

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 with the help of a diagram the hydrologic cycle. 6M
- b) What is infiltration? Write short notes on Infiltration indices. 6M

(OR)

2. a) What do you understand by precipitation? Explain various types of precipitation. 6M
- b) Explain any one type of automatic rain gauge. 6M

UNIT-II

3. a) What is a hydrograph? Draw a single peaked hydrograph and explain its components. 6M
- b) The ordinates of 2h-UHG of a basin are given below. Determine the ordinates of 6h-UHG by using S-Curve method and compute the equilibrium discharge. 6M

Time (h)	0	2	4	6	8	10	12	14	16	18	20	22
2h UH Ordinates (m ³ /s)	0	25	100	160	190	170	110	70	30	20	6	0

(OR)

4. a) Define unit hydrograph and state its limitations. 6M
- b) Describe various methods of computing average rainfall over a basin. 6M

UNIT-III

5. a) Discuss different types of geological formations of aquifers. 6M
- b) During a recuperation test, the water in an open well was depressed by pumping by 2.5 meters and it recuperated 1.8m in 80 minutes. Compute yield from the well of 4 m diameter under a depression head of 3m. 6M

(OR)

6. a) What do you understand by recuperation test? Derive the equations used in the test. 6M
- b) Describe various aeration zones in sub-surface water. 6M

UNIT-IV

7. a) Describe the soil water relationship. 6M
- b) What is evapo-transpiration? How it is determined? 6M

(OR)

8. a) Discuss the basic requirement for adaption of any irrigation method. 4M
- b) An irrigation canal has gross command area of 80,000 hectares out of which 85% is culturable irrigable. The intensity of irrigation for kharif season is 30% and for Rabi season 60%. Compute the discharge required at the head of the canal if the duty at its head is 800 hectares/cumecs for Kharif season and 1700 hectares/cumecs for rabi season. 8M

UNIT-V

9. a) What is a Cross Drainage Work. Explain different types of CDW's. 6M
- b) Write the design of irrigation canal using Lacey's theory. 6M

(OR)

10. a) How do you classify the types of canals? Explain any two. 6M
- b) Write the design procedure of irrigation canal using Kennedy theory. 6M

**ELECTRICAL MEASUREMENTS
(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) Describe the construction and working principle of PMMC instrument. Derive an expression for the deflecting torque and write advantages of PMMC. 6M
- b) Explain with the neat sketches the working of an attraction type MI instrument and derive an expression for the deflecting torque. 6M

(OR)

2. a) Explain with circuit diagram range extension of DC ammeter using shunts. Write the equations. 6M
- b) A moving coil instrument gives a full scale deflection for a current of 20 mA with a potential difference of 200 mV across it. Calculate i) Shunt required to use it as an ammeter to get a range of 0-200 A. ii) Multiplier required to use it as a voltmeter of range 0-500 V. 6M

UNIT-II

3. a) Draw the equivalent circuit and phasor diagram of a potential transformer. Derive the expression for ratio error and phase angle errors. 6M
- b) Explain the construction and working principle of electro dynamometer type wattmeter. And list the errors. 6M

(OR)

4. a) Derive the expression for active and reactive power in balanced system. 6M
- b) What is hall effect sensor? Explain briefly. 6M

UNIT-III

5. a) Describe the construction and working of 1- ϕ Induction type energy meter. 6M
- b) Write the different errors in single phase energy meter. How to compensate those errors? 6M

(OR)

6. a) With neat sketch explain moving iron type power factor meter. 6M
- b) Write the short notes on maximum demand meters. 6M

UNIT-IV

7. a) How to measure the low value of resistance by using Kelvin's double bridge? 6M
- b) Explain the loss of charge method for measurement of high resistance. 6M

(OR)

8. a) Derive the balance equation for Schering's bridge and Give its applications. 6M
- b) How to measure the self inductance by using Maxwell's bridge. 6M

UNIT-V

9. a) What do you mean by standardization and explain the working principle of DC Crompton's Potentiometer. 6M
- b) Explain the construction and working of Drysdale polar potentiometer. 6M

(OR)

10. a) Derive the expression for deflection of Flux Meter. 6M
- b) Explain the step-by-step method to obtain B-H curve of a given magnetic material. 6M

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

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All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the terms: 1. Lower pair, 2. Higher pair, 3. Kinematic chain, and 4. Inversion. 4M
b) Sketch slider crank chain and its various inversions, stating actual machines in which these are used in practice. 8M

(OR)

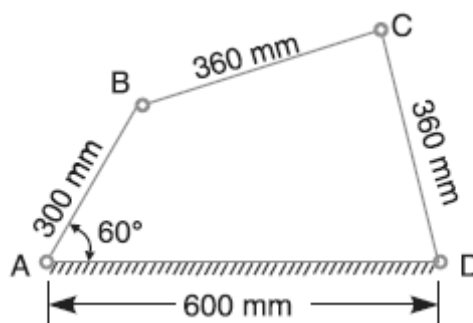
2. a) Sketch and Describe the Watt's and Peaucellier straight-line motion mechanisms. 6M
b) Explain with a neat sketch describe the classification of kinematic pairs? 6M

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 : 12M
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,

(OR)

4. a) In a pin jointed four bar mechanism, as shown in Fig, AB = 300 mm, BC = CD = 360 mm, and AD = 600 mm. The angle BAD = 60° . The crank AB rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link BC. 8M



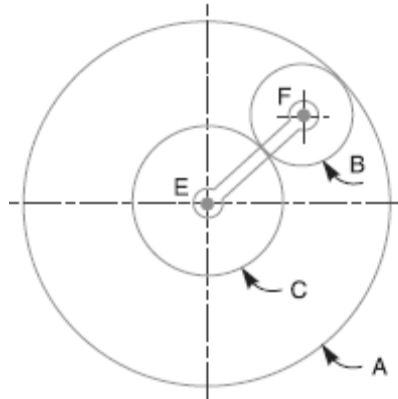
- b) Define Instantaneous centre? Explain about different types of Instantaneous centres? 4M

UNIT-III

5. a) State and prove the law of gearing. 4M
b) A pinion of 20 involute teeth and 125 mm pitch circle diameter drives a rack. The addendum of both pinion and rack is 6.25 mm. What is the least pressure angle which can be used to avoid interference? With this pressure angle, find the length of the arc of contact and the minimum number of teeth in contact at a time. 8M

(OR)

6. a) What is the difference between a simple gear train and a compound gear train? Explain with the help of sketches. 4M
- b) An epicyclic gear consists of three gears A, B and C as shown in Fig. The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the centre of A at 18 r.p.m. If the gear A is fixed, determine the speed of gears B and C. 8M



UNIT-IV

7. A vertical petrol engine 100 mm diameter and 120 mm stroke has a connecting rod 250 mm long. The mass of the piston is 1.1 Kg. Speed is 200 rpm and the expansion stroke with a crank angle 200 from TDC, the gas pressure is 700 kN/m². Determine i) Net force on the piston, ii) Resultant load on the gudgeon pin, iii) Thrust on the cylinder walls and iv) the speed above which other things remaining same, gudgeon pin load would be reversed in direction 12M

(OR)

8. a) An aeroplane flying at 240 km/h turns towards the left and completes a quarter circle of 60 m radius. The mass of the rotary engine and the propeller of the plane is 450 kg with a radius of gyration of 320 mm. The engine speed is 2000 rpm clockwise when viewed from the rear. Determine the gyroscopic couple on the aircraft and state its effect. In what way is the effect changed when the (i) aeroplane turns towards right (ii) engine rotates clockwise when viewed from the front (nose end). 12M

UNIT-V

9. a) A horizontal cross compound steam engine develops 300 kW at 90 r.p.m. The coefficient of fluctuation of energy as found from the turning moment diagram is to be 0.1 and the fluctuation of speed is to be kept within $\pm 0.5\%$ of the mean speed. Find the weight of the flywheel required, if the radius of gyration is 2 metres. 6M
- b) The turning moment diagram for a multicylinder engine has been drawn to a scale 1 mm = 600 N-m vertically and 1 mm = 3° horizontally. The intercepted areas between the output torque curve and the mean resistance line, taken in order from one end, are as follows :
+ 52, - 124, + 92, - 140, + 85, - 72 and + 107 mm², when the engine is running at a speed of 600 r.p.m. If the total fluctuation of speed is not to exceed $\pm 1.5\%$ of the mean, find the necessary mass of the flywheel of radius 0.5 m. 6M

(OR)

10. A Porter governor has equal arms each 250 mm long and pivoted on the axis of rotation. Each ball has a mass of 5 kg and the mass of the central load on the sleeve is 15 kg. The radius of rotation of the ball is 150 mm when the governor begins to lift and 200 mm when the governor is at maximum speed. Find the minimum and maximum speeds and range of the governor. 12M

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) With a neat sketch explain the basic elements of a digital communication system. 6M
- b) List the advantages and disadvantages of PCM. 6M

(OR)

2. a) Derive an expression for quantization noise in DM system and find signal to quantization noise ratio. 6M
- b) Draw the block diagram for Delta modulation system and explain each Block. 6M

UNIT-II

3. a) Explain with neat block diagram the generation and recover of BPSK. 6M
- b) Draw and explain the power spectra and geometrical representation of BPSK. 6M

(OR)

4. a) With a neat sketch explain the QPSK transmitter and receiver 6M
- b) Mention the advantages and disadvantages of BPSK, QPSK, MSK. 6M

UNIT-III

5. a) What is optimum filter? Derive the expression for error probability of optimum filter. 6M
- b) Calculate the error probability for BPSK 6M

(OR)

6. a) Explain Entropy and its properties. 6M
- b) A discrete source emits one of five symbols once every millisecond. The symbol probabilities are 1/2, 1/4, 1/8, 1/16 and 1/16 respectively. Find the source entropy and information rate. 6M

UNIT-IV

7. a) Briefly explain linear block codes implementation. 6M
- b) Find all the code vectors for a (6,3) block code, whose generator matrix is given as, 6M

$$G = \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{array} \right]$$

(OR)

8. a) Explain the capacity of a Gaussian channel. 6M
- b) Calculate the capacity of a low pass channel with a usable bandwidth of 3000 Hz and $S/N = 10^3$ at the channel output. Assume the channel noise to be Gaussian and white. 6M

UNIT-V

9. a) Explain about convolutional codes. 6M
- b) What are code tree, trellis and state diagrams for a convolutional encoder? 6M

(OR)

10. a) Draw the code tree of a Convolutional code of code rate $r=1/2$ and Constraint length of $K=3$ starting from the state table and state diagram for an encoder which is commonly used. 6M
- b) Explain Viterbi decoding in convolutional codes. 6M

AR18

CODE: 18CST311

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech I Semester Supplementary Examinations, June-2022

**SOFTWARE ENGINEERING
(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) What are the differences between functional requirements and non-functional requirements? 6 M
b) Explain the user requirements in Software Engineering. 6 M
- (OR)
2. a) What is feasibility study? How will you determine the feasibility of your project? 6M
b) Explain how to validate the requirements? 6 M

UNIT-II

3. a) Illustrate the Waterfall model with a suitable diagram. 6 M
b) Give an overview of the unified process model. 6 M
- (OR)
4. a) What are Context Models? Construct the context diagram for ATM. 6 M
b) What are Behavioral models? Explain State machine models with an example. 6 M

UNIT-III

5. a) What are the characteristics of a good design? Explain in detail. 6 M
b) Explain any three design concepts. 6 M
- (OR)
6. a) Briefly explain various architectural styles. 6 M
b) Explain about the user interface design process. 6 M

UNIT-IV

7. a) Determine the difference between validation and verification. 6 M
b) Explain the process of debugging. 6 M
- (OR)
8. a) Explain the concept of System Testing. 6 M
b) What is pair-wise testing? Where can it be used? 6 M

UNIT-V

9. a) Explain different software quality factors. 6 M
b) Explain the software metrics for source code. 6 M
- (OR)
10. a) Explain the COCOMO II Model for software estimation. 6 M
b) Explain the Measures of Reliability and Availability. 6 M

AR16

CODE: 16CE3014

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

**III B.Tech I Semester Supplementary Examinations, June-2022
TRANSPORTATION ENGINEERING-I**

(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) Briefly discuss different types of road patterns with neat sketches 7M
- b) What are the factors affecting highway alignment 7M

(OR)

2. a) Explain the targets of road development plans 7M
- b) Enumerate the road classification with its significance. 7M

UNIT-II

3. a) The design speed of a road is 65Kmph, the friction coefficient is 0.36 and reaction time of driver is 2.5sec. Calculate the values of 7M
 - i) Head light sight distance
 - ii) Intermediate sight distance required for the road
- b) Explain the different types of vertical curves 7M

(OR)

4. a) Explain the analysis of extra widening on curves. 7M
- b) Illustrate the design of Transition curves. 7M

UNIT-III

5. a) Recall the requirements of design mix 7M
- b) List out the tests to be carried out on aggregates and explain any two tests briefly. 7M

(OR)

6. a) Explain Marshalls Method of Mix design 7M
- b) List out the tests to be carried out on bitumen and explain any two tests briefly. 7M

UNIT-IV

7. a) Explain about the Different Types of Speed Studies Carried out For the Traffic Survey? 7M
- b) What are the basic traffic characteristics? Explain briefly. 7M

(OR)

8. a) Describe the various steps involved in traffic accident studies. 7M
- b) Briefly explain the collision and condition diagrams. 7M

UNIT-V

9. a) Draw the sketches of various types of grade separated intersection. Write its advantages 7M
- b) Write a note on Traffic Islands with its objectives. 7M

(OR)

10. a) Illustrate the conflicts at intersections with neat sketches 7M
- b) Explain the design considerations of rotary elements. 7M

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) Give classification of kinematic pairs. 7M
b) Explain Peaucellier mechanism with neat sketch. 7M
- (OR)
2. a) Give any two applications of inversions of four bar mechanisms? 2M
b) Explain with neat sketch all inversions of single slider crank mechanisms. 12M

UNIT-II

3. PQRS is a four bar chain with link PS fixed. The lengths of the links are PQ = 62.5 mm; QR = 175 mm ; RS = 112.5 mm ; and PS = 200 mm. The crank PQ rotates at 10 rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS = 60° and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS. 14M
- (OR)
4. a) State and prove Kennedy's theorem. 4M
b) In a slider crank mechanism, the lengths of crank OB and connecting rod AB are 100 mm and 400 mm respectively. The crank rotates clockwise with an angular velocity of 10 rad/s. At the instance when crank makes 45° with horizontal, locate all the instantaneous centres of the slider crank mechanism. Find (i) Velocity of the slider A (ii) Angular velocity of the connecting rod AB. 10M

UNIT-III

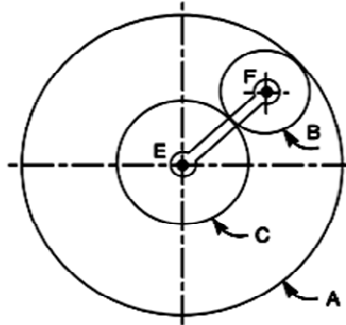
5. a) Explain dynamically equivalent system and derive the expressions for masses and their distances? 7M
b) A connecting rod is suspended from a point 25 mm above the centre of small end, and 650 mm above its centre of gravity, its mass being 37.5 kg. When permitted to oscillate, the time period is found to be 1.87 seconds. Find the dynamical equivalent system constituted of two masses, one of which is located at the small end centre. 7M
- (OR)
6. An aeroplane makes a complete half circle of 50 metres radius, towards left, when flying at 200 km per hr. The rotary engine and the propeller of the plane have a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it. 14M

UNIT-IV

7. a) Derive the expression for minimum number of teeth on the pinion in order to avoid Interference. 9M
- b) Determine the minimum number of teeth required on a pinion, in order to avoid interference which is to gear with a wheel to give a gear ratio of 3 to 1. The pressure angle is 20° and a standard addendum of 1 module for the wheel may be assumed. 5M

(OR)

8. a) What is compound gear train? Give an application where it is used. 4M
- b) An epicyclic gear consists of three gears A, B and C. The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the centre of A at 18 r.p.m.. If the gear A is fixed, determine the speed of gears B and C. 10M



UNIT-V

9. a) Differentiate between flywheel and governor. 4M
- b) The turning moment diagram for a petrol engine is drawn to the following scales: 10M
Turning moment, 1 mm = 5 N-m ; crank angle, 1 mm = 1° . The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm². The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m.

(OR)

10. a) What is hunting and sensitiveness of governor? 4M
- b) The following particulars refer to a Proell governor with open arms: Length of all arms = 200 mm ; distance of pivot of arms from the axis of rotation = 40 mm ; length of extension of lower arms to which each ball is attached = 100 mm ; mass of each ball = 6 kg and mass of the central load = 150 kg. If the radius of rotation of the balls is 180 mm when the arms are inclined at an angle of 40° to the axis of rotation, find the equilibrium speed for the above configuration. 10M

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

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All parts of the Question must be answered at one place

UNIT-I

1. a) Explain about Changing Nature of Software? 7M
b) Discuss briefly about waterfall model? 7M
- (OR)
2. a) Describe about Incremental process models? 7M
b) Explain about Evolutionary process models? 7M

UNIT-II

3. a) Explain about software requirements document? 7M
b) Discuss about Requirements validation? 7M
- (OR)
4. a) Discuss about Context Models and Behavioral models? 7M
b) Explain about Data models and Object models? 7M

UNIT-III

5. a) Explain about Architectural styles and patterns? 7M
b) Illustrate about Design evaluation? 7M
- (OR)
6. a) Explain about Software architecture, Data design? 7M
b) Discuss about Architectural Design? 7M

UNIT-IV

7. a) Discuss about strategic approach to software testing? 7M
b) Explain about COCOMO II Model? 7M
- (OR)
8. a) Explain about Validation testing and System testing? 7M
b) Describe about Metrics for source code and Metrics for testing? 7M

UNIT-V

9. a) Explain about Statistical Software quality Assurance? 7M
b) Discuss about Reactive vs. Proactive Risk strategies? 7M
- (OR)
10. a) Explain about Software Reliability and software risks? 7M
b) Discuss about Risk refinement? 7M