion, and size can help the engineer monitor the build quality of software. (10)

3. a) Explain in detail, how communication is taking place starting from connection establishment, data transfer and connection termination in
       (i) Circuit switching   (ii) Packet switching.   (10)

   b) What are the requirements to connect two different networks (Ethernet and Token ring) in the lower layers? (10)

3. a) Discuss various approaches to deal with noisy data to prepare it for pattern mining. (8)

   b) Discuss an association mining algorithm for extracting frequent itemsets from a large transaction database without generating candidate itemsets. (12)

5. Discuss the pros and cons of the following approaches for data classification: (20)

   i) Decision trees   ii) K-nearest neighbors   iii) Support Vector machines

6. a) Discuss different network devices and their functionality. (10)
   b) What are the various applications of virtual private networks and explain any two with suitable examples. (10)

7. a) Discuss different message authentication schemes. (10)

   b) Write a short note on IP security. (10)

8. a) Give comparative study on image filters and their advantages. (10)

   b) Explain features and challenges of Color Image Processing. (10)

Dr. Peri Srinivasa Rao
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Andhra University
A. U. College of Engineering(A)
Visakhapatnam

Chemical Engineering and Bio Technology

Paper for the Pre Ph. D. Course Work

Max. Marks 100   **Duration: 3 hr**

Answer any five questions
All questions carry equal Marks

1. Explain the principle of venturi meter with a neat sketch. Prove the expression for the rate of flow of fluid through it?

2. Define a centrifugal pump. Describe the principle and working of a centrifugal pump with a neat sketch.

3. Differentiate between differential and cumulative screen analysis. Explain the Tyler's standard screen series?

4. Classify the equipments used for size reduction. discuss their basic principles? What are the different laws of crushing? Explain their limitations. Derive an expression for estimating the pressure exerted by granular solids on the floor of a circular bin?

5. Derive an expression for log mean temperature difference of parallel flow heat exchanger.

6. What is the fouling factor? Explain their effect in Heat Exchanger design?

7. Define molecular diffusion. Derive the equation of NA for steady state equimolal counter diffusion

8. Explain different types of packing materials and their selection criteria?

(P. RAJENDRA PRASAD)
Prof & Bos, Dept of Chem Engg

DEPARTMENT OF ECE, AUCE(A)
Andhra University
Qualifying Examination for PhD Submission
ELE CTRONICS AND COMMUNICATION ENGINEERING
MODEL QUESTION PAPER

Time: 3Hrs   Max.Marks:100

Answer any Five Questions:

1. (a) Differentiate between overlap-add and overlap-save methods in detail.

   (b) Describe the need of frequency shift and convolution properties in DFT compared to time domain.

2. (a) Draw the flow graph of an 8-point DIF-FFT algorithm and explain.

   (b) Describe the advantage of Chirp Z Transformation algorithm over radix based FFT algorithm for computing DFT

3. (a) Mention some of the applications of multirate signal processing and explain it in detail.

   (b) Describe about Decimation and Interpolation techniques.

4. (a) Define and explain any five parameters of an antenna in detail.

   (b) Derive the array factor expression for N-element array

5. (a) List and compare different feed methods of parabolic reflector.

   (b) Describe the operation of lens antenna, its merits and demerits and explain aboutmetal plate lens antenna.

6. (a) Describe the radiation mechanism of antenna.

   (b) List out salient features of any three VHF, UHF antennas with neat sketches.

7. Write in detail each component of GPS transmitted signal and also formulate the GPS signal in suitable mathematical equations.

8. Explain with the relevant mathematical equations how receiver state is estimated using Least Square approximation.

Prof. P. RAJESH KUMAR
Chairman, Board of Studies
Department of E.C.E
AUCE(A), Andhra Universi...
Visakhapatnam-530 003 (A...

Model question paper

Time: 3 hrs   Marks: 100

Sensors and Signal Conditioning

1) Explain about the piezoelectric sensors in measurement of acceleration of a vibrating body with a neat sketch?

Or

2) Derive the Gauge factor equation? And explain about the measurement of torque using a strain gauge?

3) Define relative humidity, wet bulb temperature? And Design a model for measurement of moisture in paper?

Or

4) Explain the Gas Analysis by Thermal conductivity sensor with a sketch?

5) Explain about the three amplifier configuration in an instrumentation amplifier? And derive the expression for output voltage?

Or

6) Explain about the Deflection type Wheatstone bridge provided with zero adjustment and derive the expression for bridge sensitivity?

7) Explain about the Owen's Bridge with a neat sketch and write the bridge balance condition?

Or

8) Describe the construction and working of a phototransistor? Draw their characteristics and explain their advantages and disadvantages?

9) Explain about the moisture determination in grain by capacitance sensor in nondestructive method?

Or

10) Discuss in brief about different bio-fuel materials and their advantages over the conventional materials?

10/09/2018

Head of the Department of
Instrument Technology
A.U. College of Engineering (A)
Andhra University
Visakhapatnam-530 003.

DEPARTMENT OF METALLURGICAL ENGINEERING
A.U.COLLEGE OF ENGINEERING (A)
Ph.D. Qualifying Examination
MODEL QUESTION PAPER
MECHANICAL BEHAVIOUR OF MATERIALS

Time: 3Hours   Total Marks: 100
Answer Any Five Questions   Each Question carries 20 Marks

1. (a). Classify types of testing methods. State criteria for selection of testing methods and give examples for selection of the method?
   (b). Describe in detail about basic properties of materials.

2. (a). List types of hardness tests. Write application of each of this test for different metals and alloys?
   (b). Compare between Rockwell and Vickers hardness tester? What are the advantages and limitations?

3. (a). Draw Engineering and true stress strain curves?
   (b). Explain the significance of typical of stress strain diagram.

4. (a). What is a compression test? Explain the modes of deformation in compression testing.
   (b). What are the typical materials subjected to compression testing?

5. (a). Explain the significance of Impact Testing? What are the different types?
   (b). Describe Izod impact test. What are the factors that affect impact strength?

6. (a). Explain the types of fracture in metals? Brief on the problems of brittle fracture.
   (b). With sketch explain ductile-brittle transition? How is it important in design based on service conditions?

7. (a). What is creep? Explain the creep curve and factors affecting creep strength.
   (b). Describe the creep testing procedure for high temperature alloys?

8. (a). What is fatigue? Explain the S-N curve. Define Endurance limit?
   (b). Explain the variables and its effects on fatigue strength.

Head of the Department of
Metallurgical Engineering

1. a) Define stress and strain. Explain the different types of stresses and strains.

   b) A rod 150 cm long and of diameter 2 cm is subjected to an axial pull of 20kN. If the modulus of Elasticity of the material is 2×10^5 N/mm², Determine (i) stress (ii) Strain   (iii) Elongation of the rod

2. The simply supported beam shown in fig? Below carries two concentrated loads and a uniformly distributed load. Draw the S.F. and B.M. diagrams.
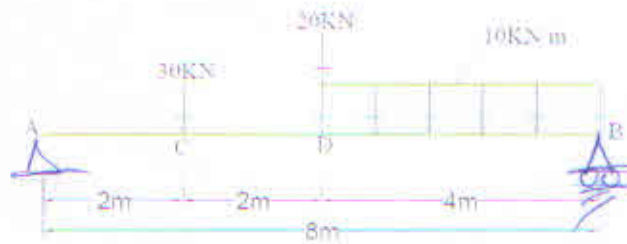
3. a) What is Hydrologic cycle?

   b) What is meant by workability of concrete. Explain any one method of determining the workability of concrete.

4. a) What are the needs of irrigation?

   b) How do you estimate flood discharge? Explain any method briefly.

5. a) What are the methods available to estimate runoff? Explain any one briefly.

   b) Discus the application of Remote sensing is water resources engineering.

6. Differentiate Slow sand and Rapid sand Filtration.

7. Explain the activated sludge process of waste water treatment.

8. Write short notes on the following? (write on any two questions)

   a) Rain water Harvesting.

   b) Break point chlorination

   c) Oxidation pond

   d) Mix design