Q.P. Code: 2025401 **SET - 1**

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Business Economics and Accounting for Engineers (CE, ME & ECE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			Marks	CO	Skills
		UNIT - I			
1.	(a)	"Business economics is economics applied to decision making" Explain.	6M	CO1	U
	(b)	Explain the concept of demand. What are the different types of demand?	6M	CO1	U
		(OR)			
2.	(a)	Discuss the various definition of Business Economics?	6M	CO1	E
	(b)	How a manager can choose the right forecasting technique? Explain.	6M	CO1	R
		UNIT – II			
3.	(a)	What is a production function? Explain it with a suitable diagram.	6M	CO2	R
	(b)	Distinguish between Internal and External Economies.	6M	CO2	A
		(OR)			
4.	(a)	Explain Least-cost combination of factors and maximation of output.	6M	CO2	U
	(b)	What is Break-even analysis. Explain its assumptions and uses.	6M	CO2	R
		UNIT – III			
5.	(a)	What does Market mean in Economics? Explain the classification of markets.	6M	CO3	R
	(b)	State the marginal Productivity theory of distribution and point out its limitations?	6M	CO3	C
		(OR)			
6.	(a)	Explain the equilibrium of a under perfect competition.	6M	CO3	U
	(b)	How is price determined under monopoly?	6M	CO3	R
		UNIT – IV			
7.	(a)	Explain the need and functions of accounting	6M	CO4	U
	(b)	Prepare a personal account of Mr. Kiran	6M	CO4	E

2022			
April 1	Debit balance of Kiran account		8,000
4	Bought goods from Kiran	1,500	
7	Sold goods to Kiran	3,000	
10	Goods returned by Kiran	400	
15	Goods returned to Kiran	100	
20	Cash received from Kiran	500	
25	Cash paid to Kiran	1000	
27	Sold to Kiran on credit		2,000

(OR)

8. The following is the Trial Balance of Ram Chandra on 31 March 2022. Prepare the final account. **12M** **CO4** **E**

Particulars	Debit Rs	Credit Rs.
Capital		1,50,000
Stock (1 April 2021)	30,000	
Cash at Bank	10,000	
Cash in Hand	5,000	
Machinery	10,000	
Purchases	13,000	
Furniture	2,00,000	
Wages	50,000	
Carriage	33,000	
Salaries	70,000	
Discount Allowed	4,000	
Discount Received		5,000
Advertising	50,000	
Office Expenses	40,000	
Sales		5,00,000
Sundry Debtors	90,000	
Sundry Creditors		40,000
	6,95,000	6,95,000

Value of Closing Stock as at 31 March 2021 was Rs. 5,000

UNIT-V

9. (a) What do you mean by Ratio analysis? Explain the advantages and limitations of accounting ratios. **6M** **CO5** **R**

(b) What is the difference between current ratio and liquid ratio? **6M** **CO5** **A**

(OR)

10. (a) From the following information determine opening and closing stock. **6M** **CO5** **C**
Stock turnover = 5 times
Total sales = Rs. 2,00,000
Gross Profit – 25% of sales
The closing stock value was more by Rs. 4,000 than the opening stock.

(b) Classify financial ratios on the basis of their dependence on financial statement **6M** **CO5** **U**

- **R** – Remembering
- **U** – Understanding
- **A** – Applying
- **Az** – Analyzing
- **E** – Evaluating.
- **C** – Creating

Q.P. Code: 2021401

SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Special Functions & Complex Analysis (EEE)

Time: 3 Hours **Max. Marks: 60**

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

		Questions	Marks	CO	Skills
		UNIT - I			
1.	(a)	Show that $\frac{d}{dx}\left[x^{-n}J_n(x)\right]=-x^nJ_{n+1}(x)$.	6M	CO1	U
	(b)	Show that $\int_{-1}^{1}P_m(x)P_n(x)dx=\frac{2}{2n+1}$, *if* $m=n$.	6M	CO1	U
		(OR)			
2.	(a)	Show that $J_{-n}(x)=(-1)^nJ_n(x)$, n is an integer.	6M	CO1	U
	(b)	State and prove Rodrigue's formula.	6M	CO1	C
		UNIT – II			
3.		Show that the function $f(z)=\begin{cases}\frac{x^3(1+i)-y^3(1-i)}{x^2+y^2}, & z\neq 0\\ 0, & z=0\end{cases}$ is continuous and the C-R equations are satisfied at the origin but the derivative of $f(z)$ at origin does not exist.	12M	CO2	U
		(OR)			
4.	(a)	If $w=\phi(x,y)+i\psi(x,y)$ represents the complex potential for an electric field and $\phi(x,y)=\log(x^2+y^2)$, determine the function $\psi(x,y)$.	6M	CO2	C
	(b)	If $f(z)$ is a regular function of z, prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\left\|\text{Re}\,f(z)\right\|^2=2\left\|f'(z)\right\|^2$.	6M	CO2	C
		UNIT – III			
5.	(a)	Find the bilinear transformation that maps the points $z=-1,0,1$ on to the points $w=-1,-i,1$ respectively. Hence find the invariant points of this transformation.	6M	CO3	C
	(b)	Determine the image of the circle $\left\|z-2i\right\|=2$ under the transformation $w=\frac{1}{z}$.	6M	CO3	C
		(OR)			
6.		Discuss the transformation $w=\cos z$.	12M	CO3	U
		UNIT – IV			
7.		Evaluate $\int_C\frac{dz}{z^2-4}$ where C is (i) $\left\|z\right\|=1$ (ii) $\left\|z\right\|=3$ (iii) $\left\|z+2\right\|=1$.	12M	CO4	E
		(OR)			
8.	(a)	State and prove Cauchy's Integral formula.	6M	CO4	C
	(b)	Evaluate $\int_C\frac{(z^2-1+4)dz}{z-3}$ where C is $\left\|z\right\|=5$.	6M	CO4	E

UNIT-V

9.	Apply the calculus of Residues, to prove that $\int_0^{2\pi} \frac{d\theta}{1-2p\sin\theta+p^2} = \frac{2\pi}{1-p^2}, (o<p<1)$.	12M	CO5	A
	(OR)			
10.	Use Residue theorem to evaluate $\int_0^{\infty} \frac{dx}{x^4+a^4}$.	12M	CO5	E

Q.P. Code: 2005403

SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Principles of Operating Systems (CSE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Define Operating System and explain the various types of Operating Systems?	6M	CO1	R & U
	(b)	Explain Distributed Systems?	6M	CO1	U
		(OR)			
2.	(a)	Write about Storage Management?	6M	CO1	R
	(b)	Write about Memory management?	6M		R
		UNIT – II			
3.	(a)	Define Process? Explain process State diagram?	6M	CO2	R & U
	(b)	Explain about Scheduling Algorithms	6M	CO2	U
		(OR)			
4.	(a)	Define and Explain Process synchronization	6M	CO2	R & U
	(b)	Write a short notes on semaphores	6M	CO2	R
		UNIT – III			
5.		Discuss about page replacement algorithms with example	12M	CO3	E
		(OR)			
6.	(a)	Write short notes on (i) File attributes (ii) File Operations (iii) Page fault	6M	CO3	R
	(b)	What is contiguous memory allocation? Explain it.	6M	CO3	U
		UNIT – IV			
7.	(a)	What are the methods for handling deadlock?	6M	CO4	R
	(b)	Explain about Deadlock Avoidance?	6M	CO4	U
		(OR)			
8.	(a)	What is file sharing and explain about it.	6M	CO4	R & U
	(b)	Define and Explain the various File Allocation Methods	6M	CO4	R & U
		UNIT-V			
9.	(a)	Write in detail about goals of protection	6M	CO5	U
	(b)	Explain based protection with example.	6M	CO5	U
		(OR)			
10		What is access matrix? Explain implementation of access matrix.	12M	CO5	R

Q.P. Code: 2001402

SET - 1

I

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Hydraulics and Hydraulic Machinery (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Explain the characteristics of boundary layer along a thin flat plate	6M	CO1	U
	(b)	Experiments were conducted on a wind tunnel with a wind speed of 50 km/h on a flat plate of size 2 m long and 1 m wide. The density of air is 1.15 kg/m^3. The coefficients of lift and drag are 0.75 and 0.15 respectively. Determine i) The lift force ii) The drag force and iii) Resultant force	6M	CO1	A
		(OR)			
2.	(a)	What is boundary layer separation? Explain the control measures for boundary layer separation	6M	CO1	U
	(b)	Define i) Laminar boundary layer ii) Turbulent boundary layer and iii) Magnus effect	6M	CO1	R
		UNIT – II			
3.	(a)	Derive an expression for the discharge through a channel by Chezy's formula	6M	CO2	R
	(b)	Classify and explain the channel bottom slopes with neat sketches for gradually varied flow	6M	CO2	U
		(OR)			
4.	(a)	What is specific energy curve? Draw specific energy curve, and derive expressions for critical depth and critical velocity	6M	CO2	R
	(b)	The depth of flow of water, at a certain section of a rectangular channel of 4 m wide, is 0.5 m. The discharge through the channel is 16 m3/s. If the hydraulic jump takes place on the downstream side, find the depth of flow after the jump	6M	CO2	A
		UNIT – III			
5.	(a)	Prove that the force exerted by a jet of water on a fixed semi-circular plate in the direction of the jet when the jet strikes at the centre of the semi-circular plate is two times the force exerted by the jet on an fixed vertical plate.	6M	CO3	R
	(b)	A jet of water of diameter 50 mm, having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s in the direction of the jet. The jet leaves the vane at an angle of 60^0 to the direction of motion of vane at outlet. Determine the force exerted by the jet on the vane in the direction of motion	6M	CO3	A
		(OR)			
6.	(a)	Show that the efficiency of a free jet striking normally as series of flat plates mounted on the periphery of a wheel never exceeds 50%	6M	CO3	R
	(b)	A jet of water of diameter 50 mm strikes a fixed plate in such a way that the angle between the plate and the jet is 30^0. The force exerted in the direction of the jet is 1471.5 N, determine the rate of flow of water.	6M	CO3	A

UNIT – IV

7.	(a)	Write a short note on classification of turbines	6M	CO4	U
	(b)	Define the term specific speed of a turbine. Derive an expression for specific speed	6M	CO4	R
		(OR)			
8.	(a)	Make a neat sketch of a hydropower plant and explain the various elements of it	6M	CO4	U
	(b)	A turbine is to operate under a head of 25 m at 200 r.p.m. If the discharge is 9 m^3/s and turbine efficiency is 90 % , Calculate power generated by the turbine, specific speed of the turbine and performance of the turbine under a head of 20 m.	6M	CO4	A

UNIT-V

9.	(a)	Explain with neat sketch the working of a single stage centrifugal pump	6M	CO5	U
	(b)	Three turbo generators each of capacity 10,000 kW have been installed at a hydel power station. During a certain period of load, the load on the plant varies from 12,000 kW to 26,000 kW. Calculate (i) load factor (ii) plant factor and (iii) utilization factor	6M	CO5	A
		(OR)			
10.	(a)	Derive an expression for discharge and work done for a reciprocating pump	6M	CO5	R
	(b)	Define cavitation. What are the effects of cavitation? Give the necessary precautions against cavitation	6M	CO5	R

Q.P. Code: 2025402

SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Fundamentals of Management for Engineers (EEE)

Time: 3 Hours Max. Marks: 60

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

		Marks	CO	Skills
	UNIT-I			
1.	Explain the role and importance of management in the present competitive scenario.	12M	CO1	U
	(OR)			
2.	Explain in detail, Henry Fayol's contribution to management thought. To what Extent these principles are relevant in today's context?	12M	CO2	U & Az
	UNIT-II			
3.	What are the different types of plans? Describe various steps in the planning process.	12M	CO2	R & U
	(OR)			
4.	Define decision making? Explain the decision making process with the help of an example	12M	CO2	R & U
	UNIT-III			
5.	Why the Matrix structure is most preferred organization structure in present business scenario?	12M	CO3	Az
	(OR)			
6.	Bring out the importance of the Strategic Human Resource Planning in the present competitive scenario.	12M	CO3	U
	UNIT-IV			
7.	Discuss various styles of leadership. Do you think categorization of leadership styles into water-tight compartments is possible?	12M	CO4	E
	(OR)			
8.	Explain Abraham Maslow's motivation theory based on hierarchy of needs.	12M	CO4	U
	UNIT-V			
9.	"Budgetary control is tool of planning, coordination and control". Explain.	12M	CO5	U
	(OR)			
10.	State the requirements of an effective, control system in an organization.	12M	CO5	R

Q.P. Code: 2021402 | **SET - 1**

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Probability Statistics and Numerical Methods (ME)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 girls (iv) at least one boy? Assume equal probabilities for boys and girls.	6M	CO1	C
	(b)	Build a Binomial distribution to the following data	6M	CO1	A

x	0	1	2	3	4	5
f	2	14	20	34	22	8

(OR)

2.		If the masses of 300 students are normally distributed with mean 68kgs and standard deviation 3kgs, how many students have masses (i) Greater than 72kgs (ii) Less than or equal to 64kgs (iii) Between and 71 kgs inclusive.	12M	CO1	C
		UNIT – II			
3.	(a)	Explain about Types of Errors and Critical Region.	6M	CO2	U
	(b)	A die is tossed 960 times and it fails with 5 upwards 184 times. Is the die unbiased at a level of significance of 0.01?	6M	CO2	U
		(OR)			
4.	(a)	20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by his disease is 85%in favour of the hypothesis that is more at 5% level.	6M	CO2	Az
	(b)	A manufacturer of electronic equipment subjects samples of two completing brands of transistors to an accelerated performance test. If 45 of 180 transistors of the first kind and 34 of 120 transistors of the second kind fail the test, what can he conclude at the level of significance 0.05 about the difference between the corresponding sample proportions?	6M	CO2	Az
		UNIT – III			
5.	(a)	The average breaking strength of the steel rods is specified to be 18.5 thousand pounds. To test this sample of 14 rods were tested. The mean and standard deviation obtained were 17.85 and 1,955repsepctively. Is the result of experiment significant?	6M	CO3	Az
	(b)	Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins, show the sample standard deviations of their weights as 0.8 and 0.5 repsectively. Assuming that the weight distributions are normal, test hypothesis that the true variances are equal.	6M	CO3	A
		(OR)			

6. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees .Use chi-square distribution test with LOS 0.05 — **12M CO3 E**

	Employees		
Soft drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

UNIT – IV

7. (a) Using Newton-Rapshon method find the root of the equation $x + \log^{(x)}_{10} = 3.375$ and correct to four significant figures. — **6M CO4 E**

   (b) Find a positive root of $x^3 - x - 1 = 0$ correct to two decimal places by the Bisection method. — **6M CO4 E**

(OR)

8. Solve the equations $8x - 3y + 2z = 20$; $6x + 3y + 12z = 35$ and $4x + 11y - z = 33$ by Gauss Seidel iteration method. — **12 CO4 A**

UNIT-V

9. (a) Using Newton's forward interpolation formula, and the given table of values. Find the value of f(x) when x=1.4. — **6M CO5 E**

X	1.1	1.3	1.5	1.7	1.9
f(X)	0.21	0.69	1.25	1.89	2.61

   (b) Construct difference table for the following data. Evaluate f(0. 6). — **6M CO5 E**

x	0.1	0.3	0. 5	0.7	0.9	1.1	1.3
f(x)	0.003	0.067	0.148	0.248	0.370	0. 518	0. 697

(OR)

10. The population of a town in the decimal census was given below. Estimate the population for the years 1895 and 1925 — **12M CO5 E**

Year X	1891	1901	1911	1921	1931
Y	46	66	81	93	101

Q.P. Code: 2021403 | **SET - 1**

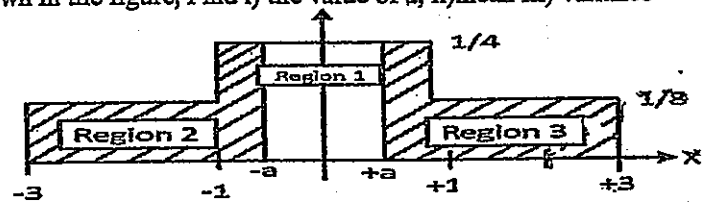
K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Probability Theory & Stochastic Processes (ECE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Define the following terms with an example i) Event ii) Sample pace iii) Probability iv) Independent events	6M	CO1	R
	(b)	A lot of 100 semiconductor chips has 20 defective chips. Two chips are selected at random without replacement from the lot. i) What is the probability that the second one selected is defective given the first one was defective? and ii).What is the probability that both are defective?	6M	CO1	A
		(OR)			
2.	(a)	Differentiate between the marginal distribution functions, conditional distribution functions and densities	6M	CO1	Az
	(b)	The pdf of random variable is given as $f_x(x)=\begin{cases}K & a\le x\le b\\ 0 & elsewhere\end{cases}$ Where K is a constant: (i) Sketch the pdf and find the value of K (ii) If a=-1 and b=2 then find $P(\lvert x\rvert \le C)$ for C=1/2	6M	CO1	E
		UNIT – II			
3.	(a)	Let X be a random variable defined, Find E [X], E[X^2] and Variance given the density function as $f_X(x)=\frac{x}{10}$ *for* $-5\le x\le 5$ = 0; else where	6M	CO2	E
	(b)	If the probability density function is divided into three regions as shown in the figure, Find i) the value of a, ii)mean iii) variance 	6M	CO2	E
		(OR)			
4.	(a)	Find the moment generating function of Poisson distribution	6M	CO2	E
	(b)	A random variable has PDF $f_x(x)=e^{-x}$ *for* $x\ge 0$ show that Chebyshev inequality gives $P[\lvert X-1\rvert>2]<\frac{1}{4}$. And also show that the actual probability is e^{-3}	6M	CO2	A

UNIT – III

5.	(a)	If the sum of two random variables X and Y related as W=X+Y, then show that the probability density function of the new random variable W is the convolution of two random variables X and Y.	6M	CO3	A
	(b)	Consider random variables Y1 and Y2 related to arbitrary random variables X and Y by the coordinate rotation. Y1=X Cos θ + Y Sinθ, Y2 = -X Sinθ + Y Cos θ (i) Find the covariance of Y1 and Y2, C_{Y1Y2} (ii) For what value of θ, the random variables Y1 and Y2 uncorrelated	6M	CO3	E

(OR)

6.	(a)	The joint probability function of two discrete random variables X and Y is given by $f(x,y)=\begin{cases} Cx^2y & ; \ x=1,2; y=0,1,2 \\ 0 & ; \ otherwise \end{cases}$. Find: (i) C (ii) E($X^2$), E(Y) (iii) E(2X+3Y)	6M	CO3	E
	(b)	Explain the Gaussian density function for N random variables	6M	CO3	U

UNIT – IV

7.	(a)	Explain the following: i) Stationarity ii) Ergodicity iii) Statistical independence with respect to random processes	6M	CO4	U
	(b)	Given a random process $X(t) = A\cos(\omega t + \theta)$, where A and ω are constants and θ is a random variable uniformly distributed on the interval $(-\pi, \pi)$. Define the new process $Y(t) = X^2(t)$. (i) Are X (t) and Y (t) WSS? (ii) Are X (t) and Y(t) Jointly WSS?	6M	CO4	R

(OR)

8.	(a)	Auto Correlation Function of a random process X(t) is $R_{XX}(\tau) = 3 + 2e^{-4\tau^2}$. Find (i).Power Spectrum of X(t) (ii). What is the average power in X (t) ? and (iii) What fraction of the power lies in the frequency band $\frac{-1}{\sqrt{2}} \le \omega \le \frac{1}{\sqrt{2}}$?	6M	CO4	E
	(b)	A random process Y(t) has the power spectral density $S_{yy}(\omega)=\frac{9}{\omega^2+64}$. Find (i) the average power of the process and (ii) The Auto correlation function	6M	CO4	E

UNIT-V

9.	(a)	Derive the Expression for mean and mean square value of response of LTI system	6M	CO5	E
	(b)	Find the input autocorrelation function, output autocorrelation function and output spectral density of RC low pass filter, when the filter is subjected to a white noise of spectral density No/2..	6M	CO5	E

(OR)

10.	(a)	A wide sense stationary process $X(t)$ with a mean value 5 and power spectrum $S_{XX}(\omega) = 50\pi\,\delta(\omega) + \frac{8}{1+\left(\frac{\omega}{2}\right)^2}$ is applied to a network with impulse response $h(t) = 4e^{-4|t|}$. Find i) $H(\omega)$ of the network and ii) the power spectrum of the response $y(t)$.	6M	CO5	E
	(b)	Show that the Narrow band noise process can be expressed as In-phase and Quadrature components	6M	CO5	A

Q.P. Code: 2005402

SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Computer Organization (CSE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Explain different functional units of a computer.	6M	CO1	U
	(b)	What do you mean performance of a computer.	6M	CO1	R
		(OR)			
2.	(a)	Explain fixed-point and floating-point representation the real number.	6M	CO1	U
	(b)	Convert the following IEEE single precision floating-point number to their decimal value "01000100101101101000010000000000000"	6M	CO1	E
		UNIT – II			
3.	(a)	Design registers selection circuit to select one of the four 4-bit registers content on to bus. Give full explanation.	6M	CO2	C
	(b)	With the help of block diagrams, explain a 4-bit binary adder.	6M	CO2	U
		(OR)			
4.	(a)	Discuss some applications of logic micro operations.	6M	CO2	U
	(b)	Explain the hardware implementation of arithmetic logic shift unit.	6M	CO2	U
		UNIT – III			
5.	(a)	List down the types of computer instruction formats in a basic computer. Explain in brief.	6M	CO3	R
	(b)	Briefly explain the addressing modes of instruction.	6M	CO3	R & U
		(OR)			
6.	(a)	Explain the hardwired control unit. Give the advantages and disadvantages of hardwired implementation.	6M	CO3	U
	(b)	Draw a flow chart which explains multiplication of two signed magnitude fixed point numbers.	6M	CO3	U
		UNIT – IV			
7.	(a)	What is pipelining? Explain how processing is done in the pipelining.	6M	CO4	R & U
	(b)	Explain how the instruction pipeline works.	6M	CO4	U
		(OR)			
8.	(a)	Explain different components of memory hierarchy.	6M	CO4	U
	(b)	Write a short note on virtual memory? Explain with the help of an example.	6M	CO4	U
		UNIT-V			
9.	(a)	What is program-controlled I/O? Explain with the help of a diagram.	6M	CO5	R & U
	(b)	Explain DMA transfer along with its diagram.	6M	CO5	U
		(OR)			
10.	(a)	What is multiprocessor? Describe the desirable features in a processor for multiprocessing.	6M	CO5	R & U
	(b)	What is an interconnection network? List the different schemes available for establishing an interconnection network? Explain multiport memory interconnection network.	6M	CO5	R & U

Q.P. Code: 2001403

SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Soil Mechanics (CE)

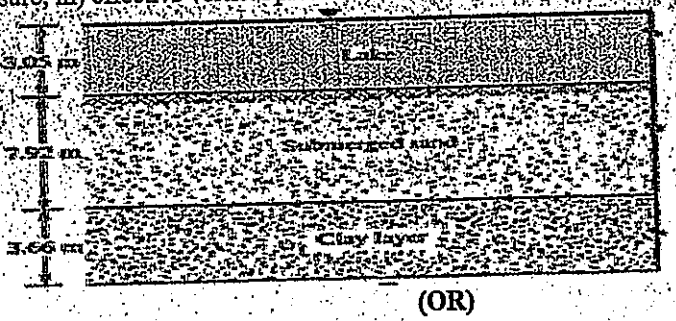
Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

		Questions	Marks	CO	Skills
		UNIT - I			
1.	(a)	Derive a relationship between water content and degree of saturation for a given soil mass of specific gravity, G using unit phase diagram	6M	CO1	U
	(b)	Explain the procedure to classify the fine grained soil using plasticity chart	6M	CO1	U
		(OR)			
2.	(a)	Explain in detail about the activity and thixotropy properties of clay	6M	CO1	U
	(b)	Embankment fill is to be compacted at a density of 18 kN/m^3. The soil of the borrow area is at a density of 15 kN/m^3. What is the estimated number of trips of 6 m^3 capacity truck for hauling the soil required for compacting 100 m^3 fill of embankment? (Assume moisture content does not vary)	6M	CO1	AZ
		UNIT – II			
3.	(a)	In a falling head permeability test the length and area of cross section of soil specimen are 0.17 m and 21.8 x 10^{-4} m^2 respectively. Calculate the time required for the head to drop from 0.25 m to 0.10 m. The area of cross section of standpipe is 2 x 10^{-4} m^2. The sample has three layers with: $k_1 = 3 \times 10^{-5}$ m/sec $Z_1 = 0.06$ m, $k_2 = 4 \times 10^{-5}$ m/sec, $Z_2 = 0.06$ m, $k_3 = 6 \times 10^{-5}$ m/sec, $Z_3 = 0.05$ m. Assume the flow is taking place perpendicular to the bedding plane.	6M	CO2	AZ
	(b)	Explain the Quick sand condition and derive the formula for critical hydraulic gradient.	6M	CO2	A
		(OR)			
4.	(a)	Derive an expression for average coefficient of permeability for stratified or layered soil system?	6M	CO2	A
	(b)	At a given site, the water table is located at the ground surface and the submerged unit weight of soil is 8 kN/m^3.if the water table rises 4 m above the ground surface, determine the changes in effective stress at 6 m below the ground surface.	6M	CO2	AZ
		UNIT – III			
5.	(a)	A Rectangular area 2x4 m carries a u.d.l of 8 t/m^3 at the ground surface. Find the vertical pressures at 5 m below the center and corner of loaded area using Boussinesq's equation.	6M	CO3	AZ
	(b)	A clay stratum 3.66 m thick rests beneath of submerged sand 7.92 m thick. The top of the sand is located 3.05 m below the surface of a lake. The saturated unit weight of the sand is 19.62 kN/m^3 and of the clay is 18.36 kN/m^3. Compute i) the total vertical pressure, ii) pore water pressure, iii) effective vertical pressure at mid height of the clay layer	6M	CO3	AZ



(OR)

6.	(a)	A uniform homogeneous sand deposit of specific gravity 2.60 and void ratio 0.65 extends to a large depth. The ground water table is 2 m from G.L. Determine the effective, neutral, and total stress at depths of 2 m and 6 m. Assume that the soil from 1 m to 2 m has capillary moisture leading to degree of saturation of 60%.	6M	CO3	AZ
	(b)	Derive an expression for vertical stress under circular loaded area?	6M	CO3	A
		UNIT – IV			
7.	(a)	Distinguish between Consolidation and compaction process	6M	CO4	U
	(b)	A clay layer of 4 m thick is subjected to a pressure of 55 kPa. If the layer has a double drainage and undergoes 50% consolidates in one year. Determine the coefficient of consolidation, assume time factor, T_v as 0.196, if the coefficient of permeability is 0.020 m/yr. Determine the settlement in one year	6M	CO4	AZ
		(OR)			
8.	(a)	Explain the factors effecting compaction on soil properties.	6M	CO4	U
	(b)	A 8 m thick clay layer with single drainage settles by 120 mm in 2 layers. The coefficient of consolidation for this clay was found to be $6x10^{-3}$ cm^2/sec. Calculate the likely ultimate consolidation settlement and find out how long it will take to undergo 90% of this settlement	6M	CO4	AZ
		UNIT-V			
9.	(a)	Draw the stress-strain curves as well as volume change relationship for dense sand and loose sand?	6M	CO5	U
	(b)	A shear vane of 7.5 cm dia and 11 cm length was used to measure the shear the shear strength of soft clay. If a torque of 600 N-m was required to shear the soil, calculate the shear strength.	6M	CO5	AZ
		(OR)			
10.	(a)	Derive the relationship between principal stresses at failure using Mohr-Coulomb criterion.	6M	CO5	A
	(b)	Discuss the merits and demerits of the direct shear test	6M	CO5	U

Q.P. Code: 2002403 | **SET - 1**

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Induction Motors & Synchronous Machines (EEE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

		Questions	Marks	CO	Skills
		UNIT – I			
1.		Describe in detail about the production of rotating magnetic field in 3-phase Induction Motor.	12M	CO1	U
		(OR)			
2.		Derive the maximum torque expression in-terms of full load torque and starting torque in 3- phase induction motor.	12M	CO2	E
		UNIT – II			
3.		Explain about the methods used for starting 3-phase cage rotor Induction motor	12M	CO2	U
		(OR)			
4.		Explain about the methods used for starting 1-phase cage rotor Induction motor	12M	CO2	U
		UNIT – III			
5.	(a)	Classify and compare the synchronous generators.	6M	CO1	U
	(b)	Calculate the EMF of a 2-pole, 3-Ø, Y-connected alternator running at 3000rpm from the following data: flux per pole = 0.15 wb; Total no.of slots = 24; conductors per slot(in two layers) = 4; coils are short by one slot.	6M	CO1	E
		(OR)			
6.	(a)	Explain the concept of leakage flux and synchronous reactance in alternator.	6M	CO1	U
	(b)	Describe about the Potier Triangle function in determination of voltage regulation of alternator using ZPF method.	6M	CO3	U & E
		UNIT – IV			
7.	(a)	Interpret about the importance of two reaction analysis in salient pole alternators.	6M	CO1	U
	(b)	Construct the phasor diagram of salient pole alternator.	6M	CO1	U
		(OR)			
8.	(a)	Classify and Explain the conditions for parallel operation of alternators.	6M	CO3	U
	(b)	Discuss about the load sharing between two alternators connected in parallel.	6M	CO3	U
		UNIT-V			
9.	(a)	Describe about the principle of operation of 3-phase Synchronous Motor.	6M	CO1	U
	(b)	Define hunting and explain the methods to minimize hunting	6M	CO3	R & U
		(OR)			
10.	(a)	Explain the variation of current and power factor with excitation	6M	CO4	U
	(b)	A synchronous motor absorbing 40kW is connected in parallel with a factory load of 250kW having a lagging power factor of 0.866. If the combination has a power factor of 0.9 lag. How many leading kVAR are to be supplied by the motor? At what power factor is it working	6M	CO4	E

Q.P. Code: 2003403

SET - 1

I

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Applied Thermodynamics (ME)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			Marks	CO	Skills
		UNIT – I			
1.	(a)	Derive the expression of efficiency for diesel cycle by explaining the processes involved in it and represent the cycles on P-V & T-S Diagrams.	6M	CO1	A
	(b)	The efficiency of an Otto cycle is 60% and $\gamma = 1.5$. What is the compression ratio?	6M	CO2	R
		(OR)			
2.	(a)	State the development of I.C engines and Classification of I.C. engines.	6M	CO1	U
	(b)	Explain the working principle of four stroke cycle S.I engines with a line diagram.	6M	CO1	U
		UNIT – II			
3.	(a)	Explain with neat sketches the various stages of combustion in CI engines.	6M	CO2	U
	(b)	Explain the various factors that influences the flame speed.	6M	CO2	U
		(OR)			
4.	(a)	Explain with neat sketches the phenomena of knocking in SI engines.	6M	CO2	U
	(b)	What is delay period and what are the factors that affect the delay period.	6M	CO2	R
		UNIT – III			
5.	(a)	A rope-brake dynamometer was used to measure the brake power of a single cylinder, four-stroke cycle petrol engine. It was found that the torque due to brake load was 175 Nm and the engine makes 500 rpm. Determine the brake power developed by the engine.	6M	CO3	E
	(b)	The following results were obtained from a test on a single-cylinder, four-stroke Diesel engine. Diameter of the cylinder is 30 cm, stroke of the piston is 45 cm, indicated mean effective pressure is 540 kPa and engine speed is 2400 rpm. Calculate the indicated power of the engine.	6M	CO3	E
		(OR)			
6.	(a)	A two-stroke, Diesel engine develops a brake power of 420 kW. The engine consumes 195 kg/h of fuel and air–fuel ratio is 22:1, Calorific value of the fuel is 42000 kJ/kg. If 76 kW of power is required to overcome the frictional losses, calculate (i) Mechanical efficiency, (ii) Air consumption, (iii) Brake thermal efficiency.	6M	CO3	
	(b)	A 4 cylinder, 4 stroke gasoline engine having a bore of 80 mm and stroke of 90 mm has a compression ratio of 8. The relative efficiency is 65% when indicated fuel specific consumption is 200 gm/kWh. Estimate: (i) Calorific value of fuel, and (ii) Corresponding fuel consumption, given that indicated mean effective pressure (imep) is 7.5 bar and speed is 2000 rpm.	6M	CO3	E

UNIT – IV

7.	(a)	Explain the working principle of a Rankine cycle	6M	CO4	U
	(b)	A simple Rankine cycle works between pressure of 30 bar and 0.04 bar, the initial condition of steam being dry saturated, calculate the cycle efficiency	6M	CO4	E
		(OR)			
8.	(a)	0.5 kg of air is compressed reversibly and adiabatically from 80 kPa, 60 to 0.4 MPa and is then expanded at a constant pressure to the original volume. Sketch these processes on the p-v and T-s planes. Compute the heat transfer and work transfer for the whole path.	6M	CO4	E
	(b)	What is reheating? What the advantages of reheat Rankine cycle?	6M	CO4	R
		UNIT-V			
9.	(a)	Explain the working of reciprocating compressor using relevant sketch	6M	CO4	U
	(b)	Differentiate centrifugal and axial compressors.	6M	CO4	A
		(OR)			
10.	(a)	Explain the functions of parts of a simple vapour compression system with neat sketch?	6M	CO4	U
	(b)	What is the effect of friction on the flow through a steam nozzle?	6M	CO5	R

Q.P. Code: 2004403

SET - 1

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

B. Tech. IV Semester (R20) Regular Examinations of August – 2022

SUB: Microprocessors and Microcontrollers (ECE & CSE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.		Explain the Architecture of 8086 Microprocessor in detail with neat diagram?	12M	CO2	U
		(OR)			
2.		Draw the Pin diagram of 8086 Microprocessor and explain each pin in detail	12M	CO2	U
		UNIT – II			
3.	(a)	Write an ALP in 8086 to reverse the given string.	6M	CO3	E
	(b)	Write an ALP in 8086 to add the given two 16-bit data	6M	CO3	E
		(OR)			
4.	(a)	Write an ALP in 8086 to exchange a block of N bytes of data between source and destination.	6M	CO3	E
	(b)	Write an ALP in 8086 to find the largest number in a given block of data	6M	CO3	E
		UNIT – III			
5.	(a)	With a neat diagram explain the operation of 8257	6M	CO2	U
	(b)	What are the basic modes of operations of 8255 and explain in detail.	6M	CO2	U
		(OR)			
6.	(a)	Explain the block diagram of 8251.	6M	CO2	U
	(b)	With a neat diagram explain the operation of interrupt controller 8259.	6M	CO2	A
		UNIT – IV			
7.		Explain in detail about the Architecture of 8051	12M	CO2	U
		(OR)			
8.		With neat diagram explain the pins of 8051 Microcontroller?	12M	CO2	A
		UNIT-V			
9.		Explain the ARM Design Philosophy and ARM Registers	12M	CO2	U
		(OR)			
10.		Explain the different Thumb programming model of ARM controller with examples.	12M	CO5	A

Q.P. Code: 2001404

SET - 1

I

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

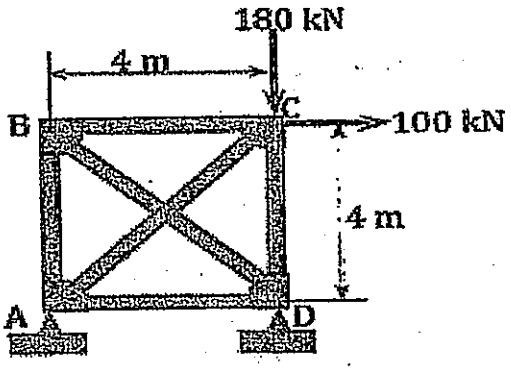
SUB: Structural Analysis (CE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

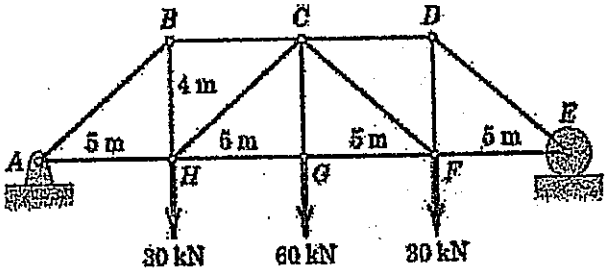
All questions carry Equal Marks.

		Marks	CO	Skills
	UNIT - I			
1.	Analyze the truss shown in the figure shown below. Take EI as constant.	12M	CO1	Az



(OR)

2.	Analyze the truss shown in the figure shown below. Take EI as constant.	12M	CO1	Az



UNIT – II

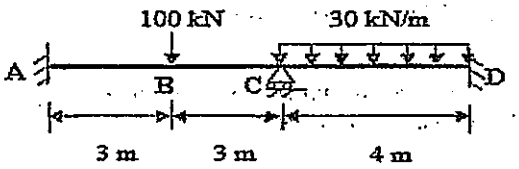
3.	A fixed beam of length 7m carries concentrated load of 250 kN at 2 m from the left fixed support and uniformly distributed load of 5 kN/m in the middle half-portion. Find the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams.	12M	CO2	E

(OR)

4.	A two span continuous beam ABC is fixed at the left end A and placed over simple supports at B and C such that AB=10 m and BC=12 m. It carries a concentrated load of 25 kN at 4 m from the end A. In addition, the beam carries a uniformly distributed load of 2kN/m over BC. Assuming uniform section throughout, analyse the beam and sketch the shear force and bending moment diagrams.	12M	CO2	Az

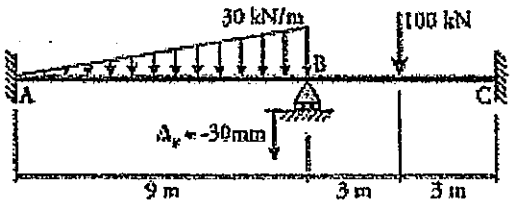
UNIT – III

5.		Analyze the continuous beam as shown in the below Figure using slope-deflection method.	12M	CO3	Az



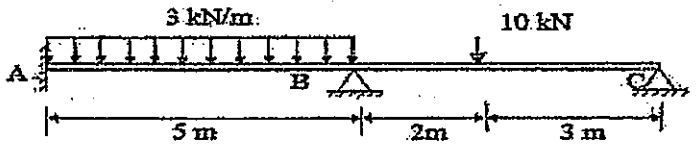
(OR)

6.		Analyze the continuous beam as shown in the below figure using slope-deflection method. Consider moment of inertia as 1.5 x 10^8 mm^4, E as 200000 MPa.	12M	CO3	Az



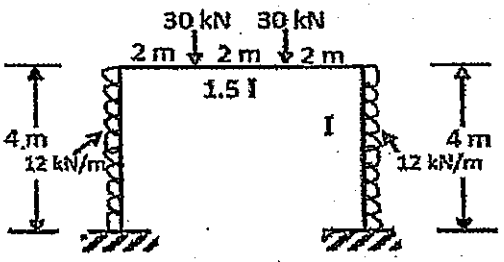
UNIT – IV

7.		Analyse the beam using moment-distribution method for the beam shown in the below figure. Assume EI as constant.	12M	CO4	Az



(OR)

8.		Analyse the truss shown in the below figure using moment-distribution method. Assume E as constant.	12M	CO4	Az



UNIT-V

9.	(a)	Differentiate between three hinged arch, two hinged arch and fixed arch.	5M	CO5	U
	(b)	Discuss about the temperature effects in two-hinged arches.	7M	CO5	U

(OR)

10.		A symmetrical three-hinged parabolic arch has span of 20 m and central rise of 5m. It carries a concentrated load of 80 kN at left quarter-point. Determine the horizontal thrust in the arch and maximum bending moments.	12M	CO5	E

Q.P. Code: 2002404

SET - 1

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

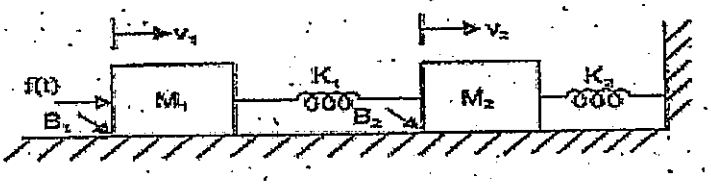
B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Linear Control Systems (EEE)

Time: 3 Hours **Max. Marks: 60**

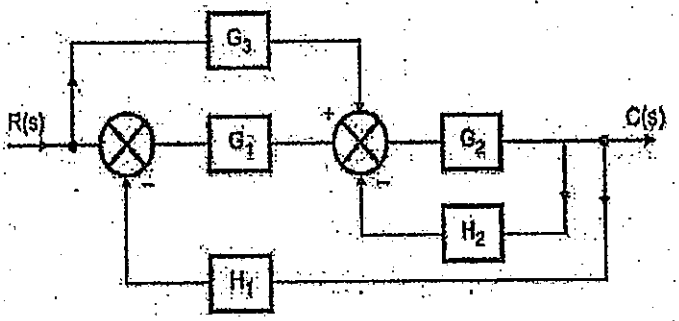
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

		Questions	Marks	CO	Skills
		UNIT - I			
1.	(a)	Explain open loop and closed loop control systems with any two examples.	6M	CO1	U
	(b)	Determine the transfer function of the system shown in figure	6M	CO1	E

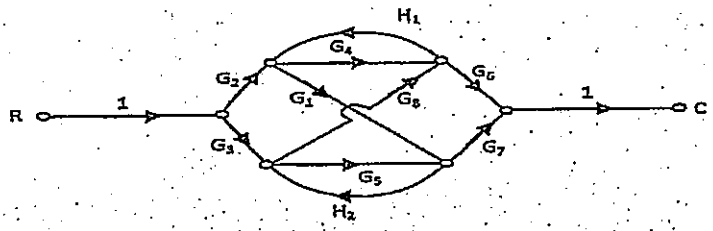


(OR)

2.	(a)	Determine the transfer function of the system shown in figure using block diagram reduction technique.	6M	CO3	E



	(b)	Determine the transfer function of the system shown in figure using Mason's gain formula.	6M	CO3	E



		UNIT – II			
3.	(a)	Determine the time response of under damped second order system for a unit step input.	6M	CO1	E
	(b)	A unit feedback control system has a open loop transfer function, G(s) = 8/s(s+3). Determine the rise time, peak overshoot and peak time, settling time and delay time for a unit step input.	6M	CO2	E
		(OR)			
4.	(a)	Explain about various test signals used in control systems	6M	CO1	U
	(b)	For a unity feedback control system, the open loop transfer function is $G(s)= 10(s+2)/ s^2 (s+1)$, Determine i) position, velocity, acceleration error constants and ii) the steady state error when the input is $R(s)= 3/s-2/s^2+1/3s^3$	6M	CO3	E

UNIT – III

5.	(a)	Explain the concepts of stability based on the location of roots of characteristic equation.	6M	CO1	U
	(b)	For the given characteristic equation of the system $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16=0$ determine the stability of the system and comment on roots location by constructing Routh Array.	6M	CO2	E
		(OR)			
6.		Sketch the Root locus for the given open loop transfer function and discuss on stability. $G(s) = \frac{10}{s(s^2+6s+10)}$	12M	CO2	A

UNIT – IV

7.	(a)	Define the following i) Gain cross over frequency ii) Phase cross over frequency iii) Gain margin iv) Phase margin	6M	CO1	R
	(b)	Given $\xi = 0.7$ and $\omega_n = 10$ rad/sec. Calculate resonant peak, resonant frequency and bandwidth.	6M	CO2	E
		(OR)			
8.	(a)	Sketch the bode diagram for the given open loop transfer function $G(s) = \frac{10}{s(1+0.4s)(1+0.1s)}$ and determine the gain and phase cross over frequencies.	12M	CO2	A

UNIT-V

9.	(a)	Explain the procedure for the design of lead compensator in frequency domain	6M	CO4	U
	(b)	Explain lag compensator and derive its transfer function.	6M	CO4	U
		(OR)			
10.		Consider a unity feedback system with open loop transfer function, $G(s)=K/s(s+1)$. Design a suitable lead compensator to meet the following specifications. (i) $K_v=20$ sec^{-1} (ii) Phase margin $\geq 40^0$.	12M	CO4	A

Q.P. Code: 2003404

SET - 1

I

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Kinematics of Machines (ME)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	What is constrained motion? Explain the types of constrained motions with examples.	6M	CO1	U
	(b)	Explain the term kinematic link. Give the classification of kinematic link.	6M	CO1	U
		(OR)			
2.	(a)	Explain different kinds of kinematic pairs giving example for each one of them.	8M	CO1	U
	(b)	How machines are classified? Explain.	4M	CO1	U
		UNIT – II			
3.		The crank and connecting rod of a theoretical steam engine are 0.5 m and 2 m long respectively. The crank makes 180 r.p.m. in the clockwise direction. When it has turned 45° from the inner dead centre position, determine: (i) velocity of piston, (ii) angular velocity of connecting rod, (iii) velocity of point E on the connecting rod 1.5 m from the gudgeon pin, (iv) velocities of rubbing at the pins of the crank shaft, crank and crosshead when the diameters of their pins are 50 mm, 60 mm and 30mm respectively.	12M	CO2	E
		(OR)			
4.		The crank and connecting rod of a reciprocating engine are 150 mm and 600 mm respectively. The crank makes an angle of 60° with the inner dead centre and revolves at a uniform speed of 300 r.p.m. Find, by Klein's or Ritterhaus's construction, (i) Velocity and acceleration of the piston, (ii) Velocity and acceleration of the mid-point D of the connecting rod, and (iii) Angular velocity and angular acceleration of the connecting rod.	12M	CO2	E
		UNIT – III			
5.	(a)	Sketch and explain the working of a pantograph and show that it can be used to reproduce to an enlarged scale a given figure.	6M	CO3	C
	(b)	What are straight line mechanisms? Describe one type of exact straight line motion mechanism with the help of a sketch.	6M	CO3	U
		(OR)			
6.		The dimensions of four bar mechanism are; AB =400 mm, BC = CD = 360mm, and AD = 650 mm. The angle BAD = 60°., AD is a fixed link.The crank AB rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link BC.	12M	CO3	Az

UNIT – IV

7.		A cam rotating clockwise at a uniform speed of 100 r.p.m. is required to give motion to knife-edge follower as below : (i) Follower to move outwards through 25 mm during 120° of cam rotation, (ii) Follower to dwell for the next 60° of cam rotation, (iii) Follower to return to its starting position during next 90° of cam rotation, and (iv) Follower to dwell for the rest of the cam rotation. The minimum radius of the cam is 50 mm and the line of stroke of the follower passes through the axis of the cam shaft. If the displacement of the follower takes place with uniform and equal acceleration and retardation on both the outward and return strokes, find the maximum velocity and acceleration during outstroke and return stroke.	12M	CO4	E

(OR)

8.	(a)	Distinguish radial and off set followers used in cam mechanism.	6M	CO4	U
	(b)	What are the different types of motions with the follower can move?	6M	CO4	U

UNIT-V

9.	(a)	Derive an expression for the length of the arc of contact in a pair of meshed spur gears.	6M	CO5	E
	(b)	Explain the terms: (i) Module, (ii) Pressure angle, and (iii) Addendum.	6M	CO5	U

(OR)

10.	(a)	Derive an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel.	6M	CO5	E
	(b)	Two spur gear wheels with 18 and 26 teeth gear together. The addendum of each wheel is equal to one module, and pressure angle is 200. Find the length of the arc of contact.	6M	CO5	E

Q.P. Code: 2004404 | SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Electromagnetic Waves and Transmission Lines (ECE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Obtain the relation between electric field, E and Scalar potential, V. Let $V = 3x^2y + xy^2 + 3z$ v. Find E at (2,3,1)	6M	CO1	E
	(b)	Derive Possion's and Laplace's equations from fundamentals	6M	CO1	E
		(OR)			
2.	(a)	Using Gauss Law, derive an expression for the electric field intensity due to infinite sheet charge in the xy-plane with uniform charge density ρ_s C/cm	6M	CO2	E
	(b)	State Coulomb's Law. Find the force on charge Q1, 30 μC due to a charge Q2, -200 μC, where Q1 is at (0,0,2) m and Q2 is at (2,1,0) m	6M	CO1	R & E
		UNIT – II			
3.	(a)	Explain the concept of scalar and vector Magnetic potential	6M	CO1	U
	(b)	Using Ampere's circuital law, find magnetic field H due to infinitely long conductor carrying current "I" amp	6M	CO2	E
		(OR)			
4.	(a)	A current distribution gives rise to the vector magnetic potential $A = x^2ya_x + xy^2a_y - 4xyza_z$ Wb/m. Calculate: (i) B at (-1,2 , 5) (ii) The flux through the surface defined by $z = 1, 0 \le x \le 1, -1 \le y \le 4$	6M	CO2	E
	(b)	Obtain the expression for force between two current loops placed in a magnetic Field.	6M	CO2	E
		UNIT – III			
5.	(a)	Derive the boundary conditions for the tangential and normal components of magneto static fields at the boundary between two perfect dielectrics	6M	CO3	E
	(b)	In Free Space, $E = 20\cos(wt - 50x)a_y\ V/m$ determine D, H and B	6M	CO3	E
		(OR)			
6.	(a)	Write Maxwell's equations for time varying fields in different final forms and give their word Statements	6M	CO2	R
	(b)	The region $y < 0$ contains a dielectric material for which $\varepsilon_{r1} = 2$ and the region $y > 0$ contains a dielectric material for which $\varepsilon_{r2} = 4$. If $E_1 = -3a_x + 5a_y + 7a_z$ V/m, find the electric field E_2 and D_2 in medium 2	6M	CO3	E
		UNIT – IV			
7.	(a)	When a uniform wave is incident normally on an interface between two media derive the expression for transmission coefficient	6M	CO4	E
	(b)	State and prove pointing theorem	6M	CO4	R & E
		(OR)			
8.	(a)	An EM wave propagating in a certain medium is described by	6M	CO4	E

		$E=10\sin(2\pi X10^6 t-3x)a_z\ V/m$, Determine the direction of wave propagation, wavelength and the velocity			
	(b)	Explain the concept of critical angle and total internal reflections	6M	CO4	U
		UNIT-V			
9.	(a)	A load of $Z_L=100+j150\ \Omega$ is connected to a 75Ω lossless line. Using a smith chart, determine the reflection coefficient and the standing wave ratio	6M	CO5	E
	(b)	Define the reflection coefficient and derive the expression for input impedance in terms of reflection coefficient	6M	CO5	R & E
		(OR)			
10.	(a)	Starting from the equivalent circuit, derive the transmission line equations for V and I, in terms of the source parameters	6M	CO5	E
	(b)	A transmission line operating at 500 MHz has $Z_0 = 80\Omega$, $\alpha=0.04Np/m$ and $\beta=1.5rad/m$.Calculate R , L , C , and G of the line	6M	CO5	E

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SET - 1

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Digital Logic Circuits & Design (CSE)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Perform the binary arithmetic operations on (-14)-(-2) using signed 2's complement representation.	6M	CO1	A
	(b)	Given that $(64)_{10} = (100)_b$, Determine the value of b.	6M	CO1	E
		(OR)			
2.	(a)	Simplify the following using Boolean algebra: (A+B)(A+(AB')')C+A'(B+C')+A'B+ABC.	6M	CO2	A
	(b)	Express the following function F = xy + x' y in a product of max-terms	6M	CO2	U
		UNIT – II			
3.	(a)	Simply the following Boolean function using K-map. F(A,B,C,D) = ∑(0,2,3,8,9,10,12,15)	6M	CO2	A
	(b)	Simplify the following function and realize using universal gates F(A,B,C) = A'BC' + ABC + B'C' + A'B'	6M	CO2	A
		(OR)			
4.	(a)	Use the K-map method to simplify the following 5-variable function F(A,B,C,D,E) = 3,6,7,8,10,12,14,17,19,20,21,24,25,27,31)	6M	CO2	A
	(b)	Implement Ex- NOR gate using only NOR gates.	6M	CO3	A
		UNIT – III			
5.	(a)	What is a decoder? Construct 3 x 8 decoder using logic gates and also write truth table.	6M	CO4	R & C
	(b)	Design a 4 bit odd parity generator. Mention its truth table.	6M	CO4	C
		(OR)			
6.	(a)	Derive the expression for BCD to excess-3 code converter using K-map and implement the combinational logic circuit of it.	6M	CO3	E
	(b)	Design a combinational logic circuit that generates the 9's complement of a BCD digit.	6M	CO3	C
		UNIT – IV			
7.	(a)	Compare the differences between Latches and FlipFlops	6M	CO5	U
	(b)	Design a 4 bit universal shift register with neat diagram	6M	CO4	C
		(OR)			
8.	(a)	What is sequential circuit? Explain about state reduction and state assignment with an example	6M	CO5	R & U
	(b)	A clocked sequential circuit with single input x and single output z produces an output z=1 whenever the input x compares the sequence 1011 and overlapping is allowed. Obtain the state diagram, state table and design the circuit with D flip-flops.	6M	CO4	E
		UNIT-V			
9.	(a)	Design a 3 bit synchronous up counter using T Flip-flops.	6M	CO5	C
	(b)	What is Race-free state Assignment? Explain.	6M	CO5	R & U
		(OR)			
10.	(a)	Define register and explain about Universal shift register.	6M	CO5	R & U
	(b)	Draw the timing waveforms for read and write memory cycle in a Random Access Memory.	6M	CO5	R

Q.P. Code: 2001405 | SET - 1 | I

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

B. Tech. IV Semester (R20) Regular Examinations of August – 2022

SUB: Transportation Engineering (CE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	What are Jayakar committee recommendations? Mention how this helped in road development in India?	6M	CO1	R
	(b)	Explain, various factors to be considered in highway alignment.	6M	CO1	R
		(OR)			
2.	(a)	Describe the road patterns in India with neat sketches.	6M	CO1	R
	(b)	Mention the use of map study in engineering surveys for highway location.	6M	CO1	U
		UNIT – II			
3.	(a)	Derive the expression for over taking sight distance with neat sketch.	6M	CO2	E
	(b)	A vertical summit curve is formed when an ascending gradient of 1 in 25 meets another ascending gradient of1 in 100. Find the length of the summit curve to provide the required SSD for a design speed of 80 kmph.	6M	CO2	E
		(OR)			
4.		While aligning a highway in built up area, it was necessary to provide a horizontal circular curve of radius 120m. The design speed is 65kmph, length of wheel base of vehicle is 6.0m and the width of the pavement is 10.5m. Design i) superelevation, ii)extra widening of pavement and iii) length of transition curve. Assume suitable data required, if any.	12M	CO2	E
		UNIT – III			
5.	(a)	Explain the factors affecting Capacity.	6M	CO3	U
	(b)	Discuss the advantages and dis – advantages of traffic signals.	6M	CO3	U
		(OR)			
6.	(a)	Explain the relation between speed, flow and density with neat sketches.	6M	CO3	R
	(b)	The average normal flow of traffic on two cross roads A and B are during design periods are 400 and 250 PCU /hr. The saturation flow values on these roads are estimated as 1250 and 1000 PCU/hr respectively. The all red time for pedestrian carrying is 12 seconds. Design the two phase traffic signal approach by Webster method and draw the phase diagram.	6M	CO3	E
		UNIT – IV			
7.	(a)	Explain briefly, the design factors to be considered in design of flexible pavements.	6M	CO4	R

	(b)	Calculate the wheel load stresses at interior, edge and corner regions of a concrete pavement using Westergaard's stress equation for the following data: Wheel load=5100 kg, tyre pressure=7 kg/cm^2 Modulus of elasticity of concrete=$3.0x10^5$ kg/cm^2 Pavement thickness=18cm Modulus of subgrade reaction=$6.0kg/cm^3$ Diameter of loaded area =15cm Poisson's ratio of concrete= 0.15	6M	CO4	E
		(OR)			
8.	(a)	Differentiate between flexible and rigid pavements.	6M	CO4	U
	(b)	Explain the significance of temperature stresses in rigid pavement design.	6M	CO4	R
		UNIT-V			
9.	(a)	Explain desirable properties of road aggregates.	6M	CO5	R
	(b)	Mention the construction steps for laying of bituminous concrete.	6M	CO5	R
		(OR)			
10.	(a)	List out the tests on bitumen. Explain procedure of any one test on bitumen in detail.	6M	CO5	U
	(b)	Explain the construction of cement concrete pavements in brief.	6M	CO5	R

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Power Systems - I (EEE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Draw a general layout of a modern thermal power plant and explain working of different circuits?	6M	CO1	Ap
	(b)	Explain the types of nuclear reactor with a neat sketch?	6M	CO1	U
		(OR)			
2.	(a)	Explain the important components used in nuclear power plant with neat diagram?	6M	CO1	U
	(b)	Write the factors to be considered for selection of site for hydropower plant?	6M	CO1	R
		UNIT – II			
3.	(a)	The maximum demand of a generating station is 200MW. The annual load factor being 60%. Calculate the total electrical energy generated per year. The load on a power plant on a typical day is as under 12 Midnight to 5am = 20 MW, 5 AM to 9 AM = 40 MW, 9AM to 6 PM = 80 MW, 6 PM to 10 PM = 100MW, 10 PM to 12 Midnight = 20 MW. Draw load curve and load duration curve. Find energy supplied by the plant per day in 24 hours and load factor of the plant.	6M	CO5	An
	(b)	Briefly discuss the type of consumers used?	6M	CO5	R
		(OR)			
4.	(a)	What is a load curve? What is its importance?	6M	CO5	U
	(b)	A generating station has a maximum demand of 500MW.The annual load factor is 50% and capacity factor is 40%.find the reserve capacity of the plant ?	6M	CO5	Ap
		UNIT – III			
5.	(a)	Discuss the voltage distribution and string efficiency of a suspension insulator string.	6M	CO3	U
	(b)	Derive the expression for sag when the supports are at equal heights.	6M	CO3	U
		(OR)			
6.	(a)	Discuss about the suspension type insulator with suitable diagram.	6M	CO3	U
	(b)	An overhead transmission line has a span of 220m, the condcutor weighing 804Kg/Km. Calculator the maximum sag if the ultimate tensile strength of the conductor is 5758Kg. Assume a safety of 2, Ground clearance is 10m. Calculate the height at which condcutor should be supported.	6M	CO3	Ap
		UNIT – IV			
7.	(a)	Derive an expression for capacitance of a single phase overhead transmission line.	6M	CO4	An

	(b)	A single phase transmission line has two parallel conductors 3m apart, the radius of each condcutor being 1cm. Calculate the loop inductance per Km length of the line if the material of the conductor is (i) Copper (ii) Steel with relative permeability of 100	6M	CO4	U
		(OR)			
8.	(a)	Explain various types of Transmission line conductors	6M	CO4	U
	(b)	Derive an expression for inductance of a three phase asymmetrical spacing.	6M	CO4	Ap
		UNIT-V			
9.	(a)	Derive an expression for the insulation resistance of a single core cable.	6M	CO2	An
	(b)	Explain the advantages and disadvantages of Corona	6M	CO2	R
		(OR)			
10.	(a)	Derive an expression for capacitance of a single core cable.	6M	CO2	An
	(b)	A 132KV overhead line condcutor of radius 1Cm is built so that corona takes place if the line voltage is 210KV (rms). If the value of voltage gradient at which ionization occurs can be taken as 21.21KV (rms) per cm, determine the spacing between the conductors.	6M	CO2	Ap

Q.P. Code: 2003405

SET - 1

I

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Machine Tools (ME)

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

			Marks	CO	Skills
		UNIT - I			
1.		What is the difference between orthogonal and oblique cutting	12M	CO1	U
		(OR)			
2.		Explain the single point tool angle nomenclature with a neat sketch?	12M	CO1	U
		UNIT – II			
3.	(a)	How do you specify planers?	2M	CO2	R
	(b)	Explain the principal parts of a planer with a line diagram?	10M	CO2	U
		(OR)			
4.		Explain the various parts of a shaper with a neat sketch and labeling the parts	12M	CO2	U
		UNIT – III			
5.	(a)	Explain the parts of a Jig boring machine with neat sketch	10M	CO3	U
	(b)	Explain specifications of boring machines?	2M	CO3	U
		(OR)			
6.		Briefly explain about any three tool holding devices that are used in a drilling machine with neat sketches?	12M	CO3	U
		UNIT – IV			
7.		Classify milling machines? Explain the end milling process with a neat sketch?	12M	CO4	U
		(OR)			
8.		Explain the working mechanism of universal dividing head with neat sketch?	12M	CO4	U
		UNIT-V			
9.		Explain the working principle of centre less grinder with three feeds	12M	CO5	U
		(OR)			
10.		Explain the working principle of vertical Broaching machine with a neat sketch?	12M	CO5	U

Q.P. Code: 20044005 | SET - 1 | I

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Linear and Digital IC Applications (ECE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.	(a)	Discuss in detail about each block of Op-Amp block diagram.	6M	C01	U
	(b)	Describe ideal and practical Op-Amp specifications.	6M	C01	U
		(OR)			
2.	(a)	Explain i) Input Off set voltage ii) Thermal drift iii) slew rate	6M	C01	U
	(b)	Describe the operation of Ideal and practical Non-Inverting closed loop Op-Amp configurations.	6M	C01	U
		UNIT – II			
3.	(a)	Derive an output expression for inverting summing and scaling Operational amplifier.	6M	C05	A
	(b)	Derive an output expression for Op-Amp instrumentation amplifier.	6M	C05	A
		(OR)			
4.	(a)	Explain the principle and operation of Op-Amp Comparator.	6M	C03	U
	(b)	Explain the operation of Op-Amp square wave generator.	6M	C03	U
		UNIT – III			
5.	(a)	Explain the functional diagram of 555 Timer with neat sketch.	6M	C03	U
	(b)	Describe IC 565 and PLL applications.	6M	C03	U
		(OR)			
6.	(a)	Design mono stable multivibrator using 555 timer to produce a pulse width of 100mSec.	6M	C05	A
	(b)	Explain the operation of dual slope integration type ADC with neat sketch.	6M	C03	U
		UNIT – IV			
7.	(a)	Explain CMOS 2-input NAND and NOR gates with circuit diagram, Functional table and logic symbol.	6M	C05	U
	(b)	Explain CMOS AND-OR-INVERT with circuit and function table.	6M	C05	U
		(OR)			
8.	(a)	Discuss dynamic electrical behavior of CMOS.	6M	C05	U
	(b)	Discuss the concept of CMOS transmission gates.	6M	C05	U
		UNIT-V			
9.	(a)	Discuss Logical, Relational and Logical operators in Verilog HDL.	6M	C04	U
	(b)	Explain Behavioral model elements in Verilog HDL.	6M	C04	U
		(OR)			
10.	(a)	Explain the design procedure of verilog module for half adder.	6M	C04	U
	(b)	Write Verilog module for SSI Latches.	6M	C04	A

Q.P. Code: 2021405 | **SET - 1**

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

B. Tech. IV Semester (R20UG) Regular Examinations of August – 2022

SUB: Probability Theory and Statistical Methods (CSE)

Time: 3 Hours **Max. Marks: 60**

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

			Marks	CO	Skills
		UNIT - I			
1.		Two dice are thrown. Let X assign to each point (a,b) in S the maximum of its numbers i.e., $X(a,b)=\max(a,b)$. Find the probability distribution. X is a random variable with $X(S)=\{1,2,3,4,5,6\}$. Also find the mean and variance of the distribution.	12M	CO1	E
		(OR)			
2.		A continuous random variable has the probability density function $f(x)=\begin{cases} kxe^{-\lambda x}, & for\ x\geq 0,\lambda>0 \\ 0, & otherwise \end{cases}$ Find (*i*) k (*ii*) Mean and (*iii*) Variance.	12M	CO1	E
		UNIT – II			
3.	(a)	Assume that 50% of all engineering students are good in Mathematics. Determine the probabilities that among 18 engineering students (*i*) atleast 10 (*ii*) atmost 8 (*iii*) atleast 2 and atmost 9 are good in Mathematics.	6M	CO2	E
	(b)	Buses arrive at a specified stop at 15 min. intervals starting at 7 A.M., that is, they arrive at 7, 7:15, 7:45 and so on. If a passenger arrives at the stop at a random time that is uniformly distributed between 7 and 7:30 A.M., find the probability that he waits (*a*) less than 5 min. for a bus and (*b*) at least 12 min. for a bus.	6M	CO2	E
		(OR)			
4.		If the masses of 300 students are normally distributed with mean 68 kg and standard deviation 3 kg, how many students have masses (*i*) greater than 72 kg (*ii*) less than or equal to 64 kg and (*iii*) between 65 and 71 kg inclusive.	12M	CO2	A
		UNIT – III			
5.	(a)	The mean life time of a sample of 100 fluorescent light tubes produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the tubes produced by the company is 1600 hours. Using the LOS of 0.05, is the claim acceptable?	6M	CO3	Az
	(b)	In a large city *A*, 20% of a random sample of 900 school boys had a slight physical defect. In another large city *B*, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant?	6M	CO3	Az
		(OR)			