AR18

CODE: 18CET316 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, Sep/Oct-2021

GEOTECHNICAL ENGINEERING-II

(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) What are the design features of good sampler? 8M
   b) What is boring and sampling? 4M

(OR)

2. a) Describe the salient features of sub-soil investigation report. 6M
   b) Explain about Electrical resistivity method with neat sketch. 6M

UNIT-II

3. a) Discuss different of slope failures with neat sketches. 7M
   b) The shear strength parameters of a soil obtained from the laboratory test are cohesion = 36 kN/m^2, angle of internal friction = 20° and the mobilised values of cohesion = 32 kN/m^2 and friction = 17°. What is the factor of safety with respect to cohesion, friction, and shear strength? 5M

(OR)

4. a) Explain friction circle method for stability analysis of slopes. 6M
   b) Calculate the factor of safety of a slope for a cohesion less soil inclined at 15° .If (i) slope is completely submerged (ii) If there is a steady seepage parallel to the slope when water table is at ground level. What will be the change in factor of safety take $\phi = 28°$, saturated unit weight as 19 kN/m^3? 6M

UNIT-III

5. a) Compare Rankine's earth pressure theory with coulomb's wedge theory. 6M
   b) A retaining wall 16 m high having 3 different layered soil strata having following properties from 0 – 3 m : c = 40 kN/m^2, $\phi = 0°$, $\gamma = 21$ kN/m^3, 6M

   4 – 12 m : c = 30 kN/m^2, $\phi = 12°$, $\gamma = 24$ kN/m^3,

   12 m – 16 m : c = 0, $\phi = 28°$, $\gamma = 27$ kN/m^3,

   Draw the active earth pressure distribution.

(OR)

6. a) What are the assumptions in coulomb's wedge theory? With neat sketch explain what are the forces acting on the wedge? 6M

b) A retaining wall with soft saturated clay backfill 9 m high. For the undrained condition of the backfill, determine: (i) the maximum depth of tensile crack (ii) the active force below the tensile crack (iii) the active force after the occurrence of tensile crack. c_u = 30 kN/m^2, γ = 16 kN/m^3 6M

UNIT-IV

7. a) Explain general shear failure and local shear failure with neat sketches. 7M
   b) Determine the net ultimate bearing capacity of a footing of 2x2m diameter and its base is at a depth of 2.5 m below ground level resting on saturated clay having cohesion of 50 kN/m^2. Take γ_d = 21 kN/m^3, γ_{sat} = 23 kN/m^3 γ_w = 10 kN/m^3, N_c=5.7, N_q= 1 and Nγ=0. 5M

(OR)

8. a) Explain the types of Shallow foundations and also discuss about its suitability towards the conditions of the site. 6M
   b) The following date was obtained from a plate load test carried out on a 600 mm square test plate at a depth of 1.5 m below ground surface on a sandy soil which extends up to large depth .Determine the settlement of foundation 3 m x 3 m carrying a load of 1200 kN and located at a depth of 3 m below ground surface. 6M

Load intensity(kN/m$^{2)}$	40	80	120	160	200	240	280	320
Settlement (mm)	3	5	7.5	10	14	19.2	28.7	40

UNIT-V

9. a) Explain Indian standard method of conducting a pile load test with a sketch. 6M
   b) Determine the safe load of a group of nine cast-in-situ piles, 45 cm diameter, 16m long, installed in a cohesive deposit. The pile spacing is 1.2m c/c. The soil profile is 3.5 m thick desiccated firm clay (α = 0.6) having undrained Cohesion = 52 kPa, followed by a 8.5 m thick soft organic clay (α = 0.8), having undrained cohesion= 28 kPa, followed by a stiff clay (α = 0.4), having undrained cohesion=100 kPa. Factor of safety = 2.50. 6M

(OR)

10. a) Classification of piles with neat sketches. 8M
    b) A 350 mm diameter and 9 m long pile was driven by double acting hammer have mass 2500 kg and height of fall 1.5 m. The driving was done with 2.5 cm cushion only. The average penetration in the last five blows was 5 mm/blow. Determine the safe pile load using Modified Hiley formula unit weight of concrete is 24 kN/m^3.,e = 0.8 η_h = 0.85 4M

AR18

CODE: 18EET316 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, Sep/Oct-2021

INDUSTRIAL AUTOMATION

(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	What is an Industrial Automation and explain its impact.	6M
	b)	Give the classification of Automation.	6M
		(OR)	
2.	a)	Outline the history and development of industrial automation.	6M
	b)	List some applications of Industrial Automation.	6M

UNIT-II

3.	a)	What is PLC? Draw the block diagram of PLC and explain each block in detail.	6M
	b)	Explain the arithmetic (Mathematical) instructions of PLC.	6M
		(OR)	
4.	a)	Explain Sourcing and Sinking concept in PLC	6M
	b)	Give a brief note on capability of PLC	6M

UNIT-III

5.		Develop Ladder logic diagram for each of the following Boolean expressions using AND, OR, and NOT gates: (a) Y= ABC + D (b) Y= AB + CD (c) Y= (A+ B) ($\bar{C}$+D)	12M
		(OR)	
6.	a)	Explain the PLC programming methods as per IEC Standard.	6M
	b)	List out various Ladder symbols.	6M

UNIT-IV

7.		Explain timer and counter functions of PLC in detail.	12M
		(OR)	
8.	a)	Write short note on up-down counter.	6M
	b)	Explain any Boolean logic functions with an example.	6M

UNIT-V

9.	a)	Explain, with a neat diagram typical SCADA system and its hierarchy.	8M
	b)	Explain the benefits of SCADA system.	4M
		(OR)	
10.	a)	Explain remote terminal unit in detail.	6M
	b)	List the various types of interfaces in SCADA and explain any one type.	6M

***

AR18

CODE: 18MET315 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, Sep/Oct-2021

DYNAMIC SYSTEMS & MECHANICAL VIBRATIONS

(Mechanical Engineering)

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

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. A disc cam is to give uniform motion to a knife edge follower during out stroke of 50 mm during the first half of the cam revolution. The follower again returns to its original position with uniform motion during the next half of the revolution. The minimum radius of the cam is 50 mm and the diameter of the cam shaft is 35 mm. Draw the profile of the cam when 1. the axis of follower passes through the axis of cam shaft, and 2. the axis of follower is offset by 20 mm from the axis of the cam shaft. 12M

(OR)

2. Cam is to be designed for a knife edge follower with the following data : 12M
   Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.
   Dwell for the next 30°.
   During the next 60° of cam rotation, the follower returns to its original position with simple harmonic motion.
   Dwell during the remaining 180°; Draw the profile of the cam when the line of stroke of the follower passes through the axis of the cam shaft, and the radius of the base circle of the cam is 40 mm. Determine the maximum velocity and acceleration of the follower during its ascent and descent, if the cam rotates at 240 r.p.m.

UNIT-II

3. Four masses m1, m2, m3 and m4 having 100, 175, 200 and 25Kg are fixed to cranks of 20 cm radius and revolve in planes 1,2,3 and 4. The angular position of the cranks in planes 2,3 and 4 with respect to the crank in plane 1 are 75^0 , 135^0 and 200^0 taken in the same sense. The distance of planes 2,3 and 4 from plane 1 are 60cm, 186cm and 240 cm respectively determine the position and magnitude of the balance mass at radius of 60cm in plane L and M located at middle of the plane 1 and 2 and the middle of the planes 3 and 4 respectively. 12M

(OR)

4. A single cylinder engine runs at 250 r.p.m. and has a stroke of 180 mm. The reciprocating parts has a mass of 120 kg and the revolving parts are equivalent to a mass of 70 kg at a radius of 90 mm. A mass is placed opposite to the crank at a radius of 150 mm to balance the whole of the revolving mass and two-thirds of the reciprocating mass. Determine the magnitude of the balancing mass and the resultant residual unbalance force when the crank has turned 30° from the inner dead centre, neglect the obliquity of the connecting rod. 12M

UNIT-III

5. a) Develop mathematical expression for logarithmic decrement. 6M
   b) A light cantilever of lenth L has a mass M fixed at its free end. Find the frequency of lateral vibration in the vertical plane. 6M

(OR)

6. The mass of a spring-mass-dash pot system is given an initial velocity (from the equilibrium position) of Aωn where ωn is the undamped natural frequency of the system. Find the equation of motion for the system, for the cases when 12 M
   (i) $\varsigma = 2.0$ (ii) $\varsigma = 1.0$ (iii) $\varsigma = 0.2$

UNIT-IV

7. a) Explain the transmissibility and transmitted force for a spring mass damper system. 6M
   b) A rotor having mass of 5 kg, is mounted mid way on a 0.01 m diameter shaft supported at the ends by two bearings. The bearing span is 0.40 m. Because of certain manufacturing inaccuracies, the C.G of the disc is 0.02 mm away from the geometric centre of the rotor. If the system rotates at 3000 rpm, find the amplitude of steady state vibration and the dynamic force transmitted to the bearing. Neglect damping. Take E=1.96 x 10^{11} N/m^2. 6M

(OR)

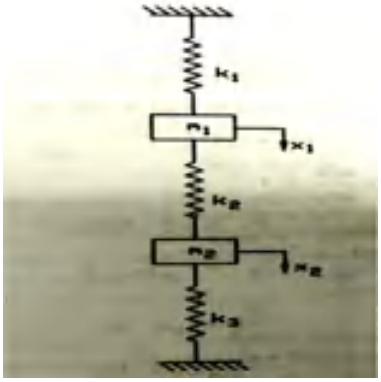
8. Investigate the motion of masses for the following different cases to determine two natural frequencies when m_1==m_2=m=9.8 kg; k_1=k_3=8820 N/m; K_2=3430 N/m 12 M

   (a) both masses are displaced 5 mm downward and released simultaneously.

   (b) both masses are displaced 5 mm; m_1 in downward and m_2 in upward direction, and released simultaneously.

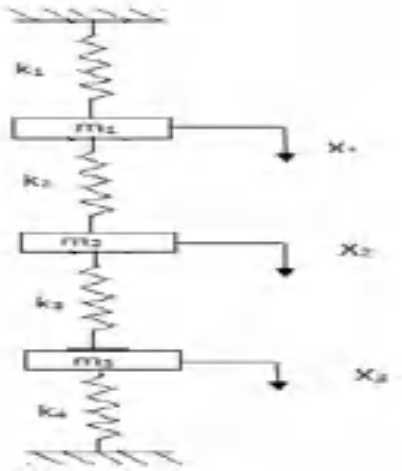
   (c) mass m_1 is displaced 5 mm downward and mass m_2 is displaced 7.5 mm downward. Both masses are released simultaneously.

   .



UNIT-V

9. Determine the natural frequencies of the system shown in the Figure. Assume m1=m2=m3=m and k1=k2=k3=k4=k 12M



(OR)

10. Two rotors A and B are attached to the end of a shaft 50cm long. Weight of the rotor A is 300N and its radius of gyration is 30 cm and corresponding values of 'B' are 500N and 45 cm respectively. The shaft is 7cm in diameter for the first 25cm, 12cm diameter for the next 10cm and 10cm diameter for the remaining length. Modulus of rigidity for the shaft material is 8 X 10^{11} N/m^2. Find equivalent length and diameter of the shaft. also find the natural frequencies of the torsional vibration. 12M

AR18

CODE: 18ECT316 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, Sep/Oct-2021
DIGITAL SIGNAL PROCESSING
(Electronics and Communication Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) For following system, determine whether the system is stable, causal, linear and time-invariant . $y[n] = nx[n]$ 6M
   b) Determine the impulse response for the cascade of two LTI systems having impulse responses: $h_1[n] = \left(\frac{1}{2}\right)^n u[n]$ and $h_2[n] = \left(\frac{1}{4}\right)^n u[n]$ using convolution. 6M

(OR)

2. a) Illustrate the following classifications of DT sequences. i) Causal and Non-Causal Sequences
   (ii) Energy and Power Sequences 6M
   b) Write any three properties of Z-transform. 6M

UNIT-II

3. a) Find the DFT of the following sequences. 6M
   $x_1[n] = \{\underset{\uparrow}{0}\ \ 1\ \ 2\ \ 1\}$ and $x_2[n] = \{\underset{\uparrow}{1}\ \ 2\ \ 3\ \ 1\}$
   b) State and prove the following properties of DFT (i) Circular time shifting (ii) Circular convolution. 6M

(OR)

4. Find the 8-point DFT by radix-2 DIT-FFT algorithm for x(n) = {2,1,2,1,2,1,2,1} 12M

UNIT-III

5. a) Compare IIR and FIR filters. 6M
   b) Obtain the direct form I, II , parallel and cascade form realization for the system y(n)= -0.1y(n-1)+0.2y(n-2)+3x(n)+3.6x(n-1)+0.6x(n-2) 6M

(OR)

6. a) Explain the realization of cascade structure of an IIR system 4M
   b) Design a low pass filter using rectangular window by taking 9 samples of w(n) and with a cut-off frequency of 1.2radians/sec. 8M

UNIT-IV

7. Explain about Wiener smoothing and prediction filters. 12M

(OR)

8. a) Write the properties of LMS adaptive filter 6M
   b) Explain the concept of Direct form linear prediction filtering 6M

UNIT-V

9. Draw the architecture of TMS320C54XX DSP processor and explain the function of each block in detail. 12M

(OR)

10. Explain the Features, MAC unit and Pipelining concepts in detail. 12M

AR18

CODE: 18CST314 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, Sep/Oct-2021

DATA MINING

(Common to CSE & IT)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain different data mining tasks for knowledge discovery.	6M
	b)	Enumerate about data mining. Express any three functionality of data mining.	6M

(OR)

2.	a)	List out the reasons for data pre processing. Explain steps involved in data pre processing.	6M
	b)	Narrate about the data smoothing techniques. Illustrate Data Integration and Transformation	6M

UNIT-II

3.	a)	List out the key features of data warehouse. Explain about various multidimensional data models.	6M
	b)	What is the significance of OLAP in data warehouse? Describe OLAP operations with example.	6M

(OR)

4.	a)	Illustrate difference between the three main types of data warehouse usage: information processing, analytical processing, and data mining.	6M
	b)	Suppose that a data warehouse for Big University consists of the following four dimensions: student, course, semester, and instructor, and two Measures count and average grade. When at the lowest conceptual level (e.g., for a given student, course, semester, and instructor combination), the average grade measure stores the actual course grade of the student. At higher combination. Draw a snowflake schema diagram for the data warehouse.	6M

UNIT-III

5.	a)	State the problem definition for association rules. Explain about apriori algorithm.	6M
	b)	Illustrate about mining multilevel association rules from transaction databases in detail.	6M

(OR)

6.	a)	List out the pruning strategies of closed frequent item sets. Describe the rule of support for item sets.	6M
	b)	Describe Association rule mining often generates a large number of rules. Illustrate effective methods that can be used to reduce the number of rules generated while still preserving most of the interesting rules.	6M

UNIT-IV

7.	a)	Describe about the classification and prediction with an example.	6M
	b)	Illustrate about basic decision tree induction algorithm.	6M

(OR)

8.	a)	Distinguish supervised learning and unsupervised learning with an illustration.	6M
	b)	Explain various performance measures of a classifier with suitable example.	6M

UNIT-V

9.	a)	What are the advantages and disadvantages of k-means clustering algorithm	6M
	b)	You are given a set of numbers [2,3,5,8,13,21,34,55,89,144,233,377]. Find two clusters using K-Means with initial centroids [1] and [377]	6M

(OR)

10.	a)	Explain density based algorithm for clustering data. Discuss its merits and demerits.	6M
	b)	Write short notes on i) DBSCAN clustering algorithm ii) BIRCH algorithm.	6M

AR16

CODE: 16CE3018 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

GEOTECHNICAL ENGINEERING-II

(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Explain and discuss the various factors that help to decide the number and depth of bore holes required for subsoil exploration. 7M
   b) Describe with the help of a neat sketch the wash boring method of subsoil exploration. In what type of soils this method is recommended? What are the limitations of this method? 7M

(OR)

2. a) Explain the soil investigation report along with bore log. 7M
   b) Draw a neat sketch of split-spoon sampler showing all salient features? 7M

UNIT-II

3. a) What are the different factors of safety used in the stability of slopes? 7M
   b) An unsupported slope has a radius of 24m, angle subtended at the center is 65^0, slope angle is 50^0, weight of the wedge is 2500kN and the centroid distance of the wedge is 11m. If the height of the slope is 14m, determine the factor of safety against sliding for the trail slip circle assuming $c=50kN/m^2$, $\phi=0^0$. 7M

(OR)

4. a) How a slope is analyzed using Swedish circle method? Derive an expression for the factor of safety. 7M
   b) Calculate the safe height for an embankment rising 70^0 to the horizontal and to be made with a clayey soil having unit weight of 20 kN/m^3, $\phi = 15^0$ and a cohesion of 20 kN/m^2. Factor of safety may be taken as 2.5. Value of stability number N, corresponding to slope angle $\alpha = 70^0$ and $\phi = 15^0$ is 0.14. 7M

UNIT-III

5. a) Describe Rankine's theory of active earth pressure. What are the assumptions made? 7M
   b) Determine the intensities of active and passive earth pressure at depth 8 meters in dry cohesion less sand with $\phi=30^0$ and unit weigh 18 kN/m^3. What will be the above pressure if the water level rises to the ground level? Take saturated unit weight as 21 kN/m^3. 7M

(OR)

6. a) Sketch the active earth pressure distribution of cohesive soils behind a retaining wall. 7M

   b) A retaining wall retains cohesionless backfill in two layers the top 3 m fill has a unit weight 18 kN/m3 and $\varphi = 30^0$ and the rest of the height 5m has a unit weight 24 kN/m^3 and $\varphi = 20^0$. Determine the active pressure and point of application of Active pressure. 7M

UNIT-IV

7. a) List out different types of foundations. State the circumstances to go for combined foundations 7M

   b) A strip footing is required to be carry a net load of 1000kN art a depth of 1m. Taking a factor of safety of 3, determine the width of the footing considering c = 20 kN/m2, $\Phi = 30^0$, $\gamma_{sat} = 19$ kN/m^3, Use Terzaghi's theory. (Nc =37.2, Nq=22.5 and Nr=19.7). 7M

(OR)

8. a) Explain how the safe bearing pressure can be determined using N Value and write how the N value can be obtained? 7M

   b) A rectangular footing 3 m x 1.5 m exerts a pressure of 80 kN/m^2 on a cohesive soil (Es = 5.1 X 10^4 kN/m^2, $\mu = 0.50$). Determine the immediate settlement at the centre assuming the footing is (a) flexible (b) rigid. For flexible Influence factors for L/B = 2 are 1.53 at centre and 0.77 at corner. For rigid 0.8. 7M

UNIT-V

9. a) Explain at least two dynamic formulae of piles. 7M

   b) A friction pile 300mm in diameter is proposed to be driven in a layer of uniform cohesive soil. The pile tip is assumed to carry 20% of the load. The skin friction between the pile surface and the soil is assumed to be 50kN/m^2. Determine the length of piling required to carry a safe load 200kN with a factor of safety of 4. 7M

(OR)

10. a) Explain different classifications of piles with neat sketches. 7M

    b) Explain the Pile load test with help of neat sketch and graph. Present the importance of this test in connection with the pile foundations? 7M

***

AR16

CODE: 16EC3016 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech. II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

ANALOG AND DIGITAL ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

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

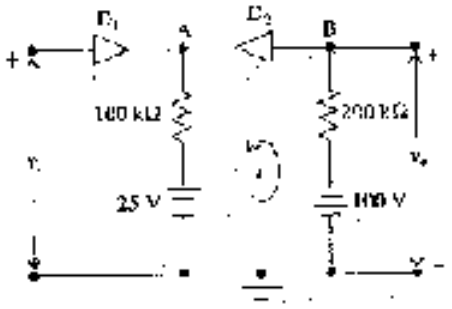
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Briefly explain the Low pass RC circuit to square wave input and derive the Expression for rise time. 7M
   b) Derive the upper cut off frequency for sinusoidal input? 7M

(OR)

2. a) The main application of high pass RC circuit is differentiator. Give the supporting explanation? 7M
   b) The input voltage Vi to the two level clipper shown in figure varies linearly from 0 to 150 V .Sketch the output voltage Vo to the same time scale as the inputVoltage. Assume ideal diodes. 7M



UNIT-II

3. a) Describe switching times of Transistor? 7M
   b) Find out the frequency and duty cycle of Astable multivibrator for the following component values R1=20 KΩ , R2=10K Ω, C1=C2= 0.01μF ? 7M

(OR)

4. a) Define UTP,LTP and hysteresis , explain Schmitt trigger using transistors 7M
   b) Which multivibrator can be called as voltage to frequency converter and explain in detail with necessary circuit diagram 7M

UNIT-III

5.	a)	Explain non inverting and inverting comparators with input and output waveforms	7M
	b)	Draw the first order low pass butter worth filter and explain its frequency Response.	7M
		(OR)	
6.	a)	Derive the expression for output voltage of Opamp integrator	7M
	b)	Derive the gain of Non inverting amplifier using Opamp	7M

UNIT-IV

7.	a)	Explain with neat sketches free running operation of Astable multivibrator with 555 IC timer.	7M
	b)	Explain in detail how SAR ADC gives full accuracy	7M
		(OR)	
8.	a)	Draw and explain the operation of R-2R DAC and compare with binary weighted DAC.	7M
	b)	Explain counter typed ADCs	7M

UNIT-V

9.	a)	State the advantages of CMOS over TTL, explain CMOS 2 input NAND gate	7M
	b)	Describe CMOS/TTL interfacing?	7M
		(OR)	
10.	a)	Explain low voltage CMOS logic and interfacing	7M
	b)	Draw and explain DTL NAND and NOR gates for 3 no of inputs.	7M

***

AR16

CODE: 16ME3019 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech. II Semester Supplementary Examinations, Sep/Oct, 2021

MECHANICAL VIBRATIONS

(Mechanical Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) What are the different types of follower motions? Explain any one. 6m
   b) Explain the Displacement, Velocity and Acceleration Diagrams when the Follower Moves with Uniform Velocity. 8 m

(OR)

2. It is required to set out the profile of a cam with radial follower for the following motion: (a) Follower to move outward with displacement of 40mm with SHM during 90° of cam rotation; (b) Follower to dwell for 45° of cam rotation ; (c) Follower to return to its original position of zero displacement in 75° of cam rotation ; and (d) Follower to dwell for the remaining period of the revolution of the cam. The distance between the pivot centre and the follower roller centre is 70 mm and the roller diameter is 20 mm. The minimum radius of the cam corresponds to the starting position of the follower is 50mm. The motion of the follower is to take place with S.H.M. during out stroke and during return stroke. 14 m

UNIT-II

3. A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions. 14 m

(OR)

4. a) Explain the effect of Partial Balancing of Reciprocating Parts of Two cylinders? 4 m
   b) A single cylinder reciprocating engine has speed 240 r.p.m., stroke 300 mm, mass of reciprocating parts 50 kg, mass of revolving parts at 150 mm radius 37 kg. If two-third of the reciprocating parts and all the revolving parts are to be balanced, find : 1. The balance mass required at a radius of 400 mm, and 2. The residual unbalanced force when the crank has rotated 60° from top dead centre. 10 m

UNIT-III

5. a) An undamped single-degree-of-freedom system has a mass of 1 kg and a stiffness of 2500 N/m. Find the magnitude and the phase of the response of the system when the initial displacement is -2mm and initial velocity of 100 mm/s. 6 m

   b) Determine the effect of the mass of the spring on the natural frequency of the spring-mass system shown in Fig.1 8 m

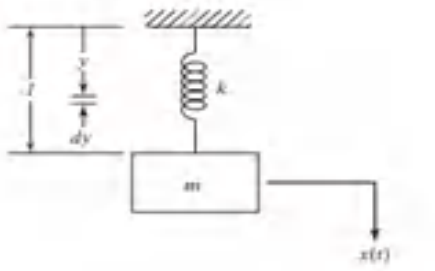


Fig 1

(OR)

6. a) Explain the concept of whirling speed of rotating shaft. 6 m

   b) A 45-kg machine is mounted on four parallel springs each of stiffness 2 X IO^5 N/m. When the machine operates at 32 Hz, the machine's steady-state amplitude is measured as 1.5 mm. What is the magnitude Of the excitation provided to the machine at this Speed? 8 m

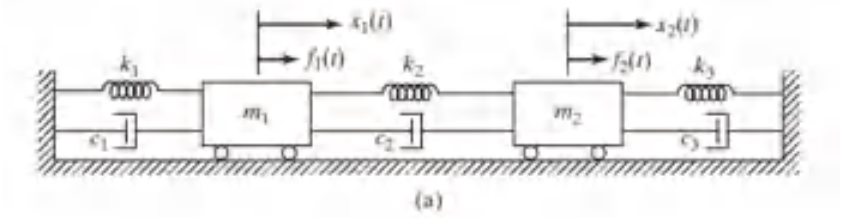
UNIT-IV

7. Explain the vibration isolation, transmissibility and transmitted force in detail. 14 m

(OR)

8. 14 m

Dervie the natural frequecny and mode shape of undamped spring mass system shown in figure. $C_1=C_2=C_3=0$



(a)

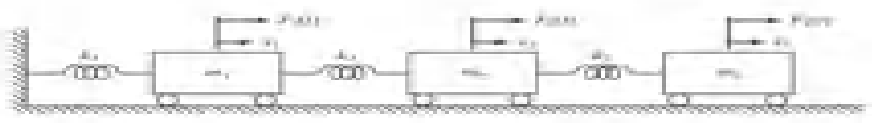
UNIT-V

9. a) Derive the natural frequencies of torsional vibrations of three rotor system. 8 m

   b) Develop the natural frequencies of geared system. 6 m

(OR)

10. Find the natural frequencies and mode shapes of the system shown in Fig. below for k1 = k2 = k3 = k and m1 = m2 = m3 = m. 14 m



***

AR16

CODE: 16EC3021 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech. II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) The system having impulse responses given below, determine whether they are stable and causal. (i) $h(n) = \delta(n) + \cos(\pi n)$, (ii). $h(n) = e^{2n}u(n-1)$ — 8 M

   b) Determine the z-transform and ROC of the following signals: — 6 M
   (i) $x(n) = \left(\frac{1}{2}\right)^{n+1} u(n)$, and (ii). $x(n) = \left(\frac{1}{3}\right)^{n} u(-n-1)$

(OR)

2. a) Determine the Fourier transform of the system whose unit impulse response is $h(n) = \begin{cases} 2 & for\ 0 \le n \le N-1 \\ 0 & elsewhere \end{cases}$ — 8 M

   b) State and prove the any two properties of Z-transform — 6 M

UNIT-II

3. a) Find the relationship between Discrete Fourier Transform and z-Transform — 6 M

   b) Find the 8-point DFT of the given sequence x(n) = {1,0,1,0,1,0,1,0} using DIF , radix-2, FFT algorithm — 8 M

(OR)

4. a) State and prove any four properties of Discrete Fourier Transform — 8 M

   b) Compute the DFT of a sequence x(n) = {1,2,3,4} using DIT algorithm — 6M

UNIT-III

5. a) Realize the system with difference equation — 7 M
   $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n) + \frac{1}{3}x(n-1)$ in parallel form

   b) Design an analog Butterworth filter that has a -2dB passband attenuation at a frequency of 20 rad/sec and atleast -20 dB stopband attenuation at 35 rad/sec — 7 M

(OR)

6. a) Determine H(z) that results when the bilinear transformation is applied to — 7 M
   $H_a(s) = \frac{s^2+4.525}{s^2+0.692s+0.504}$

   b) Obtain direct form II realization of the LTI system described by the following equation — 7 M
   $y(n) = -\frac{3}{8}y(n-1) + \frac{3}{32}y(n-2) + \frac{1}{64}y(n-3) + x(n) + 3x(n-1) + 2x(n-2)$

UNIT-IV

7. Design an ideal highpass filter with a frequency response 14 M

$$H_d(e^{jw}) = \begin{cases} 1 & for \frac{\pi}{4} \leq |w| \leq \pi \\ 0 & for\ |w| \leq \frac{\pi}{4} \end{cases}$$

Find the value of h(n) for N=11 using Hamming window

(OR)

8. a) Compare IIR and FIR Filters 7M
   b) Determine the direct form realization of system function 7M

$$H(z) = (1 + 2z^{-1} - 2z^{-2})(1 + z^{-1} - z^{-2})$$

UNIT-V

9. a) Explain addressing modes of DSP processor 7 M
   b) Explain Von-Neumann and Harvard architectures with neat diagrams. 7 M

(OR)

10. a) Explain the architecture of TMS320C5X DSP Processor with block diagram 10M
    b) Explain the pipelining operation of DSP Processors 4 M

***

AR16

CODE: 16CS3020 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Regular & Supplementary Examinations, Sep/Oct, 2021

DATA WAREHOUSING AND DATA MINING

(Common to CSE & IT)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-IM

1.	a)	Explain different data mining tasks for knowledge discovery.	7M
	b)	What is the need of dimensionality reduction? Explain any two techniques.	7M
		(OR)	
2.	a)	Briefly explain the major issues in data mining.	7M
	b)	Explain various data pre-processing methods with appropriate examples.	7M

UNIT-II

3.	a)	Write the difference between designing a data warehouse and an OLAP cube.	8M
	b)	Give a brief note on ROLAP	6M
		(OR)	
4.	a)	What is the significance of OLAP in data warehouse? Explain with neat sketch.	8M
	b)	Describe the architecture and implementation of data warehouse	6M

UNIT-III

5.	a)	How can we mine multilevel Association rules efficiently using concept hierarchies?	5M
	b)	Illustrate the steps of Apriori algorithm with a sample data set.	9M
		(OR)	
6.	a)	Illustrate FP-Growth algorithm with example?	5M
	b)	Discuss the applications of association analysis.	9M

UNIT-IV

7.	a)	How does the Naïve Bayesian classification works? Explain in detail.	8M
	b)	How to evaluate the classifier accuracy?	6M
		(OR)	
8.	a)	Write and explain decision tree classifier with induction algorithm with an example.	8M
	b)	Explain various measures used to find the best split mode in decision tree.	6M

UNIT-V

9.	a)	What are the advantages and disadvantages of k-means clustering algorithm	7M
	b)	You are given a set of numbers [2,3,5,8,13,21,34,55,89,144,233,377]. Find two clusters using K-Means with initial centroids [1] and [377]	7M
		(OR)	
10.	a)	What is Density based clustering? Describe DBSCAN clustering algorithm.	7M
	b)	Discuss merits and demerits of density based algorithm for clustering data.	7M