Subject Code: 1501402 **R 15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech IV Semester Supple Examinations, 2021- Model Paper
Sub: MECHANICS OF MATERIALS - I
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any five questions, choosing one question from each unit.
All questions carry equal marks

UNIT-I

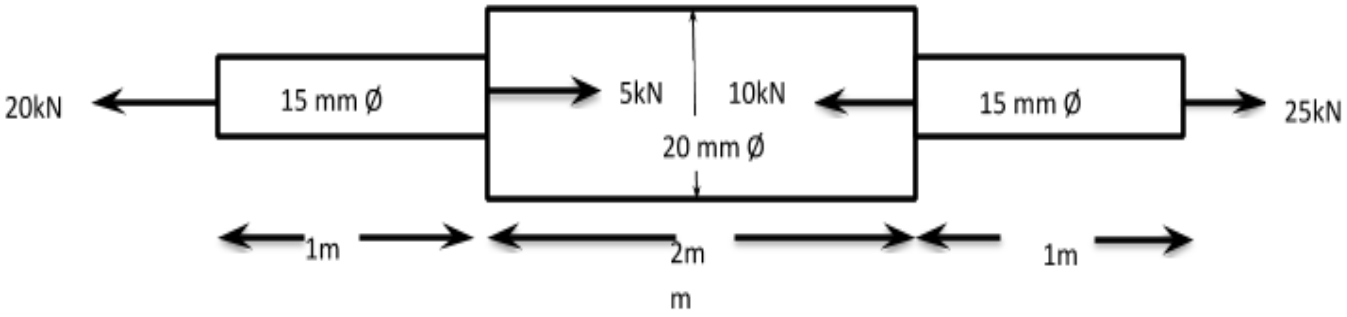
1. (a) State Hook's law? Draw stress -strain diagram for mild steel specimen tested under uni-axial tension till fracture and mark all the salient points.

   (b) A metallic rod of 10 mm diameter, when tested under an axial pull of 10 kN was found to reduce its diameter by 0.003 mm. The modulus of rigidity for the rod is 50 N/mm^2. Find the Poisson's ratio, modulus of elasticity and bulk modulus.

(Or)

2. (a) Derive the expression for the strain energy stored in a body when the load is suddenly applied.

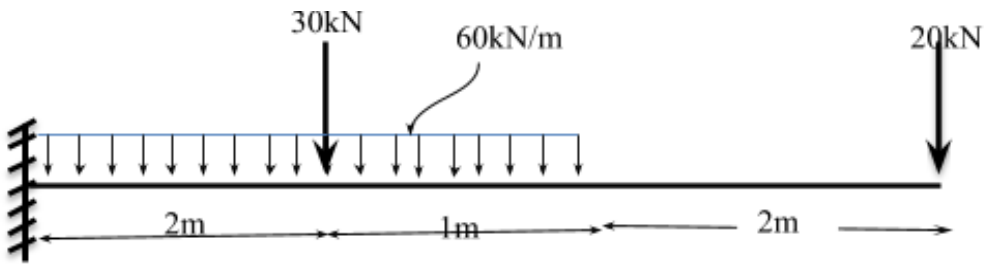
   (b) A steel bar ABCD 4 m long is subjected to forces as shown in fig. Find the elongation of bar. Take E_{steel}=200GPa



UNIT-II

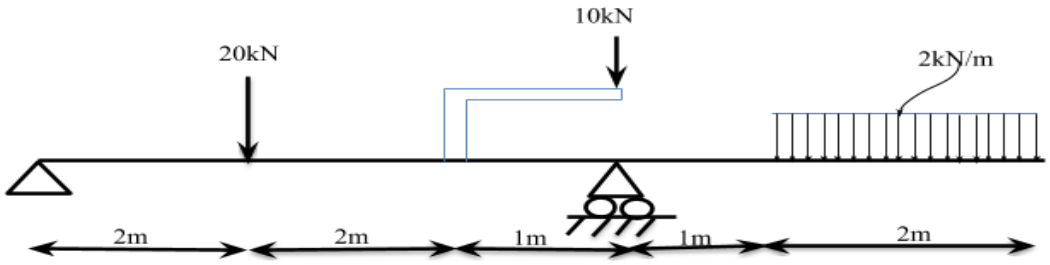
3. (a) Obtain the relation between shear force, bending moment and rate of loading at a Section of a beam.

   (b) Draw the shear force, bending moment diagrams for the beam shown in below figure



(Or)

4. A simply supported beam with overhang on the right is loaded as shown in fig below. Draw shear force and bending moment diagram indicate maximum bending moment and point of contra flexure.



UNIT-III

5. a) Derive the bending equation of simple beams MI=fy=ER. Writing all the assumptions made.

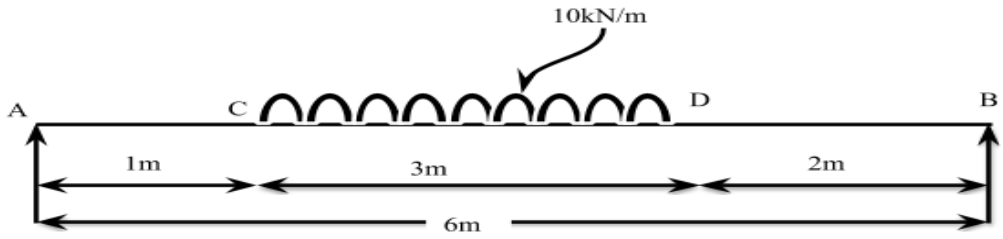
   (b) A rectangular beam 200 mm deep and 300 mm wide is simply supported over a Span of 8 m. What uniformly distributed load per meter the beam may carry, if the Bending stress is not to exceed 120 N/mm^2.

(Or)

6. An I-section flange 200 mm X 20 mm, web 300 mm X 15 mm is subjected to a shear force of 10kN. Find the shear stress at the neutral axis, top of the web and flange fibre in contact with the web. What percentage of shearing force is carried by the web ? Also sketch the variation of the shear stress along the depth of the beam.

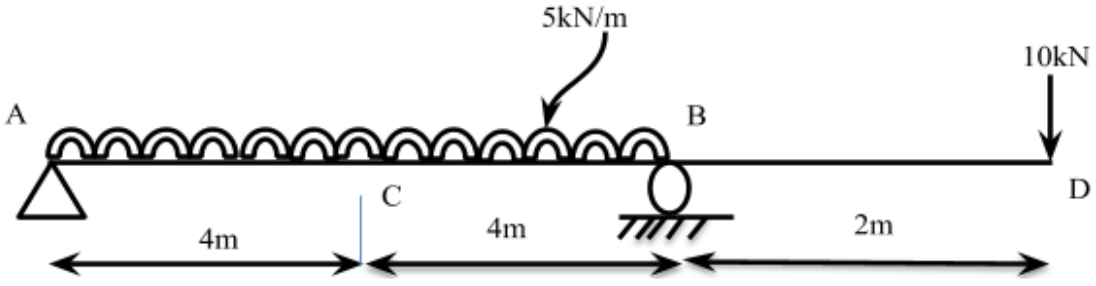
UNIT-IV

7. A beam AB , 6 m long has a moment of inertia of $450x10^6$ mm^4 and loaded as shown in fig. Determine the following using double integration method
   a. Slope at A
   b. Deflection at mid span
   c. Maximum deflection



(Or)

8. Find the deflection at points C and D of the beam loaded as shown in fig below, by moment area method. Given E=200 GPa, $I=66.67x10^6$ mm^4



UNIT-V

9. Derive the Torsion equation.

(Or)

10. (a) Derive the expression for closely-coiled helical springs subjected to an axial twist.

(b) A close-coiled helical spring of 100 mm mean diameter is made of 10 mm diameter rod and has 20 turns. The spring carries an axial load of 200 N. Determine the shearing stress. Taking the value of modulus of rigidity= $84GN/m^2$, determine the deflection when carrying this load. Also calculate the stiffness of the spring and frequency of free vibrations for a mass hanging from it.

Subject Code: 1501403 **R 15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech IV Semester Supple. Examinations, 2021- Model Paper
Sub: SURVEYING - II
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any five questions, choosing one question from each unit.
All questions carry equal marks

UNIT – I

1. How do you determine the level at top of an object when:
   a) Base is accessible
   b) Base is inaccessible

(Or)

2. In order to ascertain the elevation of the top Q of the signal on a hill, observations were made from two instrument stations P and R at a horizontal distance 100 m apart, the stations P and R being in line with Q. The angles of elevation of Q at P and R were 30°20' and 18°20' respectively. The staff readings upon the BM of elevation 287.5 were respectively 2.870 and 3.750 when the instrument was at P and at R, the telescope being horizontal. Determine the elevation of the foot of the signal if the height of the signal above its base is 3 m.

UNIT – II

3. What are the elements of simple curve? Explain with the help of neat sketch.

(Or)

4. Explain different types of vertical curves with neat sketches.

UNIT – III

5. a) Define sounding. What are the instruments used for sounding? Explain each.
   b) Discuss various methods of locating soundings?

(Or)

6. a) Explain briefly about types of GPS receivers?

   b) What is meant by GPS. What are the merits & demerits of GPS.

UNIT – IV

7. a) How would you determine the scale of a vertical photograph?

   b) What is photogrammetry? Discuss its limitations.

(Or)

8. a) What do you understand by relief displacement on a vertical photograph? Derive an expression for its determination? Calculate the length of DA and bearing of AB

   b) The distance from the principal point to an image on a photograph is 6.44cm, and the elevation of the object above the datum (sea level) is 250m. what is the relief displacement of the point if the datum scale is 1/10000 and the focal length of the camera is 20cm

UNIT – V

9. a) Describe briefly the salient features of total-station.
   b) Explain adjustments of Total station instruments and their accessories?

(Or)

10. a) Explain briefly about finding Remote Elevation Measurement (REM) by Total Station with diagram
    b) Explain how to find Missing Line Measurement (MLM) on Total Station

Subject Code: 1501404 **R 15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech IV Semester Supple. Examinations, 2021- Model Paper
Sub: BUILDING CONSTRUCTION
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any five questions, choosing one question from each unit.
All questions carry equal marks.

UNIT-I

1.(a) Explain about principles of planning of Buildings?

(b) Explain about building bye laws?

(Or)

2.(a) Explain Guidelines for planning and drawing of Residential Buildings?
(b) What are the standard dimensions for various building units?

UNIT-II

3. Explain briefly about classifications of stone masonry?

(Or)

4. Explain about different types of Bonds with neat sketch?

UNIT-III

5. Explain about different types of floors?

(Or)

6.(a) Briefly explain about different types of lintels?
(b) Explain about staircases.

UNIT-IV

7. Explain about types of doors and windows?

(Or)

8. What is damp proofing. Explain the methods of damp proofing for Foundations, floors and roofs?

UNIT-V

9. What are the principles, benefits and disadvantages of Green buildings.

(Or)

10. What is an intelligent building. What are the benefits and limitations for intelligent buildings?

Subject Code: 1501405 **R 15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003

B. Tech IV Semester Supple. Examinations, 2021- Model Paper

Sub: HYDRAULIC MACHINERY

(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any five questions, choosing one question from each unit.
All questions carry equal marks

UNIT-I

1. a) What are different types of dimensionless numbers? Explain them. 6 M

   b) The pressure difference Δp in a pipe of diameter D and length due to turbulent flow depends on the velocity V, viscosity μ, density ρ and roughness k. Using Buckingham's π–theorem, obtain expression for Δp. 8 M

(Or)

2. a) What are similarity laws? Explain them. 6 M

   b) What are the applications of dimensionless numbers? 8 M

UNIT-II

3. A jet of water having a velocity of 35 m/s impinges on a series of vanes moving with a velocity of 20 m/s. The jet makes an angle of 300 to the direction of motion of vanes when entering and leaves at an angle of 1200. Draw the triangles of velocities at inlet and outlet and find the angles of vanes tips so that water enters and leaves without shock, the work done per unit weight of water entering the vanes and the efficiency. 14M

(Or)

4. A jet of water of diameter 100 mm strikes a curved plate at its centre with a velocity of 15 m/s. The curved plate is moving with a velocity of 7 m/s in the direction of the jet. The jet is deflected through an angle of 150. Assuming the plate smooth, find:
   (i) Force exerted on the plate in the direction of the jet.
   (ii) Power of the jet.
   (iii) Efficiency. 14M

UNIT-III

5. a) Show that in the case of a Pelton wheel maximum hydraulic efficiency occurs when the bucket speed is half that of the velocity of the jet. 7M

   b) What is a turbine? Give the various efficiencies. Also give the classification of turbines. 7M

(Or)

6. a) What are the uses of a draft tube? Describe with neat sketches different types of draft tubes. 7M

   b) Define the term unit power, unit speed and unit discharge with reference to a hydraulic turbine. And also derive the expression for these terms. 7M

UNIT-IV

7. a) A centrifugal pump running at 1000 rpm delivers water against a head of 14.5 m. The vanes are curved at an angle of 300 with its periphery. If the impeller diameter at the outlet is 30 cm and outlet width is 5 cm, determine the discharge. Take the Manometric efficiency as 95%. 7 M

   b) What is the difference between single-stage and multistage pumps? Describe multistage pump with: (i) Impellers in parallel. (ii) Impellers in series. 7 M

(Or)

8. a) What it is meant by priming. The diameters of an impeller of a centrifugal pump at inlet and outlet are 30 cm and 60 cm respectively. Determine the minimum starting speed of the pump if it works against a head of 30 m. 6 M

   b) What are unit quantities? Also derive the expressions for unit speed, unit discharge and unit power for a hydraulic turbine. A centrifugal pump is to discharge 0.8 m3/s at a speed of 1450 r.p.m against a head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Find the vane angle at the outer periphery of the impeller. 8M

UNIT - V

9. A single acting reciprocating pump has a stroke length of 15 cm. The suction pipe is 7 metres long and the ratio of the suction diameter to the plunger diameter is 3/4. The water level in the sump is 2.5 metres below the axis of the pump cylinder, and the pipe connecting the sump and pump cylinder is 7.5 cm diameter. If the crank is running at 75 r.p.m., determine the pressure head on the piston : (i) in the beginning of the suction stroke, (ii) in the end of the suction stroke, and (iii) in the middle of the suction stroke. Take coefficient of friction as 0.01. 14 M

(Or)

10. The diameter and stroke length of a single acting reciprocating pump are 100 mm and 300 mm respectively. The water is lifted to a height of 20 m above the centre of the pump. Find the maximum speed at which the pump may be run so that no separation occurs during the delivery stroke if the diameter and length of delivery pipe are 50 mm and 25 m respectively. Separation occurs if the absolute pressure head in the cylinder during delivery stroke falls below 2.50 m of water. Take atmospheric pressuie head = 10.3 m of water. 14 M

Model Question Paper

K S R M College of Engineering (Autonomous), KADAPA – 516 003

B.Tech (R 15) 4th Semester Supple Examinations, 2021 – Model Paper

GEO – TECHNICAL ENGINEERING – 1

(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Note: 1. Answer FIVE questions, choosing ONE question from each UNIT

2. ALL questions carry EQUAL marks

Unit - 1

1 a Derive the relationship among dry density, bulk density and water content. 7 Marks

b Determine the IS classification of soil and percentage of materials present in. 7 Marks

IS Sieve	4.75 mm	2.00 mm	1.00 mm	600 μ	425 μ	300 μ	150 μ	75 μ
Wt. retaining in 'g'	10	50	340	250	150	80	70	50

Or

2 a Distinguish between 7 Marks

i. Flow index and toughness index

ii. Air content and percentage air voids

b A fully saturated clay sample has a mass of 130 g and has volume of 64 cm^3. The sample mass is 105 g after drying in oven. Assuming that volume does not change during drying. Determine specific gravity of soil solids, void ratio, porosity and dry density. 7 Marks

Unit - 2

3 a Describe the factors affecting permeability of soils. 7 Marks

b Explain about the pumping out test in unconfined and confined aquifers with a neat sketch. 7 Marks

Or

4 a Explain about quick sand condition with a neat sketch. 7 Marks

b Explain about the applications of flow nets. 7 Marks

Unit - 3

5 a Distinguish between Boussinesq and Westergaard theories of stress distribution in soils. 7 Marks

b A water tank has a circular foundation of 10 m diameter. If the total weight of tank with foundation is 2000 tons, calculate vertical stress at a depth of 2.5 m centrally below the foundation. 7 Marks

Or

6 a Describe the construction procedure of Newmark's influence chart. 7 Marks

b What is meant by pressure bulb? What is its significance? 7 Marks

Unit - 4

7 a Distinguish between standard and modified proctor compaction tests. 7 Marks

b The following data is obtained in IS light compaction test: 7 Marks

Water content (%)	2.0	4.2	5.5	6.6	7.5	10.0
Compacted density (g/cc)	2.02	2.08	2.17	2.20	2.21	2.20

Determine OMC and Maximum Dry Density. Also draw zero air voids line.

Or

8 a Derive differential equation for one dimensional consolidation as per Terzaghi's theory. 7 Marks

b A 20 mm thick consolidated sample of clay reached 30 % consolidation in 20 minutes with double drainage. How long would it take for the clay layer from which sample is obtained, to reach 50 % consolidation? The clay layer is 5 m thick and has single drainage. 7 Marks

Unit – 5

9 a Explain Mohr-Coulomb theory of shear strength of soils 7 Marks

b A specimen of sandy clay failed at a stress of 250 kN/m^2 in unconfined compression test. The failure plane was observed to make an angle of 35° with longitudinal axis of specimen. Determine shear parameters of soil. 7 Marks

Or

10 a Discuss merits and demerits of tri-axial test over direct shear test. 7 Marks

b The following observations were made a sample of soil in tri-axial testing. 7 Marks

Test No.	Cell pressure (kN/m^2)	Axial stress at failure (kN/m^2)
1	300	875
2	400	1160
3	500	1460

Plot Mohr circles of stress and determine shear parameters.

Subject Code: 1502401 **R 15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003

B. Tech IV Semester Supple. Examinations, 2021- Model Paper

Sub: BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

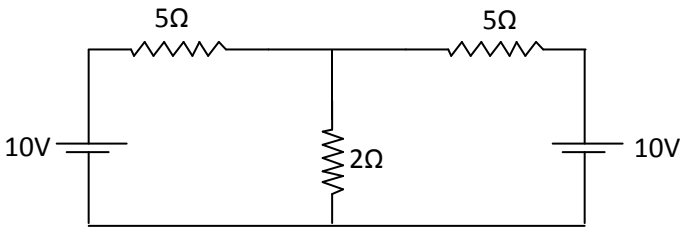
Note: Answer any FIVE Questions choosing One question from each Unit.
All questions carry Equal Marks.

Unit-I

1. Explain the different types of Network elements? With examples 14M

(Or)

2. (a) Find the mesh current equations in the given circuit and also determine the currents. 7M



(b) State and explain Kirchhoff's laws. 7M

Unit-II

3. Explain the constructional details of a DC Generator with a neat sketch? 14M

(Or)

4. (a) A shunt generator delivers 450A at 230V and resistance of the shunt field resistance and armature are 50 ohms and 0.03 ohms respectively. Calculate the generated EMF 7M

4. (b) Define the transformer and derive the EMF equation for the transformer 7M

Unit-III

5. Explain the operation of PN junction diode under forward bias and reverse bias condition along with its characteristics 14M

(Or)

6. Explain the operation of full wave rectifier with waveforms and derive the expressions for average value and RMS value. 14M

Unit-IV

7. (a) Explain the frequency response of CE amplifier. 7M

(b)Explain the operation of PNP and NPN transistor. 7M

(Or)

8. Explain the operating modes of SCR and also expain its V-I characteristics. 14M

Unit-V

9. (a) Explain principle of operation of three phase induction motor. 7M

(b)Explain the tests to be conducted for determining synchronous impedance method. 7M

(Or)

10. Explain the applications of CRO. 14M

*****

KSRM COLLEGE OF ENGINEERING(AUTONOMOUS), KADAPA

B. Tech., IV SEMESTER (R15) EEE

SUB: GENERATION OF ELECTRIC POWER MODEL PAPER

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

Note: Answer any *five* of the following

Choosing *one* from each unit

Unit I

1.a Explain the types of steam turbines used in thermal power station. 7M

b. Explain the cooling arrangement used in thermal power station. 7M

Or

2. Draw the typical layout of thermal power plant and what are the different electric equipment used in the thermal power station. 14M

Unit II

3.a. Mention the factors to be considered for the selection of site for hydro power station. 6M

b. Draw the layout of hydropower station and discuss its generation. 8M

Or

4.a. Explain the types of nuclear reactors with operation and draw its neat sketch. 10M

b. What are the advantages and disadvantages of nuclear power stations. 4M

Unit III

5.a. Explain any two types of concentrating solar collectors with neat sketch. 8M

b. Explain the role and potential of solar energy in the present energy crisis in the world. 6M

Or

6. List out the methods of harnessing the geothermal energy and explain the methods with neat sketch. 14M

Unit IV

7. Explain the working of vertical and horizontal wind mill mentioning the specific arrangement of blades. 14M

Or

8. Explain the role and potential of wind energy options in detail and also explain the applications of wind energy. 14M

Unit V

9. a. Explain one type of Biogas digester with neat diagram. 7M

b. Explain the environmental aspects of Biogas energy generation in detail. 7M

Or

10.a. Classify the tidal power plants and also explain the operation of tidal power plant. 10M

b. what are the advantages and limitations of the tidal power plants. 4M

K.S.R.M COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
II B.TECH IV SEM (R15) MODEL QUESTION PAPER
BRANCH: Electrical & Electronics Engineering
SUBJECT: Electrical & Electronics Measurements

Time: 3 HOURS Max.Marks: 70M

NOTE: Answer FIVE of the following.
Choosing one from each unit

UNIT-I

1. a) Explain the construction and working principle of MI instrument with neat diagram 10M]
   b) The inductance of a MI instrument is given by $L = 12 + 6\theta - \theta^2 \mu H$.where θ is the deflection in radians from zero position. the spring constant $12 \times 10^{-6} N - m$/radians. Calculate the deflection for a current of 8A [4M]

(OR)

2. **a)** How is the current range of a PMMC instrument extended with the help of shunts? Describe a method of reducing errors due to temperature changes in shunt connected instruments [7M]
   b) A moving coil instrument whose resistance is 25Ω gives a full scale deflection with a Current of 1mA. The instrument is to be used with a manganin shunt to extend its range to 100mA. Calculate the error caused by a 10^0C rise in temperature. [7M]

UNIT-II

3. Explain the construction and working principle of
   a) Electrodynamometer type power factor meter [7M]
   b) Moving iron type power factor meter [7M]

(OR)

4. a) Explain the function of deferent parts of a single phase energy meter [10M]
   b) Write the deference's between wattmeter and energy meter [4M]

UNIT-III

5. a) Why Kelvins Bridge is preferred? Derive bridge balance equation for the kelvins double Bridge [10M]
   b) A four terminal resister of approximately 50$\mu\Omega$ resistance was measured by means of a kelvins double bridge having the following component resistances. Standard resistor =100.03Ω, inner ratio arms = 100.31Ω and 200Ω, outer ratio arms=100.24Ω and 200Ω, Resistance of link connecting the standard and unknown resistance =700 $\mu\Omega$.calicalte the Unknown resistance to the nearest 0.01 Ω [4M]

(OR)

6. a) Derive an expression for an unknown capacitance using Schering Bridge [7M]
   b) Derive an expression for an unknown inductance using Anderson's bridge [7M]

UNIT-IV

7. a) With neat diagram explain Crompton's dc potentiometer [8M]
   b) What is standardization of dc potentiometer? Why it is necessary [6M]

(OR)

8. a) Discuss the major sources of errors in C.T [4M]
   b) Derive the expression for phase angle and ratio errors [10M]

UNIT-V

9. a) Draw and explain construction of cathode ray tube [7M]
   b) What are the lissajous figures? How are they obtained on CRO? How frequency can be measured using these figures [7M]

(OR)

10. Explain the following briefly
    a) Ramp type DVM [7M]
    b) Successive approximation DVM [7M]

KSRM COLLEGE OF ENGINEERING, KADAPA

(AUTONOMOUS)

B. Tech., IV SEMESTER (R15) EEE

ELECTIRCAL MACHINES – II MODEL QUESTION PAPER

TIME: 3Hrs **MAXIMUM MARKS: 70**

NOTE: ANSWER ALL QUESTIONS FROM THE FOLLOWING.
ALL QUESTIONS CARRIES EQUAL MARKS.

1. a) Explain the construction of a single phase in detail and Compare between core type and shell type Transformers.

   b) Derive the emf equation of a 1-phase transformer and calculate the emf / turn, if the flux is 0 .015 *Wb* at a frequency of 50 *Hz.*

(OR)

2. a) Develop the equivalent circuit of a single-phase transformer.

   b) A 200 *kVA*, 1- phase, 3300 / 400 *V* transformer gave the following results in the short circuit test with 200 *V* applied to the primary and secondary short circuited, the primary current was full load value and the input power was 1650 *W*. Calculate the secondary potential difference and the % of regulation when the full load current was Passing at a0.707 *p. f*. lagging with normal primary voltage.

3. a) Explain the O.C. and S.C. tests on the transformer and hence explain the evaluation of equivalent circuit from it.

   b) Explain the operation of autotransformer with neat diagram and also explain the saving of copper in an autotransformer when compared to static two winding transformer.

(OR)

4. a) Explain the parallel operation of transformers in detail for balanced and unbalanced loads.

   b) In a transformer, the core loss is found to be 52*W* at 40*Hz* and 90*W* at 60*Hz* measured at same peak flux density. Compute the hysteresis and eddy current losses at 50*Hz*.

5. a) Explain Scott connection in detail with neat circuit and vector diagrams.

   b) A 500 *KVA*, 3-phase, 50*Hz* transformer has a voltage ratio (line voltages) of 33/11-*KV* and is delta/star connected. The resistances per phase are: high voltage 35 *Ohms*, low voltage 0.876 *Ohms* and iron loss is 3050*W*. calculate the value of efficiency at full load and one half of full load respectively i) at unity power factor ii) 0.8 power factor.

(OR)

6. Explain the construction and the production of rotating magnetic field of a three phase induction motor with neat diagrams.

7. a) Derive torque equation and condition for maximum torque of three phase induction motor.

b) A 1100*V*, 50*Hz* delta connected induction motor has a star-connected slip ring rotor with a phase transformation ratio of 3.8. The rotor resistance and standstill leakage reactance are 0.013 *Ohm* and 0.25 *Ohm* per phase respectively. Neglecting stator impedance and magnetizing current determine.

i) The rotor current and power factor at start with slip-rings shorted.

ii) The rotor current and power factor at 4% slip with slip-rings shorted.

iii) The external rotor resistance per phase required to obtain a starting current of 100*A* in the stator supply lines.

(OR)

8. Draw the circle diagram from no-load and short-circuit test of a 3-phase. 14.92*KW*, 400*V*, 6 pole induction motor from the following test results(line values).

No-load : 400 *V*, 11*A*, 0.2 *p.f*

Blocked rotor : 100*V*, 25*A*, 0.4 *p.f*

Rotor copper loss at standstill is half the total copper loss.

From the diagram, find

(i) Line current, slip, efficiency and power factor at full load.

(ii) The maximum torque.

9. a) Explain star-delta starting method of induction motor with neat diagrams.

b) Calculate the steps in a 5 steps rotor resistance starter for a 3-phase induction motor. The slip at the maximum starting current is 2% with slip- ring short-circuited and the Resistance per rotor phase is 0.02 *Ohms*.

(OR)

10. Explain any one among rotor side and stator side speed control methods of 3-phase induction motor.

KSRM COLLEGE OF ENGINEERING, KADAPA

(AUTONOMOUS)

B. Tech., IV SEMESTER (R15) EEE

POWER SYSTEMS -I MODEL QUESTION PAPER

TIME: 3Hrs **MAXIMUM MARKS: 70**

NOTE: ANSWER ALL QUESTIONS FROM THE FOLLOWING.
ALL QUESTIONS CARRIES EQUAL MARKS.

UNIT - I

1. a) Explain the load curve and factors that can be deduced from the curve
   b) Generation

   Time (hrs): 0 – 6 6 – 10 10 – 12 12 – 16 16 – 20 20 - 24

   Load (mw): 40 50 60 50 70 40

   Draw the load curve and find (1) Max demand (2) Units generated / day (3) Average load X load factors.

(Or)

2. a) Explain tariff types and it Characteristics of a tariff
   b) A generating station has get max demand of 50Mcu calculate the cost/kwh delivered from the following data.
   1. Capital cost of RS 95×10^{-6}
   2. Annual cost of fuel and oil RS 9×10^{-6}
   3. Taker, wages and salaries RS 6×10^{-6}

   The late of interest and depreciation is 10% annual load factor is 50%

UNIT – II

3. what all the different type of insulators explain
   a string of 4 insulators has a self capacitance equal to 10 times the pin to earth capacitance find
   1) Voltage Destrehan across the various units expressed as a percentage of total voltage the string and
   2) string efficiency

(Or)

4. a) explain how as determined for an overload line conductor taking into account to effects of wind X ice loading
   b) A 132KV transmission line has the following data let of conductor=680 kg/km, length of span=260m. Ultimate strength =3100kg, safety factor=2. Calculate the height above ground at which the conductor should be suppressed. Ground clearance required is 10m

UNIT – III

5. A) derive the expression for the inductance / phase of a 3-φ line with unsymmetrical spacing assume equal transmission
   b) calculate the inductance of each conductor in a 3- φ , 3-wire system, when the conductors are allenged in a horizontal plane. With spacing such that . D_{13}=4, D_{12}= D_{23}=2m. the conductors are transposed and each has a diameter of 2.5cm.

(Or)

6. A) Derive the expression for the capacitance of a single phase overhead transmission line.
   B) A 1-φ , 25km long overhead line constants of two conductors 1.8 m apart, diameters of each conductors being 6mm. If the line voltage is 33Kv,50Hz.Determine the charging current of the open circuited line.

UNIT – IV

7. A) Explain the different types of primary distribution systems.
   B) a single phase AC distributor AB 300m long is fed from end A and is loaded as under.
   1. 100A at 0.707 p.f lagging 200m from point A
   2. 200A at 0.8 p.f lagging 300m from point A.
   The total resistance and reactance of the distributor is 0.2Ω and 0.1Ω/KW. Calculate the total voltage drop in the distributor. The load power factor refer to the voltage at the far end.

(Or)

8. A) state and explain kelvins law.
   b) Determine the most economical cross-section for a 3-phase transmission line, 1km long to supply at a constant voltage of 110kv. The following daily load cycle is
   6hours 20MW at p.f 0.8 lagging
   12hours 5MW at p.f 0.8 lagging
   6hours 6MW at p.f 0.8 lagging
   The line is used for 365days yearly. The cost/km of line is including erection is Rs(9000+6000a). where a is the area of cross-section of conductor in cm^2 . the annual rate of interest and depreciation is 10% and the energy cost 6p/kwh. The resistance per kw of each conductor is 0.176/a.

UNIT-V

9 (a) derive expression for dielectric stress in a single core cable.
   (b) Explain the different methods of cable grounding?

(Or)

10 (a) derive expression for critical disturbance voltage of overhead conductors.
   (b) Describe the corona phenomenon and discuss the factors which affect corona loss.

Code: (1503402)

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B.Tech IV semester (R15) Supple Examinations, April-2020
COMPOSITE & NANO MATERIALS
(Mechanical Engineering)

MODEL QUESTION PAPER

Time: 3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

UNIT-I

1. Define a Composite material. How are these classified, Explain briefly with neat sketches.

(OR)

2. a) Explain the fabrication methods of fiber glass reinforced composites by prepreg production process with neat sketch.
b) Write some applications of Composites?

UNIT-II

3. Describe the properties and applications of Polymer Matrix Composites(PMC) and Metal Matrix Composites.(MMC)

(OR)

4. Explain the properties and applications of Ceramic Matrix Composites(CMC) and Carbon-Carbon Composites(CCC).

UNIT-III

5. Describe the Ceramic Composite Materials
a) Reinforced Cement Concrete (RCC)
b) Pre-stressed Concrete (PC)

(OR)

6. a) Explain briefly about Post-tensioning in reinforced concrete (PTRC)
b) Write properties and applications of particulate composites and Hybrid Composites.

UNIT-IV

7. Define Ceramics? List out the classifications and applications of Ceramic materials.

(OR)

8. a) What are the different types of glasses. Explain briefly.
b) Explain various fabrication methods of glasses.

UNIT – V

9. Describe the properties and applications of nano-phase materials and smart-materials.

(OR)

10. Explain the different types of advanced ceramics with properties and applications.

Code: 1503404

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)

B.Tech IV semester (R15) Supple. Examinations, April-2020

Kinematics of Machinery

(Mechanical Engineering)

MODEL QUESTION PAPER

Time:3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

Unit-I

1. (a)Discuss in Detail about Degrees of freedom of mechanisms.
   (b) Explain in detail different types of constrained motions.

(OR)

2. (a)Sketch and explain any one inversion of double slider crank chain.
   (b)Explain the classification of kinematic pairs.

Unit-II

3. Give a neat sketch of the straight line motion Hart mechanism. Prove that it produces an exact straight line motion.

(OR)

4. (a) Prove that the ratio of angular velocities of the driven and driving shafts for a Hooke's joint is given by

$$\omega_2 / \omega_1 = \text{Cos}\alpha / 1\text{-Cos}^2\theta\ \text{Sin}^2\alpha$$

   (b) Write a short note on double Hooke's joint?

Unit-III

5. In Fig., the angular velocity of the crank OA is 600 r.p.m. Determine the linear velocity of the slider D and the angular velocity of the link BD, when the crank is inclined at an angle of 75° to the vertical. The dimensions of various links are : OA = 28 mm ; AB = 44 mm ; BC 49 mm ; and BD= 46 mm. The centre distance between the centres of rotation O and C is 65mm. The path of travel of the slider is 11 mm below the fixed point C. The slider moves along a horizontal path and OC is vertical.

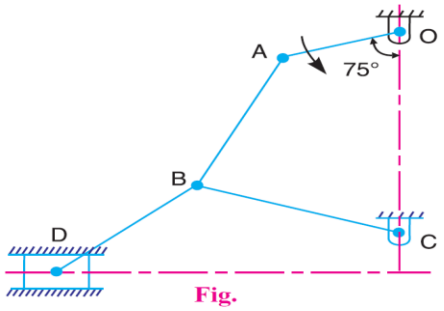


Fig.

(OR)

6. (a) Derive an expression for the magnitude and direction of coriolis component of acceleration.
   (b) Explain the procedure to locate all I-Centers for a mechanisam consists of 4 links.`

Unit-IV

7. A cam operating a knife-edged follower has the following data :
   (*a*) Follower moves outwards through 40 mm during 60° of cam rotation.
   (*b*) Follower dwells for the next 45°.
   (*c*) Follower returns to its original position during next 90°.
   (*d*) Follower dwells for the rest of the rotation.
   The displacement of the follower is to take place with simple harmonic motion during the outward and with Uniform velocity during return stroke. The least radius of the cam is 50 mm. Draw the profile of the cam when the axis of the follower is offset 20mm towards right from the cam axis. If the cam rotates at 300 r.p.m., determine maximum velocity and acceleration of the follower during the outward stroke and the return stroke.

(OR)

8. (a) Explain with sketches the different types of cams and followers.

   (b) Define and explain the terms

   (i) Base circle (ii) Prime circle (iii) Pitch curve (iv) Pressure angle

Unit-V

9 (a) State and prove law of gearing. Show that involute profile satisfies the conditions for correct gearing.
   (b) What do you understand by the term "Interference" as applied to gears.

(OR)

10. A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20^{o} pressure angle,12mm module and 10mm addendum. Find the length of path of contact, arc of contact and contact ratio.

Code: 1503405

K.S.R.M COLLEGE OF ENGINEERING, KADAPA(AUTONOMOUS)

B.Tech IV Sem (R15) Supple Examinations, April, 2020

Thermal engineering-1

(Mechanical Engineering)

MODEL QUESTION PAPER

Time:3 hrs **Max Marks: 70**

Answer five questions, Selecting one Question from each unit

All Questions carry equal marks

Unit-I

1. Explain the working principle of four stroke I.C engine with valve timing diagram

(OR)

2. Illustrate the constructional details of I.C engines Explain briefly about the important components and its materials?

Unit-II

3. Explain the working of Zenith carburetor with neat sketch.

(OR)

4. With a neat sketch explain the battery coil ignition system?

Unit-III

5. What are the different stages of combustion in C.I engines? Explain with p-θ diagram?

(OR)

6. Explain the combustion process in S.I engines and pre ignition in S.I engines?

Unit-IV

7. A cylinder, 4 stroke cycle petrol engine has a bore 90mm and stroke 90mm.

   The clearance volume of each cylinder is 86 cm^3. Find the compression ratio. If the indicated mean effective pressure is 530 KN/m^2 at 80 rev/sec and the engine uses 15.0 liter of fuel per 1 hour. Find the indicated power and indicated thermal Efficiency. The calorific value of the petrol is 42 MJ/kg and its specific gravity is 0.8

(OR)

8. a) Define brake power , how do you measure brake power in the laboratory
   b) Explain the method of Morse test for obtaining friction power of a multi cylinder engine

Unit-V

9 A) Describe the working of a single stage reciprocating air compressor

B) A single stage air compressor with 300mm bore and 400mm stroke is required to compress air from 1 bar to 5 bar. Find the power required by the compressor by the compressor while running at 200 rpm, when the compression of the air is (i) Isothermal (ii) Adiabatic (iii) Follows the law of $PV^{1.25}$ = Constant

(OR)

10. a) Explain the principle of operation of centrifugal compressor with the help of neat sketch

b) Explain the variation of pressure and velocity in centrifugal compressor?

Code: (1503406)

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)

B.Tech IV semester (R15) Supple. Examinations, April-2020

MANUFACTURING TECHNOLOGY

(Mechanical Engineering)

MODEL QUESTION PAPER

Time: 3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

UNIT-I

1) Explain the concept of solidification of casting of pure metals and alloys with a neat sketch.

(OR)

2) Define pattern and briefly explain about any six types of patterns with a neat sketch

UNIT-II

3) Describe briefly hot chamber die-casting machine with a neat sketch by stating its pros and cons.

(OR)

4) Explain in detail the working of a cupola furnace with a neat sketch.

UNIT-III

5) Explain "oxy-acetylene gas welding" with a neat sketch.

(OR)

6) With a neat sketch, explain the working principle of Thermit welding process.

UNIT-IV

7) Explain Briefly about TIG and MIG welding with a neat sketch.

(OR)

8. a) Write a short note on soldering and brazing.

b) Explain any three types of weld defects with a neat sketch.

UNIT – V

9) How do you classify extrusion processes? Explain Hydrostatic Extrusion with a neat sketch.

(OR)

10. a) With a neat sketch explain “Smith forging”.

    b) Explain any four forging defects with a neat sketch.

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

IV SEMESTER (R15) Branch: ECE

Subject: **ANALOG COMMUNICATIONS** Model Paper

Time: 3 Hours Max.Marks:70

Answer any five questions, choosing one question from each unit.

All questions carry equal marks.

UNIT-1

1. (a) Draw the block diagram and explain generation of DSB-SC signal using balanced modulator with necessary waveforms.

(b) The antenna current of an AM transmitter is 9 A when only the carrier is sent, but it increases to 10.6 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percentage of modulation changes to 0.8

OR

2. (a) Explain working principle of FDM system with necessary diagram.

(b) Explain in detail about VSB modulation with a neat diagram and waveforms.

UNIT-1I

3. (a) An FM signal is represented in time domain as $s(t) = 10 \cos (2\pi.106t + 5 \sin 8\pi.103t)$. Calculate the frequency deviation, modulation index, power and band width.

(b) Explain the principle of direct method of generation of FM signal using relevant diagrams.

OR

4. (a) Derive expression for single tone modulated FM wave and plot the necessary waveforms.

(b) Discuss the bandwidth of FM signal. Compare NBFM and WBFM.

UNIT-1II

5. Discuss a simple radio receiver design. With the help of the block diagram explain the working principle of super heterodyne receiver in detail. List out the advantages

OR

6. Briefly explain about (i) Choice of intermediate frequency (IF)

(ii) Automatic gain control (AGC)

(iii) Tracking characteristics of receivers

UNIT-1V

7. (a) Derive the equation for noise figure of FM receiver.

(b) What is the purpose of pre-emphasis and de-emphasis filtering? Explain the filtering process with suitable sketches.

OR

8. (a) Explain about noise effect in AM and obtain expression for figure of merit.

(b) Explain the terms i) Sources of internal and external noise

ii) Noise temperature

iii) FM threshold effect

UNIT-V

9. (a) Explain the generation of a PAM signals with a neat block diagram and waveforms. Give merits and demerits of PAM.

(b) Compare PAM, PWM and PPM systems.

OR

10. (a) Compare the pulse modulation systems and continuous modulation systems.

(b) Explain PPM generation and detection with a neat block diagram.

KSRM COLLEGE OF ENGINEERING, KADAPA

(AUTONOMOUS)

B. Tech., IV SEMESTER (R15) EEE

SUB: SWITCHING THEORY AND LOGIC DESIGN MODEL PAPER

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

Note: Answer any *five* of the following

Choosing *one* from each unit

UNIT – I

1. (a) What are reflective codes? Explain with an example. (7M)
   (b) Subtract 798.46 from 435.12 using 10's complement method. (7M)

(Or)

2. (a) What are error detecting codes? Explain in detail. (7M)
   (b) Determine the Hamming code for the binary sequence 11011. (7M)

UNIT – II

3. (a) Express the function f(A,B,C)= ∑(2,3,5,7) in minimal SOP form. (7M)
   (b) Realize the basic logic gates using NAND and NOR gates alone. (7M)

(Or)

4. Simplify the function f(A,B,C,D)=∑(6,7,9)+d(10,11,12,13) using tabulation method. (14M)

UNIT – III

5. (a) Define combinational circuit and write its design procedure. (7M)
   (b) Design a BCD to seven segment decoder. (7M)

(Or)

6. (a) Implement the function f(A,B,C) =∑(1,3,5,6) using MUX. (7M)
   (b) Design a BCD to Excess-3 code converter. (7M)

UNIT – IV

7. (a) Design a combinational circuit using a ROM. The circuit accepts a 2-bit number and generates two outputs as f1=∑(1,2,3) and f2=∑(0,2). (7M)
   (b) Explain about PLAs. (7M)

(Or)

8. A combinational circuit is defined by the functions
   w(A,B,C,D)=∑(2,12,13), x(A,B,C,D)=∑(7,8,9,10,11,12,13,14,15),
   y(A,B,C,D)=∑(1,2,8,12,13) and z(A,B,C,D)=∑(0,2,3,4,5,6,7,8,10,11,15)
   Implement the circuit with a PAL. (14M)

UNIT – V

9. (a) Explain about Master-Slave flip-flop. (7M)
   (b) What are the different triggering methods of flip-flops? (7M)

(Or)

10. (a) Write the excitation tables for different flip-flops. (7M)
    (b) Draw the circuit of Johnson Counter and explain in detail. (7M)

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

IV SEMESTER (R15) BRANCH: ECE Model Paper

Subject: **ELECTRONIC CIRCUIT ANALYSIS**

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 an amplifier? What are the various types of amplifiers? (7M)
   (b) Define stability factor. Derive stability factor for Self Bias. (7M)

OR

2. (a) Compare CE, CB, CC amplifier characteristics. (7M)
   (b) Derive A_I, R_I, A_V and R_O for CE amplifier with emitter resistance. (7M)

UNIT-II

3. Derive the equations for voltage gain, current gain, input impedance and output admittance for a BJT using low frequency h-parameter model for CE configuration. (14M)

OR

4. (a) What is the effect of emitter bypass capacitor on low frequency response. (7M)
   (b) Calculate the Current gain, Voltage gain, Input resistance and Output resistance for the CC amplifier. The circuit parameters are R_S=1KΩ, R_1=20KΩ, R_2=20KΩ, R_E=10KΩ, R_L=40KΩ, hic=1.4KΩ, hfc=100,hrc=20μA/V. (7M)

UNIT-III

5. (a) Derive the expressions for voltage gain, input admittance, input capacitance and output resistance for CS amplifier at high frequencies. (7M)

   (b) Explain RC coupled amplifier along with circuit diagram. (7M)

OR

6. (a) Explain different types of coupling schemes. (7M)
   (b) In CD amplifier, let R_S=2KΩ, μ=40, r_d=40KΩ, Calculate the voltage gain? (7M)

UNIT-IV

7. (a)Define feedback? Derive the feedback characteristics. (7M)
   (b) An amplifier has a mid band gain of 125 and a bandwidth of 250KHz. (i) if 4% -ve feed back is introduced, find the new bandwidth and gain? (ii) if the bandwidth is to be restricted to 1MHz,find the feed back ratio. (7M)

OR

8. (a) Draw and explain the operation of WIEN-BRIDGE oscillator. Also derive expression for frequency of oscillations & conditions for sustained oscillations. (7M)
   (b) In Hartley oscillator L_2= 0.4mH,C=0.004μF. If the frequency of oscillation is 120 KHz, find the value of L_1 and h_{fe} (7M)

UNIT-V

9. What is tuned amplifier? What is the effect of cascading single tuned amplifiers on bandwidth? 14M

OR

10. (a) Derive the efficiency of class-B power amplifier. Also explain the operation of complementary symmetry push pull amplifier. (7M)

(b) Explain about Transformer coupled class-A power amplifier. Derive its theoretical efficiency. (7M)

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

IV SEMESTER (R15)

Branch: ECE Model Paper

Subject: **PULSE AND DIGITAL CIRCUITS**

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 output waveform of an RC high-pass circuit with a square wave input under different time constants. Derive the expression for percentage of tilt. (7M)

   (b) Prove that a low pass circuit acts as an integrator Derive an expression for the output voltage levels under steady state conditions of a low pass circuit excited by a ramp input. (7M)

OR

2. (a) Derive an expression for the output of low pass circuit excited by a step input. Draw the output for different time constants. (7M)

   (b) What is an attenuator? Explain its application as a CRO probe. (7M)

UNIT - II

3. (a) Give the circuits of different types of shunt clippers and explain their operation with the help of their transfer characteristics. (7M)

   (b) State and prove clamping circuit theorem. (7M)

OR

4. (a) Explain the working of a two level diode clipper with the help of circuit diagram, waveform and transfer characteristics. (7M)

   (b) Determine the output waveform for the biased clipper circuit for the square wave

input. Also explain its operation.
(7M)

UNIT - III

5. (a) Define risetime fall time delay time storage time. Explain the factors which contribute to the delay time of transistor.
(7M)
(b) Explain the operation of a monostable multivibrator and derive for the pulse width with necessary waveforms and circuits.
(7M)

OR

6. Design a collector coupled astable multivibrator using NPN silicon transistors with hfc=40, rbb=200 ohms supplied with Vcc=10V and circuit component values are Rc=1.2KOhms and C= 270pF.
(14M)

UNIT - IV

7. (a) Explain the working of a transistor Bootstrap sweep circuit and derive expression for the slope sweep error.
(7M)
(b) Why the time base generators are called sweep circuits? Give most important applications of time-base generators.
(7M)

OR

8. (a) Explain the working of transistor miller sweep circuit. What are its advantages over Bootstrap sweep circuits?
(7M)
(b) With the help of a neat circuit diagram and waveforms, explain the method to achieve frequency synchronization using pulse train as sync signals.
(7M)

UNIT - V

9. (a) Explain how the loading of control signal is reduced when the number of inputs increases in a sampling gate.
(7M)
(b) Explain the function of a sampling gate used in sampling scopes also explain how sampling gate is used in chopping amplifiers.
(7M)

OR

10. (a) Explain the characteristics and implementation of CMOS & ECL digital logic family. (7M)

(b) Classify the basic families that belong to the bipolar families and to the MOS families. (7M)

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

IV SEMESTER (R15) Branch: ECE Model Paper

Subject: **ELECTROMAGNETIC WAVES & TRANSMISSION LINES**

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 relationship between E and H?

   (b) A uniform plane wave propagating in a medium has $E=2e^{-\alpha z}\sin(10^8 t-\beta z)\mathbf{a_y}$ V/m, if the medium is characterized by $\varepsilon_r=1$, $\mu_r=20$ and $\sigma=3$S/m, find α, β and H.

OR

2. (a) Derive the wave equations for perfect dielectric medium.

   (b) Explain the wave propagation in lossless and lossy medium.

UNIT-II

3. (a) Explain the reflection of plane waves by a perfect conductor in normal incidence.

   (b) Consider two dielectric media where medium1 is free space and medium2 has $\varepsilon_2 = 4\,\varepsilon_0$ and $\mu_2 = \mu_0$. Determine the reflection coefficient for a wave obliquely incident at $\theta_1 = 30^o$ for (i) perpendicular polarization (ii) parallel polarization

OR

4. (a) Explain the concept of pointing theorem and pointing vector with appropriate expressions.

   (b) In a nonmagnetic medium $E=4\sin(2\pi \times 10^7 t-0.8x)\,\mathbf{a_z}$ v/m, find

   (i) ε_r, η

   (ii) The time average power carried by wave.

UNIT-III

4. (a) Derive the condition for distortion less and lossless transmission lines.

   (b) A distortion less line has $Z_0=60\Omega$, $\alpha=20$ Np/m, $\beta=1.5$ rad/m. Find the line parameters R, L, G, C.

OR

6. (a) Derive the transmission line equations.

   (b) Explain different types of transmission lines.

UNIT-IV

7. (a) Write a short note on Smith chart.

   (b) Derive the expression for input impedance of transmission line.

OR

8. (a) Explain the concept of UHF lines as circuit elements.

   (b) Find the input impedance of a lossless transmission line for L=2μH/m, C=80PF/m at a distance of 0.1m from the load impedance of a 100 Ω resistor in series with a 0.1mH inductor at a frequency of 500 M Hz.

UNIT-V

9. Derive the expressions for field components of rectangular wave guide and also derive

the expression for cutoff frequency.

OR

10. (a) Derive the expression for cut off frequency of rectangular cavity resonator.

(b) Explain about degenerate and dominant modes in rectangular wave guides.

K.S.R.M.COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

IV SEMESTER (R15)

Branch: ECE

Model Paper

Subject: **PROBABILITY THEORY & STOCHASTIC PROCESSES**

Time: 3 Hours Max.Marks:70

Answer any five questions, choosing one question from each unit.

All questions carry equal marks.

UNIT-1

1. (a) Explain the different methods to define the probability. Derive the Total probability expression and define Bayes theorem.

   (b) An elementary binary communication system consists of a transmitter and receiver. The channel occasionally causes errors to occur. The probabilities that the symbols 1 and 0 are selected are $P(B_1)=0.6$ and $P(B_2)=0.4$. The conditional probabilities are $P(A_1/B_1)=0.9$, $P(A_2/B_1)=0.1$, $P(A_1/B_2)= 0.1$ and $P(A_2/B_2)= 0.9$. Determine the total probabilities and Bayes theorem probabilities.

OR

2. (a) Define a random variable. Write conditions for a function to be a random variable.

   (b) Find a constant b>0 so that the function

$$f_X(x) = \begin{cases} e^{3x/4}, & 0 \le x \le b \\ 0, & elsewhere \end{cases}$$

is a valid probability density.

UNIT-II

3. (a) Explain the moments about the origin and mean.

   (b) Find the variance of X, skew and coefficient of skewness for the exponential density function.

OR

4. (a) Explain the transformation of a discrete random variable.

   (b) A random variable X is uniformly distributed on the interval $(-\pi/2,\pi/2)$. X is transformed to the new random variable $Y=T(X)= \text{atan}(X)$, where a>0, find the probability density function of Y.

UNIT-III

5. (a) Define the joint density function and list out its properties.

   (b) Find a constant b (in terms of a) so that the function

$f_{X,Y}(x,y) = \begin{cases} be^{-(x+y)}, & 0 \le x \le a \text{ and } 0 < y < \infty \\ 0, & \text{elsewhere} \end{cases}$ is a valid joint probability density.

OR

6. (a) Statistically independent random variables X and Y have respective densities $f_X(x) = 5u(x)e^{-5x}$ *and* $f_Y(y) = 2u(y)e^{-2y}$. Find the density function of the sum W=X+Y.

   (b) State and Prove the Central Limit Theorem.

UNIT-IV

7. (a) Explain Time Averages and Ergodocity.

   (b) State and prove the properties of Auto correlation function.

OR

8. (a) Explain the relationship between the cross-correlation function and the cross power spectral density.

   (b) Find the power spectrum and average power of the response of the LR network where X(t) is white noise for which $S_{XX}(\omega) = N_0/2$.

UNIT-V

9. (a) Derive an expression for power spectral density of LTI system response.

   (b) Explain the relationship between the cross-correlation function and the cross power spectral density.

OR

10. (a) Write about band limited and narrow band processes.

    (b) Explain the concept of band limited process and list out its properties.

Subject code: 1511403

K.S.R.M COLLEGE OF ENGINEERING (Autonomous), KADAPA

B.Tech IV Sem (R15) Supple Examinations, April 2020

Subject: MECHANICS OF FLUIDS

(Mechanical Engineering)

MODEL QUESTION PAPER

Time:3 Hrs **Max Marks:70**

Answer any Five questions, Selecting one question from each unit.

All Questions carry equal marks

Unit-I

1. a)Calculate the density, specific weight and weight of one litre of petrol of specific gravity is 0.7

   b) Explain surface tension. Find the relation between surface tension and pressure inside a droplet of liquid.

OR

2. a) What is the effect of temperature on viscosity of water and that of air?

   b) A Vertical Gap 2.2 cm wide of infinite extent contains a fluid of viscosity 2.0 N/m^2 & Specific gravity 0.9. A Metallic Plate 1.2m x 1.2m x 0.2cm is to be lifted up with a constant velocity of 0.15 m/s through the gap. If the plate is in the middle of the gap, find the force required. The weight of the plate is 40N.

Unit-II

3. a) Explain the terms:

   (i)Path line (ii) Streak line (iii) Stream line, and (IV) Stream tube

   b)The velocity potential function is given by $\emptyset = 5(x^2\text{-}y^2)$.Calculate the velocity components at the point (4, 5).

OR

4. What is Euler's equation of motion? How will you obtain Bernoulli's equation from it? What are the assumptions made in the derivation of Bernoulli's equation?

Unit-III

5. The difference in water surface levels in two tanks, which are connected by three pipes in series of lengths 300m, 170m and 210m and of diameters 300mm, 200mm and 400mm respectively, is 12. Determine the rate of flow of water if co –efficient of friction are 0.005, 0.0052, and0.0048 respectively, considering: (i) minor losses also (ii) neglecting minor losses.

OR

6. Explain the principle of venturimeter with a neat sketch.Derive the expression for the rate of flow of fluid through it.

Unit-IV

7. Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U}=2(\frac{y}{\delta})-(\frac{y}{\delta})^2$

OR

8. a) What do you mean by boundary layer separation? What is the effect of pressure gradient on boundary layer separation?
   b) What are the different methods of preventing the separation of boundary layer?

Unit-V

9.a)Explain Types of Drags.

b) A man weighing 981N descends to the ground from an airplane with help of a parachute against the resistance of air. The shape of the parachute is hemisphere of 2m dia. Find the velocity of the parachute with which it come down. Assume C_D=0.5 and density of air =1.25 kg/m3.

OR

10. a) Explain the concept of 'Terminal velocity of body'.

b) A 2mm diameter spherical metallic ball(specific weight 117.5 KN/m^3) is dropped in a large mass of fluid of viscosity 15 poise and specific gravity 0.95.proceeding from first principles make calculations for the drag force exerted by fluid on metallic ball, pressure drag and skin friction drag and the terminal velocity of ball in fluid.

K.S.R.M COLLEGE OF ENGINEERING KADAPA

(AUTONOMOUS)

B.TECH IV SEM EEE EXAMINATIONS-2021

SUB: **ANALOG ELECTRONIC CIRCUITS MODEL PAPER**

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

Answer any FIVE questions. Choosing one question from each unit.

All questions carry equal marks.

UNIT-I

1. a. Derive the equations for voltage gain , current gain , input impedance, output impedance for a BJT using low frequency h-parameter model for CE configuration.

   b. Explain the Miller's theorem and its dual

(OR)

2. a. Determine the input impedance , output impedance , voltage gain and current gain for the CC-amplifier with $R_S=R_L=10K$.The h-parameters of the transistor are $h_{fe}= -51$,$h_{ie}=1.1K$,$h_{rc}=1$and $h_{oc}=25\mu A/v$.

   b. Explain about the small signal model analysis of FET

UNIT-II

3. a. Explain the analysis of RC-coupled amplifier.

   b. A CE-RC coupled amplifier uses transistors with the following h-parameters $h_{ie}=1200\Omega$, $h_{oe} = 25x10^{-6}$mhos.The biasing resistors $R_1=100k\Omega$, $R_2 = 10k\Omega$ the load resistor $R_c = 2000\Omega$. What should be the minimum value of coupling capacitor C_c in order to have lower 3 dB frequency f_L not exceeding 10Hz.

(OR)

4. a. Explain the analysis of FET RC-coupled amplifier

   b. Calculate the bandwidth of single and multistage amplifiers.

UNIT-III

5. a. Distinguish between the positive and negative feedback amplifiers and give their applications

   b. Derive an expression for the input and output impedance with feed back of a voltage shunt feed back amplifier.

(OR)

6. a. Derive an expression for frequency of oscillation of RC phase shift oscillator using a transistor.

   b. Explain about the colpitt's oscillator and give its applications.

UNIT-IV

7. a. Explain why even harmonics are not present in a push pull amplifier. Give two additional advantages of this circuit over that of a single transistor amplifier

   b. Calculate the maximum value of efficiency of class-A amplifier.

(OR)

8. a. Show that the maximum conversion efficiency of an idealized class-B push pull amplifier is 78.5.

   b. Explain about the

   (i). thermal run away (ii) . heat sinks

UNIT-V

9. a. state and prove clamping circuit theorem.

   b. Explain the operation of Bistable multivibrator with neat sketch.

(OR)

10. a. Explain how a transistor can be used as a switch and also explain various switching times of a transistor.

    b. Explain about RC low pass circuits with neat sketch .

K.S.R.M.COLLEGE OF ENGINEERING*(Autonomous)*, KADAPA

B.Tech., IV Semester (R 15) Model Paper.

Subject**: PROBABILITY AND STATISTICS**

(Common to CSE & ME)

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

Note: Answer any **FIVE** questions by choosing **ONE** from each unit.
All questions carry equal marks.

Unit-I

1. A random variable X has the following probability function

$X = x$	0	1	2	3	4	5	6	7
$P(X = x)$	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Determine $(i)\ k\ (ii)\ P(X < 6)\ (iii)\ P(X \geq 6)\ (iv)\ P(0 < X < 5)\ (v) If\ P(X \leq k) > \frac{1}{2}$, find the minimum of k (vi) mean (vii) variance.
(14M)

(OR)

2. (a) If X is a continuous random variable and k is a constant then prove that var (X+k) = var (X).
(7M)

(b) Probability density function of a random variable X is

$f(x) = \begin{cases} \frac{1}{2} sinx, for\ 0 \leq x \leq \pi \\ 0, otherwise \end{cases}$. Find the mean and median of the distribution.
(7M)

Unit-II

3. (a) The probability that a pen manufactured by a company will be defective is 0.1. If 12 such pens are manufactured, find the probability that (i) exactly two will be defective (ii) at least two will be defective and (iii) none will be defective.
(7M)

(b) Fit a Poisson distribution for the following distribution:

x	0	1	2	3	4
f	122	60	15	2	1

(7M)

(OR)

4. (a) 4 buses arrive at a specified stop at 15 minute intervals starting at 7 a.m. That is, they arrive at 7.00,7.15,7.30,7.45 a.m. and so on. If a passenger arrives at the stop at a time that is uniformly distributed between 7.00 and 7.30 a.m., find the probability that he waits (i) less than 5 minutes for a bus (ii) more than 10 minutes for a bus.
(7M)

(b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.
(7M)

Unit-III

5. (a) The mean breaking strength of the cables supplied by a manufacturer is 1800 with a S.D of 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cables have increased. In order to test this claim, a sample of 50 cables is tested. It is found that the mean breaking strength is 1850.Can we support that the claim at 1% level of significance. (7M)

(b) Random samples of 400 men and 600 women were asked whether they would like to have a fly over near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same at 5% level. (7M)

(OR)

6. (a) Two random samples drawn from two normal populations are given below:

x	19	17	26	28	22	23	19	24	26			
y	28	32	40	37	30	35	40	28	41	45	30	36

Obtain the estimates of variance of the population and test whether the two populations have the same variance. (7M)

(b) A sample analysis of examination results of 500 students was made. It was found that 220 students had failed,170 had secured a third class,90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination results which is in the ratio of 4 :3:2:1 for the various categories respectively. (7M)

Unit-IV

7. (a) Psychological tests of intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio (I.R) and engineering ratio(E.R).Calculate the coefficient of correlation. (7M)

Student	A	B	C	D	E	F	G	H	I	J
I.R	105	104	102	101	100	99	98	96	93	92
E.R	101	103	100	98	95	96	104	92	97	94

(b) Find the rank correlation for the following data. (7M)

Scores in test x	12	15	24	20	8	15	20	20	11	26
Scores in test y	21	25	35	24	16	18	25	16	16	38

(OR)

8. Find the regression lines of y on x and x on y for the following data. (14M)

x	2	4	6	8	10
y	5	7	9	8	11

Unit-V

9. Each telephone call is consider a product and the time to answer the call indicates the quality of service. Five calls chosen at random and times recorded at a busy hour. Results for the last 10 hours shown below (in seconds).

Sample No	1	2	3	4	5	6	7	8	9	10
Mean	20	34	45	39	26	29	13	34	37	23
Range	13	9	15	5	20	17	21	11	10	10

Construct $\bar{X}$ and R charts and determine whether the product is under control. (14M)

(OR)

10. (a) An inspection of 10 samples of size 400 each from 10 lots revealed the following defective units.

Sample no	1	2	3	4	5	6	7	8	9	10
No of defective units	17	15	14	26	9	4	19	12	9	15

Calculate the control limits for the number of defective units. Plot the control limits and the observations and state whether the process is under control or not. (7M)

(b) 15 tape-recorders were examined for quality control test. The number of defects in each tape-recorder is recorded below. Draw the appropriate control chart and comment on the state of control. (7M)

UnitNo .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No.of defects	2	4	3	1	1	2	5	3	6	7	3	1	4	2	1