K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Finite Element Methods (CE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Explain the step by step procedure of Finite element method.   7M
   (b) What are the merits and demerits of finite element method?   7M

(OR)

2. (a) State the limitations of finite element method.   5M
   (b) Discuss briefly about finite element modeling.   9M

UNIT – II

3. (a) Define Shape function. What are the characteristics of shape function? Why   8M
       polynomials are generally used as shape function?
   (b) Discuss about Convergence and compatibility requirements for displacement   6M
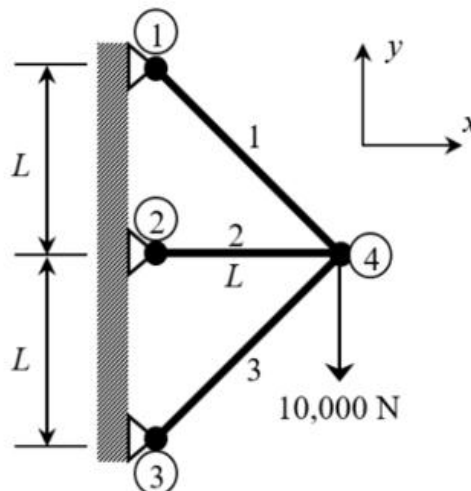   Functions.

(OR)

4. (a) Write the governing equation for 1D Transverse and longitudinal vibration of the bar   10M
       at one end and give the boundary conditions.
   (b) What is the difference between static and dynamic analysis?   4M

UNIT – III

5. (a) What are essential boundary conditions and natural boundary conditions?   5M
   (b) Derive elemental stiffness matrix for a beam element in global coordinate system.   9M

(OR)

6. Use the finite element method to solve the plane truss shown in the below Figure. Assume   14M
   $AE = 10^6$ N, L = 1.5m. Determine the nodal displacements, element forces in each element,
   and the support reactions.

UNIT – IV

7. Determine the deflection under the loads and construct the shear force and bending moment diagrams for the beam shown below.   14M
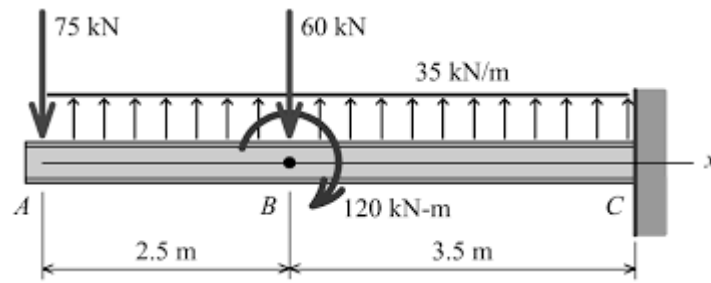
(OR)

8. (a) Discuss Shape functions for a beam element and derive.   7M
   (b) Derive stiffness matrix by Strain Energy Concept for a beam   7M

UNIT-V

9. For a four noded rectangular element the coordinates are (0, 0), (4, 0), (4, 3) and (0,3). All dimensions are in cm. Determine the following   14M
   1. Jacobian Matrix 2. Strain − Displacement matrix 3. Element Strains and 4. Element stresses.
   Take E = 200GPa, μ = 0.25; ξ=0;η=0 {δ} = [0, 0, 0.002, 0.003, 0.005, 0.004, 0, 0]^T
   Assume plane stress condition.

(OR)

10. (a) Discuss about solution techniques for static loads.   7M
    (b) What do you mean by iso parametric element, super parametric element and sub parametric element?   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Quantity Surveying *and Valuation (CE)*

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. Write short notes on a i) Plinth Area Estimate, ii) Revised Estimate, iii) Supplementary   **14M**
Estimate, and iv) Actual or Complete Estimate

(OR)

2. (a) Explain the necessity of specification and types of specification   **7M**

   (b) Explain the detailed specification for earthwork, cement, concrete, brickwork, flooring,   **7M**
   D.P.C, R.C.C
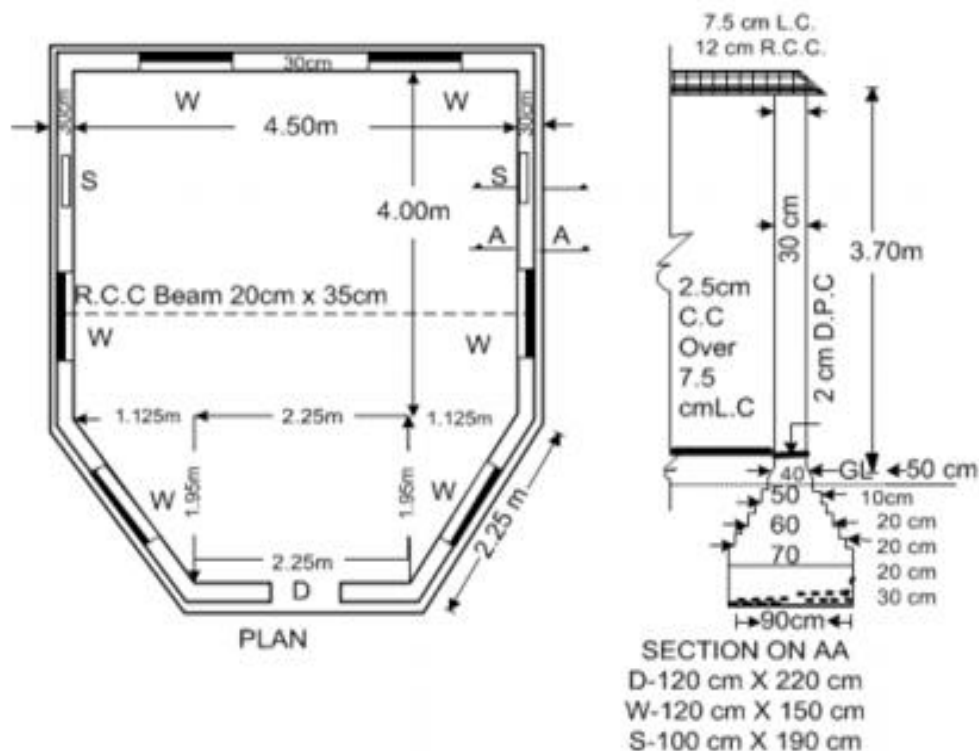
UNIT – II

3. (a) Analyses the rate of cement concrete of ratio 1:2:4 and 1:3:6   **7M**

   (b) Explain in detail about Lead Statement?   **7M**

(OR)

4. Explain the Purpose, importance and requirements of rate analysis, and units of   **14M**
measurement preparation of rate analysis?
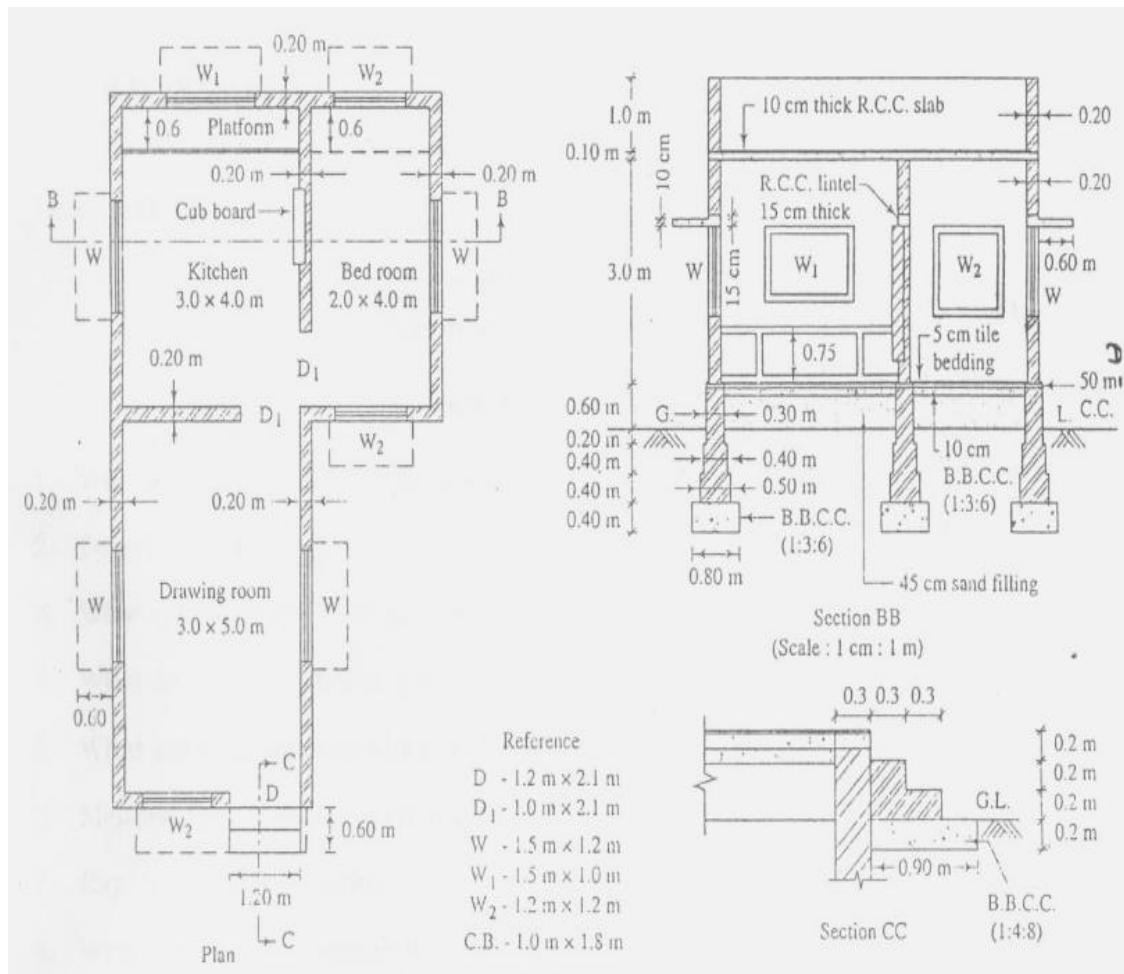
UNIT – III

5. Enumerate detailed specifications for the following items: (a) Random Rubble   **14M**
Masonry in Sub structures. (b) Plastering of walls. (c) Painting to wood works. (d)
Painting to Iron Works.

PLAN

SECTION ON AA
D-120 cm X 220 cm
W-120 cm X 150 cm
S-100 cm X 190 cm

(OR)

6. Prepare detailed Estimates of building by centre line method as shown in fig?   **14M**

Plan

Reference

D - 1.2 m × 2.1 m
D₁ - 1.0 m × 2.1 m
W - 1.5 m × 1.2 m
W₁ - 1.5 m × 1.0 m
W₂ - 1.2 m × 1.2 m
C.B. - 1.0 m × 1.8 m

Section BB
(Scale : 1 cm : 1 m)

Section CC
B.B.C.C.
(1:4:8)

UNIT – IV

7. With an example Prepare a detailed estimate of a RCC Rectangular Beam including **14M** centering and shuttering and steel reinforcement ? Also prepare a schedule of bars

(OR)

8. With an example prepare a detailed estimate of a RCC Slab of 6m span and 12m long **14M** including centering and shuttering and steel reinforcement? Also prepare a bar bending schedule?

UNIT-V

9. (a) Define valuation? Explain the purpose of valuation and write about Sinking fund? **7M**

(b) Write the types of Tenders and requirement of Tendering **7M**

(OR)

10. A building constructed on a site measuring 20 m x 30 m is fetching a gross rent of Rs. **14M** 2,500/- per month. The plinth area of the building is 140 sq.m. And the cost of construction is Rs. 2,000/- per sq.m. of plinth area. The estimate life of the building is 70 years. Determine the present value of the property based on rental income assuming a net yield of 9% for sinking fund accumulation, a compound interest of 5% may be assumed. Taxes, annual repairs and all other outgoings may be taken as 32% of the gross income, and the cost of land as Rs. 80/- per sq.m.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Design & Drawing of Irrigation Structures (CE)

Time: 3 Hours   Max. Marks: 70

Answer any ONE Question from the following

1. Design the surplus work of a tank forming part of a chain of tanks. The combined catchment area of the group of tank is 25.89 Km^2 and the area of the catchment intercepted by the upper tanks is 20.71 Km^2.

    It is decided to store water in the tank to a level of + 12.00 meters above mean sea level limiting the submersion of foreshore lands up to a level of +12.75 m above M.S.L. The general ground level at the proposed site of work is + 11.00 m, and the ground level below the proposed surplus slopes off till it reaches + 10.00 meters in about 6 m distance.

    The tank bund has a top width of 2 meters at level + 14.50 with 2.1 side slopes on either side. The tank bunds are designed for a saturation gradient of 4:1 with 1 m clear cover.

    Provision may be made to make Kutcha regulating arrangements to store water up to M.W.L. at times of necessity.

    The foundations are of hard gravel at a level of + 9.5 m near the site of work.

    Draw the following: (i) Plan of surplus weir (ii) cross section

    (OR)

2. Design a sluice taking off from a tank irrigating 200 hectares at 1000 duty. The tank bund through which the sluice is taking off has a top width of 2 m with 2:1 side slope. The top level of bank is + 40.00 and the ground level at site is + 34.50 Good hard soil for foundation is available at + 33.50.

    The sill of the sluice at off take is + 34.00.

    The maximum water level in tank is 38.00. The full tank level is + 37.00. Average low water level of the tank is + 35.00. The details of the cannel below the sluice are as under

    Bed level is + 34.00

    F.S.L + 34.50

    Bed width is 1.25 m

    Slide slopes 11/2 to 1 with top of bank at + 35.50

    Draw to a suitable scale the following

    (i) Longitudinal section and

                    Half plan at top and half plan at foundation level

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Sanitary Engineering (CE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Explain the fluctuations in sewage flow and their importance in design of sewerage system. 7M
    (b) The drainage area of one sector of a town is 50 hectares and the population is 30,000. If the time of concentration for the area is 15 minutes and coefficient of runoff is 0.5. Calculate the maximum quantity of sewage from drainage area. 7M

(OR)

2. (a) Explain the systems of sewerage with merits and demerits. 7M
    (b) What are the various sewer appurtenances? Discuss any one in detail. 7M

UNIT – II

3. (a) Determine the 5 day BOD of sample at 20°C, if its 3 day BOD at 20°C is 200 mg/l. Assume constant rate K_D at 20 °C is 0.1/day. Also calculate ultimate BOD 7M
    (b) Write a note on i) Population Equivalent and ii) Cycles of decay of waste 7M

(OR)

4. (a) Explain the layout and general outline basic concept of domestic sewage treatment plant 7M
    (b) Design a sedimentation tank to treat 10 MLD of sewage. Assume required data if necessary 7M

UNIT – III

5. (a) Differentiate between aerobic and anaerobic treatment of sewage, giving major end products. Name one treatment method in each category. 7M
    (b) Design an activated sludge process to treat 2 MLD of sewage with inlet BOD 200 mg/lit and outlet BOD 20 mg/lit. Assume suitable data. 7M

(OR)

6. (a) With neat sketch, describe the principles involved in the design and construction of Aerated Lagoons 7M
    (b) Explain the operational problems of biological treatment process units. 7M

UNIT – IV

7. (a) Write a brief note on removal nitrogen from sewage. 8M
    (b) Explain the standards for disposal of treated sewage into inland surface waters 6M

(OR)

8. (a) With the help of neat sketches, describe the working and construction details of sludge digestion tank. 7M
    (b) Design a septic tank for a small colony of 150 users with an assured water supply at the rate of 120 lpcd. Assume any data, you may needed. 7M

UNIT-V

9. (a) Explain the various collection methods of solid waste 7M
    (b) With neat sketch, describe explain the sanitary landfill method for refuse disposal 7M

(OR)

10. (a) Explain the air quality standards and limits. 7M
    (b) Explain the methods of noise pollution control. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Reliability Engineering & Application to Power Systems (EEE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
**All questions carry Equal Marks.**

UNIT - I

1. (a) Derive the expression for expected value and standard deviation of Binomial Distribution.   7M

   (b) In a sample of 60 mails, 10 of them contains only defective heads, five contain only defective tails and five contain both the defects. What is the probability that a mail that is selected randomly contains either defective head or a defective tail?   7M

(OR)

2. (a) Explain decomposition method used for the analysis of complex networks.   7M

   (b) A manufacturer performs and operational life test on ceramic capacitors and finds that they exhibit constant failure rate with a value of 3×10^{-8} failures/hour. What is the reliability of a capacitor after 10000 hours? In order to accept a large shipment of these capacitors, the user decides to run a test for 5000 hours on a sample of 2000 capacitors. How many capacitors are expected to fail during the test?   7M

UNIT – II

3. (a) Derive the relation between f(t), F(t), R(t) and h(t) and Explain MTTF, MTTR and MTBF.   7M

   (b)   7M
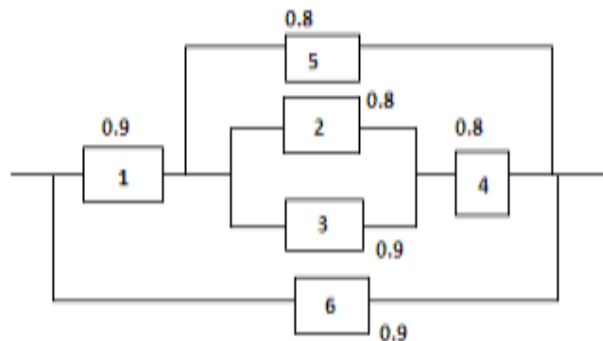
   Calculate the reliability of the above network using network reduction technique.

(OR)

4. (a) Explain reliability analysis of series parallel network using exponential distribution   7M

   (b) A system consists of two-subsystems, all components of which have reliabilities that are exponentially distributed. The sub systems are (1) two identical components having failure rates 8x10-6 f/hr and for which one component must operate for system success (2) three components having failure rates of 5 x 10-6 f/hr each, out of which at least two components must operate for system success. If all these subsystems must operate for system success, evaluate the probability of surviving for 5000 hrs   7M

UNIT – III

5. (a) Develop the State Space Model of Two-Component repairable system and hence obtain the expression for Limiting Probabilities of the States, if the states have identical transitional rates and the component have identical capacities.   7M

   (b) For the given State Space Diagram shown in Fig. below Develop STPM and Calculate the Limiting State Probabilities of each state.   7M
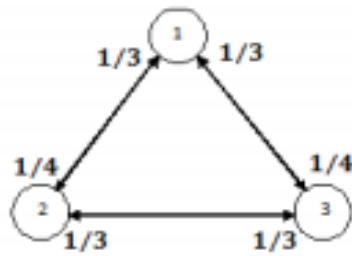
(OR)

6. (a) Discuss briefly about frequency and duration concept .What are the additional indices that are evaluated and explain the need of these indices in reliability evaluation? **7M**

    (b) Develop the expression for evaluation of Cumulative Probabilities and Cumulative Frequencies of an n-component repairable model. **7M**

UNIT – IV

7. The table below provides system data for a generating station consisting of three units. Develop Generation model by considering all the possible system states and also the transition modes from one state to another. From the developed generation model find the reduced generation model. **14M**

Unit no.	Capacity (MW)	Failure rate (f / day)	Repair rate (r / day)
1	25	0.01	0.49
2	25	0.01	0.49
3	50	0.01	0.49

(OR)

8. Write short notes on **14M**

    (i) Two-level representation of the daily load

    (ii) Sequential addition method

    (iii)Combined generation capacity model

UNIT-V

9. Give a brief description of Annualized system and load point reliability indices .Give expressions for probability of failure and frequency of failure and thereby deduce the expressions for the annualized system and load point reliability indices. **14M**

(OR)

10. (a) Explain how the customer oriented , load oriented and energy oriented indices are useful in distribution system reliability analysis. **7M**

    (b) Consider a 2-load point radial distribution system shown in the below figure and evaluate the load point reliability indices .Also obtain performance indices **7M**
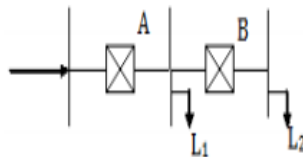
Line	λ (f/yr)	r(hrs)	No. of customers	Average Demand(KW)
A	0.12	4	175	750
B	0.25	7	225	550

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Electrical Machine Design (EEE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Derive the output equation of 1- ϕ core-type transformer.   7M
    (b) Determine the main dimensions of a 300 kVA, 3φ, 50 Hz Y/Δ, 11,000/3300 V, core-type distribution transformer. Assume distance between core centers as twice the width of core.   7M

(OR)

2. (a) Discuss the effect of stepping of core of transformer on its performance.   6M
    (b) Estimate the main core dimensions, of a 25 kVA, 3-phase, 6600/440 volts, delta/star, 50 Hz, core type transformer with the following data: 8M
    Stepped core for which area factor = 0.56
    Spaces factor for window = 0.25
    Voltage per turn = 21.0 V
    Current density= 2.36 A/mm^2
    Flux density = 1.1 Tesla.

UNIT – II

3. (a) Derive the output equation of D.C. machine in terms of main dimensions.   7M
    (b) Calculate the main dimensions of a 12 kW, 220 V, 4-pole, 1200 r.p.m. shunt generator. The specific electric loading is 18,000, average flux density is 0.46 Wb/m^2, full load efficiency is 0.86 and pole arc to pole pitch ratio is 0.68. The length of pole arc is equal to the length of the armature core. Friction and windage losses are neglected.   7M

(OR)

4. (a) Explain the design of armature of DC machine.   7M
    (b) A 300 kW, 500 V, 500 rpm, 6-pole DC generator has average flux density over pole as 0.67 Wb/m^2 and specific electric loading as 25,000 A/m. The ratio of core length to pole pitch is 0.75. Estimate suitable dimensions of core diameter, length, number of armature conductors, number of slots and number of commutator segments.   7M

UNIT – III

5. (a) For a 3-phase induction motor derive an expression showing the relationship between its output, main dimensions, speed, the specific electric and magnetic loading, efficiency, and power factor.   7M
    (b) Compute the following design information for a 30 kW, 440V, 3-phase, 6-pole, 50 Hz delta connected, squirrel cage induction motor: (i) Main dimensions of stator frame   7M

    (ii) Number of turns per phase in stator winding, and

    (iii) Number of stator slots.

    Assume: Slot pitch = 28 mm,   L/τ$_P$ ratio = 1,
    Specific magnetic loading = 0.48 tesla
     Specific electric loading= 26,000 ampere-conductor/metre,
     Full load efficiency= 0.88, Full load power factor= 0.86, Winding factor=0.955.

(OR)

6.   (a)   Suggest the changes in the design of a three-phase squirrel cage induction motor to achieve increased starting torque?   7M

       (b)   A three-phase induction motor has 56 stator slots with 8 conductors per slot and 7 rotor slots with 5 conductors per slot. Find the number of stator and rotor turns. Find the open circuited voltage across the sliprings at rest. Both the stator and rotor are star connected and a voltage of 440 V is applied across the stator terminals.   7M

UNIT – IV

7.   (a)   Why are turbo alternators designed for smaller diameter and larger length whereas water wheel generators have larger diameter and smaller length with large number of poles?   7M

       (b)   Find the main dimensions of a 100 MVA, 11 kV, 50 Hz, 40 pole salient pole generator assuming air gap flux density as 0.65 Wb/m2 and ampere conductors as 40,000 per meter. The peripheral speed should not exceed 60 m/s. Take length of airgap as 3 cm.   7M

(OR)

8.   (a)   Explain the factors that are to be considered for the choice of number of slots in synchronous machine?   7M

       (b)   Estimate the values of short circuit ratio and synchronous reactance of a 1000 kVA, 3000 V, 300 rpm star-connected alternator having stator turns per phase as 150, field turns per pole as 60, effective area per pole as 0.09 m2. Air gap length at pole center is 5 mm and field current for full load current at short circuit is 80 A. AT for iron portion per pole is 20% of that of air gap.   7M

UNIT-V

9.   (a)   Differentiate between open-circuit and closed-circuit ventilation.   7M

       (b)   Mention the desired properties of insulating materials to be used in electrical machines.   7M

(OR)

10.   (a)   Explain the difference between radiation and insolation.
In which machine do these two phenomena affect the temperature rise?   7M

       (b)   Explain continuous rating, short time rating and intermittent rating with reference to electrical machines.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Flexible AC Transmission Systems (EEE)

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

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	Write short notes on dynamic stability considerations.	**7M**
	(b)	Discuss different types of shunt connected controllers.	**7M**

(OR)

2.	(a)	Explain the importance of controllable parameters on study of stability.	**7M**
	(b)	What are the benefits of FACTS controllers?	**7M**

UNIT – II

3.	(a)	Draw the transformer connections for 12 pulse operation and explain	**7M**
	(b)	Explain briefly the basic concepts of current source converters.	**7M**

(OR)

4.	Explain the operation of three phase full wave bridge converter with all necessary diagrams.	**14M**

UNIT – III

5.	(a)	Explain briefly about variable impedance type VAR generators.	**7M**
	(b)	.What are the different types of hybrid VAR generators.	**7M**

(OR)

6.	Discuss the objectives of shunt compensation	**14M**

UNIT – IV

7.	(a)	What is a STATCOM? Discuss its construction and working.	**7M**
	(b)	Explain about general control scheme of Static VAR Compensators with neat sketch.	**7M**

(OR)

8.	(a)	Briefly describe the way by which transient stability is enhanced with SVC.	**7M**
	(b)	Compare between SVC and STATCOM in terms of operational and performance characteristics along with application benefits.	**7M**

UNIT-V

9.	(a)	Discuss briefly about enhancement of transient stability using series capacitive compensation.	**7M**
	(b)	Explain the principle and operation of TCSC with neat diagram.	**7M**

(OR)

10.	(a)	Briefly describe the way by which power oscillation damping is improved by series capacitive compensation.	**7M**
	(b)	Explain basic operating control scheme of GTO Controlled Series Capacitors with neat diagram.	**7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Utilization of Electrical Power (EEE)

Time: 3 Hours　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Discuss the inverse square law of illumination. 　7M
   (b) The candle power of a source is 200 candela in all directions below the lamp. The mounting height of the lamp is 6 m. Find the illumination: (i) Just below the lamp. (ii) 3 m horizontally away from the lamp on the ground. (iii) The total luminous flux in an area of 1.5 m diameter around the lamp on the ground. 　7M

(OR)

2. (a) Describe the construction and working principle of a sodium vapour lamp. 　7M
   (b) A hall of 30×20 m area with a ceiling height of 6 m is to be provided with a general illumination of 200 lumens/m^2, taking a coefficient of utilization of 0.6 and depreciation factor of 1.6. Determine the number of fluorescent tubes required, their spacing, mounting height, and total wattage. Take luminous efficiency of fluorescent tube as 25 lumens/W for 300-W tube. 　7M

UNIT – II

3. (a) What are the advantages of electric heating? 　7M
   (b) Explain the principle of dielectric heating. 　7M

(OR)

4. (a) Compare resistance and arc weldings. 　7M
   (b) Discuss the construction and working of indirect arc furnace. 　7M

UNIT – III

5. (a) Compare group drives and individual drives. 　7M
   (b) Explain the running characteristics of dc series motor. 　7M

(OR)

6. (a) Derive an expression for temperature raise of an electric motor. 　7M
   (b) What is load equalization? How it is achieved? 　7M

UNIT – IV

7. (a) What are the various electric traction systems in India? Compare them. 　7M
   (b) Give the features of the various motors used in electric traction. 　7M

(OR)

8. (a) Explain how rheostat braking is done in DC shunt motors and series motors. 　7M
   (b) Explain the different methods of the electric braking of the three-phase induction motor. 　7M

UNIT-V

9. (a) Explain the Speed–Time Curves for different services. 　7M
   (b) Explain analysis of Quadrilateral Speed–Time curve. 　7M

(OR)

10. (a) Derive the equations of tractive effort required to overcome (i) the force due to gravity (ii) the train resistance. 　7M
    (b) Explain the factors affecting Specific Energy Consumption. 　7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Biomedical Instrumentation (ECE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) List out the general constraints in design of medical instrumentation system.   7M
   (b) Explain dynamic characteristics of medical instruments.   7M

(OR)

2. (a) What is Bio-Signal? Explain its characteristics in detail.   7M
   (b) Suggest remedies for problems encountered with measurements from human beings.   7M

UNIT – II

3. (a) Draw the structure of a living cell of our body and explain its constituents in detail.   6M
   (b) With a relevant graph, describe the relationship between the action potential and muscle contraction.   8M

(OR)

4. (a) Derive the Nernst equation for membrane resting potential generation.   8M
   (b) Draw the action potential waveform and discuss depolarization, repolarization and absolute refractory periods.   6M

UNIT – III

5. (a) Discuss in detail about Biochemical electrodes.   7M
   (b) What type of electrodes are most useful for ECG measurement? Explain.   7M

(OR)

6. (a) Draw ECG waveform and correlate with electrical and mechanical activity of the heart.   7M
   (b) State the need of defibrillator. Describe the working of a dc defibrillator based on capacitive discharge with a suitable circuit diagram.   7M

UNIT – IV

7. (a) Mention the specifications of ECG machine and explain its operation   7M
   (b) Illustrate the working of Short-Wave diathermy with a neat diagram.   7M

(OR)

8. (a) Explain with relevant equations the working and measurement procedure of Plethysmograph.   7M
   (b) Discuss the type of Ventilators used in respiratory mechanism.   7M

UNIT-V

9. (a) Classify hazards in hospital environment. Suggest and explain natural protection mechanism for them.   7M
   (b) Demonstrate the grounding conditions in hospital environment.   7M

(OR)

10. Summarize the electrical hazards protection provided in the biomedical instrumentation system?   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Radar Systems (ECE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. Derive the expression for the modified form of the radar equation.   14M

(OR)

2. (a) What is multiple time around echoes? How can we distinguish from unambiguous echoes.   7M

   (b) Write short notes on (a) Integration of pulses (b) Minimum detectable signal   7M

UNIT – II

3. Explain about construction and operation of various duplexers used in radar systems.   14M

(OR)

4. (a) Write short notes on Types of Mixers   7M

   (b) Briefly explain about TWT Amplifier.   7M

UNIT – III

5. (a) With the help of block diagram explain the operation of FM radar.   7M

   (b) Briefly write about the staggered PRF and mention its advantage.   7M

(OR)

6. Write about range gated doppler filters and also draw its frequency response.   14M

UNIT – IV

7. (a) Write about the errors in direction finding.   7M

   (b) Explain in detail about Goniometer.   7M

(OR)

8. Write short notes on (a) VHF-VOR (b) loop Antenna   14M

UNIT-V

9. Explain in detail about i) LORAN – A ii) Decca Navigation System   14M

(OR)

10 Write about Decca receivers.   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Satellite Communications (ECE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Discuss the current state of satellite communication?   7M
    (b) Describe the brief history of satellite communication?   7M

(OR)

2. (a) Demonstrate orbital perturbations with neat diagram.   7M
    (b) Distinguish launches and launch vehicles of satellite.   7M

UNIT – II

3. (a) Explain attitude and orbit control system with neat diagram.   7M
    (b) Explain the operation of communication subsystem.   7M

(OR)

4. (a) Discuss the operation of power subsystem.
    (b) Explain the importance of space craft antennas.   7M

UNIT – III

5. (a) Demonstrate basic transmission theory.   7M
    (b) What is system noise temperature and derive G/T ratio.   7M

(OR)

6. (a) Design the satellite downlink.   7M
    (b) Discuss the design of satellite link for specified C/N.   7M

UNIT – IV

7. (a) Explain the TDMA frame structure.   7M
    (b) Discuss the concept of FDMA.   7M

(OR)

8. (a) Explain the concept of Code division multiple access.   7M
    (b) Explain the concept of frequency hopped spread spectrum system.   7M

UNIT-V

9. Explain about various equipments used in earth station for its satisfactory operations   14M

(OR)

10. Discuss the design of large earth station antennas.   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Cellular & Mobile Communications (ECE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Explain the basic cellular system with neat diagram.   7M
    (b) What is the concept of frequency reuse channels?   7M

(OR)

2. Write short notes on: (a) Hand off mechanism with diagrams; (b) Cell Splitting   14M

UNIT – II

3. (a) Derive the expression for received power Pr in the wave propagating from land to   10M
        mobile over land.
    (b) The distance between two fixed stations is 20Km. The effective antenna height at one   4M
        end is 100m. Find the effective antenna height at the other end at 850 MHz to receive
        maximum power.

(OR)

4. (a) Discuss the merits of point to point model.   7M
    (b) Explain the effect of propagation of mobile signals over water.   7M

UNIT – III

5. (a) How interference can be reduced by using the directional antennas at cell site.   7M
    (b) Write the short notes on spaced diversity antennas.   7M

(OR)

6. Determine the real time co-channel interference measurement of mobile radio trans   14M
    receivers.

UNIT – IV

7. (a) Explain the concept of channel sharing and borrowing.   7M
    (b) Write short notes on channel assignment.   7M

(OR)

8. (a) Explain how the handoff is initiated.   7M
    (b) Write short notes on MAHO and soft handoff.   7M

UNIT-V

9. (a) Explain the GSM architecture.   8M
    (b) Explain about the GSM Channels.   6M

(OR)

10.   Explain the following:
        (a) CDMA   (b) TDMA   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Geometric Modeling (ME)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. Explain the functioning of Color CRT using Shadow mask technique with neat   14M
    sketch, list out its advantage and disadvantages of shadow mask method.

(OR)

2. (a) Explain scan-line polygon filling algorithm in detail   7M

    (b) Briefly explain about boundary- fill algorithm   7M

UNIT – II

3. Explain the algorithm for line clipping by Cohen-Sutherland algorithm with an   14M
    example

(OR)

4. (a) Describe about character clipping in detail   7M

    (b) List out the characters of polygon clipping   7M

UNIT – III

5. Discuss the properties of B-Spline Curve which was used in design.   14M

(OR)

6. Explain about Hermite cubic spline curve   14M

UNIT – IV

7. A triangle is defined in a two-dimensional ICG system by its vertices (0, 2), (0, 3),   14M
    and (1,2). Perform the following transformations on this triangle:

    (a) Translate the triangle in space by 2 units in the x direction and 5 units in the y
    direction. (b) Scale the original triangle by a factor of 1.5.

    (c) Scale the original triangle by a factor of 1.5 in the x direction and 3.0 in the y
    direction.

(OR)

8. Explain 3D transformation briefly about i) Reflection ii) shear transformation iii)   14M
    composite transformations

UNIT-V

9. (a) Explain gouraud shading algorithm with neat sketch   7M

    (b) Explain about constant intensity algorithm with neat sketch.   7M

(OR)

10. (a) What do you mean Visible surface detection? Classification of Visible surface   7M
         detections. And explain any one visible surface detection method in detail.

    (b) Explain back-face detection method in detail   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Gas Turbines and Jet Propulsion (ME)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT – I

1. (a) Draw the schematic diagram of a simple gas turbine cycle and explain the working of the gas turbine cycle? — 7M

   (b) The air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1 bar and temperature of 20 ^{0}C. The pressure of the air after compression is 4 bar. The isentropic efficiencies of compressor and turbine are 80% and 85% respectively. The air- fuel ratio used is 90:1 If the flow rate of air is 3.0 kg/s find: i) Power developed   ii)Thermal efficiency of the Cycle
   Take C_p=1.0 kJ/kg K , γ=1.4 and calorific value of fuel=41800kj/kg. — 8M

(OR)

2. (a) State the merits and Demerits of a gas turbines over IC engines? — 7M

   (b) The pressure ratio of an open cycle gas turbine power plan is 5.6.Air is taken at 30^{0}C and 1 bar. The compression is carried out in two stages with perfect inter cooling in between. The maximum temperature of the cycle is limited to 700^{0}C.Assuming the Isentropic efficiency of each compressor stages as 85% and that of turbine as 90%, determine the power developed and efficiency of the power plant, if the air flow is 1.2Kg/s. The mass of the fuel may be neglected .C_p=1.02KJ/Kg-K, γ=1.41 — 8M

UNIT – II

3. (a) Give the classifications of jet propulsion engines? — 7M

   (b) Explain the principle of jet propulsion? — 8M

(OR)

4. Derive an expression for thrust, thrust power, propulsive efficiency and thermal efficiency of the jet engines? — 14M

UNIT – III

5. (a) Explain the working of a turboprop engine? — 7M

   (b) Discuss the methods of thrust augmentation? — 8M

(OR)

6. A turbo jet engine consumes air at the rate of 60.2 kg/s when flying at a speed of 1000km/h calculate — 14M

   i) Exit velocity of the jet when the enthalpy change for the nozzle is 230 kj/kg and velocity co-efficient is 0.96

   ii) Fuel flow rate in kg/s when air –fuel ratio is 70:1

   iii) Thrust specific fuel consumption

   iv) Thermal efficiency of the plant when the combustion efficiency is 92% and calorific value of the fuel used is 42000 kJ/Kg .

   v) Propulsive power

   vi) Propulsive efficiency

   vii) Overall efficiency

UNIT – IV

7.   (a)   Write the differences between Pulse jet engine and Ramjet engine?   7M

      (b)   With the help of a Schematic diagram discuss Ram jet Propulsion unit?   8M

<div align="center">(OR)</div>

8.   (a)   Mention the various advantages and disadvantages of the pulse jet engine?   7M

      (b)   Explain the working of a pulse jet engine with a neat sketch?   8M

<div align="center">**UNIT-V**</div>

9.   (a)   What are the requirements of a rocket propellant?   7M

      (b)   With the help of a neat sketch explain liquid propellant rocket system?   8M

<div align="center">(OR)</div>

10.   (a)   Explain about staging of rockets?   7M

      (b)   With the help of a neat sketch explain the working of Hybrid rocket system? 8M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Renewable Energy Sources (ME)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	Explain the energy sources available	6M
	(b)	List the differences between Renewable and non Renewable energy sources	8M

(OR)

2.	(a)	What are the advantages and limitations of Renewable energy sources	6M
	(b)	Write a short note on layers of the SUN	8M

UNIT – II

3.	(a)	Briefly explain any Six Solar Thermal Energy applications	8M
	(b)	With a neat sketch,Discuss important parts of Flat plate solar collector	6M

(OR)

4.	(a)	With a neat diagram, Explain the working principle of Solar water Heater	8M
	(b)	State the Advantages and Limitations of concentrated collector over the Flat Plate Collector?	6M

UNIT – III

5.	(a)	With a neat Block Diagram, Explain the Basic components of Wind Eenergy Conversion system	8M
	(b)	List the Advantages and Disadvantages of Wind Energy Converdion System	6M

(OR)

6.	(a)	List and Explain the Factors affecting Bio Digestion	10M
	(b)	Discuss about Wind characteristics	4M

UNIT – IV

7.	(a)	Briefly Explain types of devices for Harnessing wave energy	4M
	(b)	State the Merits and Demerits of OTEC plants ? Also List any four applications of OTEC	10M

(OR)

8.	(a)	With a neat Diagram, Explain OTEC Rankine cycle	6M
	(b)	List the Benefits as a measure of the value of OTEC	8M

UNIT-V

9.	(a)	What are the types of Fuel Cell?	4M
	(b)	Write the principle of DEC with working of that	10M

(OR)

10.	(a)	How does a Thermoelectric Generator works?	8M
	(b)	What are the types of Thermoelectric Generator?	6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Automation & Robotics (ME)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) What is automation? Explain basic elements of an automated system.   7M
    (b) Briefly explain advanced automation functions.   7M
    (OR)
2. (a) List and explain the reasons for automation.   7M
    (b) Explain hardware components for automation and process control.   7M

UNIT – II

3. (a) What is an automated production line? Explain general configuration of an automated   7M
         production line and its system configuration.
    (b) Explain storage buffer in automated production line.   7M
    (OR)
4.   Explain various types of transfer line mechanisms.   14M

UNIT – III

5. (a) Briefly explain spatial resolution, accuracy and repeatability as applicable to robotics. 7M
    (b) Explain the robot motions and sketch the different types of joints used in robots.   7M
    (OR)
6. (a) List the different classification of Robot configuration. Explain briefly with neat   7M
         sketches the jointed arm and cylindrical co-ordinate configuration robot.
    (b) Write a short note on end effectors, as a tool and gripper,

UNIT – IV

7.   Explain manipulator kinematics of forward and backward transformation for a robot   14M
         with three joints.
    (OR)
8.   Explain manipulator kinematics of a Four-Jointed robot in three dimensions.   14M

UNIT-V

9. (a) Explain pneumatic and hydraulic actuators application in robot.   7M
    (b) Briefly explain velocity sensors, tactile sensors.   7M
    (OR)
10. (a) Explain industrial application of robot.   7M
    (b) Explain position sensors with suitable examples.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Digital Image Processing (CSE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	Define the tem image	4M
	(b)	What is Image Digitization? Explain Digital Image Properties.	10M

(OR)

2.		Define the term Traditional image data structures with Example.	14M

UNIT – II

3.		Write a short note on Pixel brightness transformations with examples	14M

(OR)

4.	(a)	What are the different types of Noise Models	4M
	(b)	Explain about Order Statistic Filters	10M

UNIT – III

5.	(a)	What are the basic properties color image	8M
	(b)	Define the term color segmentation	6M

(OR)

6.		Define the term image processing and Explain various image processing methods	14M

UNIT – IV

7.		Define the term image Segmentation and Explain various approaches of thresholding.	14M

(OR)

8.	(a)	Define the terms Edge detection and Edge operators	10M
	(b)	Write short notes on Corner Detection	4M

UNIT-V

9.	(a)	What the different application of wavelets	8M
	(b)	Explain the term discrete cosine transform (DCT) in detail.	6M

(OR)

10.	(a)	Define the term image and their properties	10M
	(b)	Expand the terms JPEG and MPEG image compression	4M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Management Science (CSE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.		What is Management? Explain various functions of Management.	14M
		(OR)	
2.	(a)	What do you understand by organization chart?	7M
	(b)	Distinguish between formal and informal organization.	7M

UNIT – II

3.	(a)	What is Corporate Planning? Explain the objectives of Corporate Planning.	7M
	(b)	Briefly explain about the SWOT analysis.	7M
		(OR)	
4.	(a)	What are the important issues involved in strategy implementation?	7M
		What is plant layout? What is the need of plant layout?	7M

UNIT – III

5.	(a)	Discuss the importance of Human Resource Planning?	7M
	(b)	What is EOQ? Explain the assumptions made by the EOQ Model.	7M
		(OR)	
6.	(a)	What is job evaluation? Explain various methods of job evaluation.	7M
	(b)	Give detail account of maintain inventory records of the organisation	7M

UNIT – IV

7.	(a)	What are techniques of improving productivity?	7M
	(b)	What is acceptance sampling? Discuss the advantages of acceptance sampling.	7M
		(OR)	
8.		Enumerate the fourteen points of Deming's Philosophy.	14M

UNIT-V

9.	Distinguish between CPM and PERT. Explain various applications of CPM and PERT	14M
	(OR)	
10.	A project manager has obtained the following optimistic. pessimistic, and mostly likely times, in weeks relating to the various activities related to the construction of a power project	14M

Activity sequence	Time Estimates(weeks)		
	Optimistic	Most likely	Pessimistic
1-2	6	9	18
1-3	5	8	17
2-4	4	7	22
2-5	4	7	10
3-4	4	7	16
3-5	2	5	8
4-5	4	10	22

(i) Draw a PERT Diagram and mark clearly the critical path
(ii) What is the probability that the power would be successfully completed 32 weeks?

Extract from the Area Table

$\dfrac{x - \mu}{\sigma}$	0.42	0.50	1.00	1.42	4.50
Area	0.1628	0.1915	0.3413	0.4222	0.4332

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Ethical Hacking (CSE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Explain in detail about Meta Search Engines?   7M

   (b) Explain different phases of attacks?   7M

(OR)

2. (a) Explain foot printing tools?   7M

   (b) Explain in detail about Hacktivism & Vulnerability research?   7M

UNIT – II

3. (a) Explain any four tools of Enumeration?   7M

   (b) Explain Enumeration procedure?   7M

(OR)

4. (a) Define objectives of Scanning?   7M

   (b) Write short note on Scanning methodologies?   7M

UNIT – III

5. (a) Discuss password cracking counter measures?   7M

   (b) Explain different types of password attacks?   7M

(OR)

6. (a) Discuss in detail about password cracking websites?   7M

   (b) What is password cracking explain in detail?   7M

UNIT – IV

7. (a) Write short note on Windows OS counter measures?   7M

   (b) Write short note about Pointers in C Language?   7M

(OR)

8. (a) Write short note on HTML fundamentals?   7M

   (b) How to run the Linux OS vulnerabilities?   7M

UNIT-V

9. Discuss in detail Penetration testing tools?   14M

(OR)

10. Discuss in detail types of Penetration testing?   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VIII Sem. (R15) Regular & Supple. Examinations of July – 2021
SUB: Software Project Management (CSE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) List out the important features of waterfall model.   7M
   (b) Explain about conventional software Management performance.   7M

(OR)

2. (a) Explain how cost of a software is estimated.   7M
   (b) Discuss about how to reducing Software product size and explain how it will help for Improving Software Economics.   7M

UNIT – II

3. (a) Explain aboutLife cycle phases of Software Management   7M
   (b) How Artifacts of the process can set and manage the pragmatic artifacts of a software management.   7M

(OR)

4. (a) Discuss about in detail of the principles of conventional software Engineering   7M
   (b) How software can design the Model based software architectures? Explain.   7M

UNIT – III

5. (a) Discuss about Software process workflows with a neat diagram.   7M
   (b) Describe transitioning to an iterative process.   7M

(OR)

6. (a) What are default agendas for the life-cycle architecture milestone?   7M
   (b) Discuss about the cost and schedule estimating process.   7M

UNIT – IV

7. (a) What are the seven core metrics? Explain.   7M
   (b) Give an example to distinguish small scale project and large scale project   7M

(OR)

8. (a) What are the activities of software architecture team?   7M
   (b) Explain in detail about software change orders.   7M

UNIT-V

9. Discuss clearly the software management team activities, software architecture team activities also software development team activities?   14M

(OR)

10. (a) What are the basic characteristics of a good metric? Explain.   7M
    (b) Give a common subsystem overview of CCPDS-R.   7M