

# AR18

**CODE: 18EET312**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**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) Differentiate control and damping torque in detail 6M
- b) Explain how shunt resistance can extend measuring range of instruments 6M

**(OR)**

2. a) List out different types of Ammeters with suitable diagram. 6M
- b) Explain how current can be measured with coil's angular deflection in PMMC 6M

**UNIT-II**

3. a) Write a note on Current Transformer (CT) and potential Transformer (PT) with suitable pictorial representation. 6M
- b) Discuss various types of errors and their methods of compensation in the dynamometer type watt meters. 6M

**(OR)**

4. a) Explain working principal of single phase dynamometer wattmeter with suitable adjustment types. 6M
- b) Write a short note on hall effect sensor 6M

**UNIT-III**

5. a) A meter constant of 230v,10A watthour meter is 2500 revolutions per kWh. The meter is tested at half load and rated voltage and unity power factor. The meter is found to make 90 revolutions in 138s.determine meter error at half load. 6M
- b) Explain the construction of the 3- phase Electrodynamometer power factor with neat sketch 6M

**(OR)**

6. a) Explain the Friction and braking of single phase energy meter in detail. 8M
- b) Mention advantages and disadvantages of moving iron PF meters 4M

**UNIT-IV**

7. a) List out different methods to measure Inductance and explain each with neat sketch 6M
- b) Explain how hysteresis loop is determined by method of reversals with a neat connection diagram 6M

**(OR)**

8. a) How to measure capacitance and loss angle by using Desautybridge. 6M
- b) Explain the procedure for measuring a low resistance with the help of kelvin's double bridge. Derive the relation for finding the unknown resistance. 6M

**UNIT-V**

9. a) Explain the working principle of DC Crompton's Potentiometer and it's applications 6M
- b) List the advantages and disadvantages of A.C potentiometers 6M

**(OR)**

10. a) Distinguish between a Flux meter and ballistic galvanometer 6M
- b) Explain how measurement of Resistance and power can be done using a dc Potentiometer 6M

**KINEMATICS & DYNAMICS OF MACHINERY  
(Mechanical Engineering)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

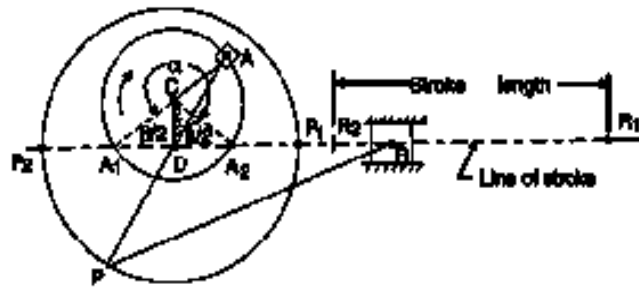
All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

1. a) Explain with a neat sketch describe the classification of kinematic pairs? 6

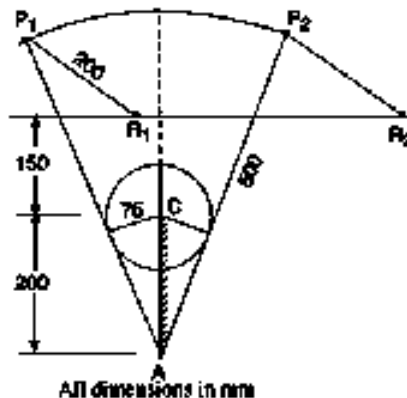
- b) A Whitworth quick return motion mechanism, as shown in Fig. , has the following particular: Length of stroke = 160 mm; Driving crank length = 40 mm; Time of cutting stroke/ Time of return stroke = 1.8. Find the lengths of  $CD$  and  $PD$ . Also determine the angles  $\alpha$  and  $\beta$ . 6

**(OR)**

2. a) Differentiate between the crank and slotted lever and Whitworth quick return mechanisms with neat sketches. 7

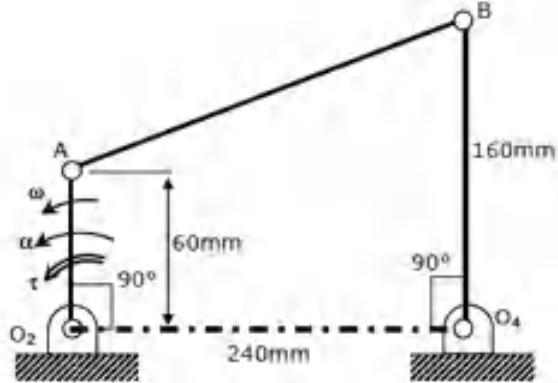
- b) In a crank and slotted lever quick return mechanism, as shown in Fig., the driving crank length is 75 mm. The distance between the fixed centres is 200 mm and the length of the slotted lever is 500mm. Find the ratio of the times taken on the cutting and idle strokes. Determine the effective stroke also. 5

6M



## UNIT-II

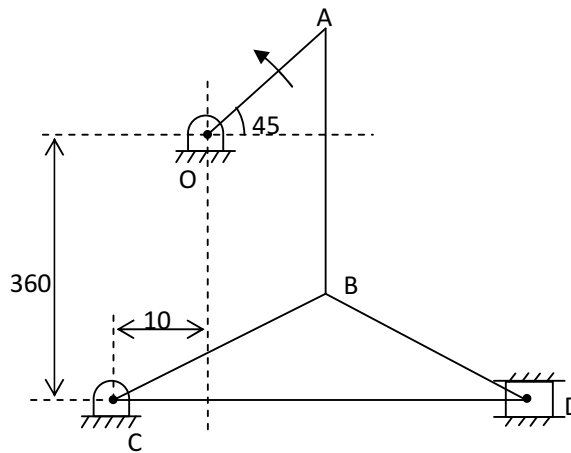
3. a) State Kennedy's theorem and elucidate its significance with an example. 4  
 b) An instantaneous configuration of a four-bar mechanism, is shown in the figure below. At this instant, the angular velocity of link  $O_2A$  are  $8\text{rad/s}$  and  $0\text{ rad/s}^2$  respectively and the driving torque is zero. The link  $O_2A$  is balanced so that its center of mass falls at  $O_2$ . 8



Identify whether the given mechanism is Grashof's or Non-Grashof's four bar mechanism  
 Identify which kind of 4-bar mechanism is  $O_2ABO_4$ ?  
 At the instant considered, Identify the magnitude of the angular velocity and angular acceleration of  $O_4B$ ?

(OR)

4. a) Explain about Coriolis acceleration? 4  
 b) In the toggle mechanism shown in figure the slider D is constrained to move in a horizontal path the crank OA is rotating in CCW direction at a speed of 180 rpm the dimensions of various links are as follows:  $OA = 180\text{ mm}$ ,  $CB = 240\text{ mm}$ ,  $AB = 360\text{ mm}$ ,  $BD = 540\text{ mm}$ . Find, i) Velocity of slider ii) Angular velocity of links AB, CB and BD. 8  
 10M



## UNIT-III

- a) Describe detailed classifications of gears. 4  
 b) An epicyclic gear consists of a pinion, a wheel of 30 teeth and an annulus with 72 internal teeth concentric with the wheel. The pinion gear meshes with the wheel and the annulus. The arm that carries the axis of the pinion rotates at 100rpm. (i) If the annulus is fixed, find the speed of the wheel; (ii) if wheel is fixed, find the speed of the annulus. 8

(OR)

6. a) A pinion A has 15 teeth and is rigidly fixed to a motor shaft. The wheel B has 20 teeth and gears with A and also with the fixed annular wheel D. The pinion C has 15 teeth and is fixed to the wheel B and gears with annular wheel E which is keyed to a machine shaft. B and C can rotate together on a pin carried by an arm, which rotates about the shaft on which A is fixed. If the motor runs at 1000 rpm, find the speed of the machine. 6
- b) Two  $20^0$  gears have a module pitch of 4 mm. The number of teeth on gear 1 is 40 and on gear 2 is 24. If the gear 2 rotates at 600 rpm, determine the velocity of sliding when the contact is at the tip of the tooth of gear 2. Take addendum equal to one module. Also find maximum length of path of contact and the maximum velocity of sliding. Take pinion as driver. 6

#### UNIT-IV

7. a) The length of crank and connecting rod of the horizontal reciprocating engine are 250mm and 1 m respectively. The cylinder bore is 0.5 m and the mass of the reciprocating parts is 250 kg. The crank is rotating at 225 rpm. When the crank has turned through 60 degree from the IDC, the difference of the pressure between the cover and piston end is  $0.30\text{N/mm}^2$ . Calculate 6
- i) Thrust on sides of the cylinder walls.  
ii) Thrust in the connecting rod.
- b) A four wheeled trolley car weighing 20 kN runs on rails, which are 1.5m apart and travel around a curve of 30m radius at 24 km/hr. Each wheel of the trolley is 75 cm in diameter and each of the two axles is driven by a motor running in a direction same to that of the wheels at a speed of five times the speed of rotation of the wheels. The moment of inertia of each axle is  $18\text{ kg} - \text{m}^2$ . Each motor has a moment of inertia of  $12\text{ kg} - \text{m}^2$ . The center of gravity of the car is 90 cm above the rail level. Determine the reactions on each wheel from ground. 6

(OR)

8. a) If the crank and the connecting rod are 200 mm and 1.2 m long respectively and the crank rotates at a constant speed with an angle  $45^\circ$  of 200 r.p.m., 1 6
- Determine 1. Acceleration of piston 2. Velocity of piston 3. The crank angle at which the maximum velocity occurs.
- b) Discuss the effect of reactive gyroscopic couple on ship, when the rotor rotates 6
- (i) clock wise looking from aft and ship steers to the left. (ii) counter clock wise looking from aft and ship steers to the right

#### UNIT-V

9. a) The turning moment diagram for a multicylinder engine has been drawn to a scale 1 mm = 600 N-m vertically and 1 mm =  $3^\circ$  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 mm<sup>2</sup>, 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. 6
- b) A porter governor has all four arms 300mm long. The upper arms are pivoted on the axis of rotation and the lower arms are attached to the sleeve at a distance of 35mm from the axis. Each ball has a mass of 7kg and the sleeve mass is 55kg. If the extreme radii of rotation of the balls are 200mm and 250mm, determine the range of speed of the governor? 6

(OR)

10. a) The turning moment curve for an engine is represented by the equation, 6  
 $T = (20000 + 9500 \sin 2\theta - 5700 \cos 2\theta) \text{ N-m}$ , where  $\theta$  is the angle moved by the crank from inner dead centre. If the resisting torque is constant, find: 1. Power developed by the engine 2. Moment of inertia of flywheel in  $\text{kg-m}^2$ , if the total fluctuation of speed is not to exceed 1% of mean speed which is 180 r.p.m., when the crank has turned through  $45^\circ$  from inner dead centre.
- b) A spring loaded governor of the Hartnell type has equal arms. The balls rotate in a 6  
circle of 10 cm diameter when the sleeve is in the mid position and the ball arms are vertical. The equilibrium speed for this position is 400 rpm. The maximum sleeve movement is to be 3 cm and the maximum variation of speed taking in account the friction to be  $\pm 5\%$  of the mid position speed. The mass of the sleeve is 5 kg and the friction force may be considered to arise out of an equivalent 3 kg mass at the sleeve. The power of the governor must be sufficient to overcome the friction by 1% change of speed either way from mid position. Determine the rotating masses

**DIGITAL COMMUNICATIONS  
(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) List the drawbacks in PCM and how do you overcome using Differential PCM? 6
- b) Sketch and explain the block diagram of delta modulation transmitter. 6
- (OR)**
2. a) Differentiate slope overload and granular noise in Delta modulator using neat sketch. 6
- b) The input to a linear delta modulator having a step size  $\Delta=0.628$  is a sine wave with frequency  $f_m$  and peak amplitude  $E_m$ . If the sampling frequency  $f_s=40\text{KHz}$ . If the sinusoidal frequency is  $4\text{KHz}$  then what is the value of  $E_m$  such that slope overload will take place. 6

**UNIT-II**

3. Sketch and Explain the block diagrams of BPSK transmitter and receiver with waveforms 12
- (OR)**
4. a) Elucidate M-ary PSK and M-ary FSK systems? 6
- b) The bit stream 1101010010 is to be transmitted using DPSK. Determine the transmitted sequence and encoded sequence 6

**UNIT-III**

5. a) Derive the expression of signal to noise ratio for an Optimum filter assuming the noise as White gaussian noise. 6
- b) Discrete source transmitting one of the five symbols once in every milli second with probabilities  $1/2, 1/4, 1/8, 1/16, 1/16$  respectively. Determine Information, Entropy & Information rate. 6
- (OR)**
6. a) Prove that  $H(X,Y)=H(X/Y)+H(Y)$ . 6
- b) A binary PCM wave uses Bipolar NRZ signalling to transmit symbols 1 and 0; symbols 1 is represented by rectangular pulse of amplitude  $A$  and duration  $T_b$ . the channel noise is modelled as AWGN with zero mean and power spectral density  $N_0/2$ . Assuming that symbols 1 and 0 occur with equal probability, find an expression for the average probability of error at the receiver output using a matched filter. 6

### UNIT-IV

7. a) Design Huffman code for the given source which produces the letters A, B, C, D, E, F and G with probabilities {0.08, 0.2, 0.12, 0.15, 0.03, 0.02, 0.4}. Also determine the average length of the codeword and coding efficiency. 6
- b) For a systematic linear block code, the three parity check bits C4,C5,C6 are given by 6

$$C4 = M1+M2+M3$$

$$C5 = M1+M2$$

$$C6 = M1+M3$$

- (i) Construct generator matrix  
(ii) Construct code generated by matrix

**(OR)**

8. a) Interpret the trade-off between Signal to Noise ratio and Bandwidth with necessity graph. 6
- b) Find the generator matrix for a systematic (7,4) cyclic code if  $G(P)=P^3+P+1$ . Also obtain its Parity check Matrix. 6

### UNIT-V

9. Consider a  $(K,k,n)=(3,1,2)$  convolution code with  $g_1=(011)$ ,  $g_2=(110)$  (i) Draw encoder Block diagram (ii) Obtain encoded sequence using transform domain approach for  $m=(10101)$  (iii) Draw Code tree for the above data. 12

**(OR)**

10. What are the different methods of decoding of convolutional codes? Explain. 12

# AR18

**CODE: 18CST311**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**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 goals of Requirements Engineering ? What are the tasks performed in Requirements Engineering? 6M
- b) Develop a set of use-cases that could serve as a basis for understanding the requirements of an ATM system. 6M

**(OR)**

2. a) Explain about various software myths. 6M
- b) Discuss about the requirement elicitation and analysis process in detail. 6M

## UNIT-II

3. a) Why the concurrent model is advantageous over waterfall model. Explain with an example. 6M
- b) Discuss the concept of Unified Process Model. 6M

**(OR)**

4. a) How does Feature Driven Development works and explain how it is different from SCRUM model. 6M
- b) What are the benefits of agile working ? When to adopt an agile approach. 6M

## UNIT-III

5. Explain in detail Design Concepts. 12M

**(OR)**

6. a) Describe the golden rules for user interface design ? 6M
- b) Explain in detail about the characteristics of good software design ? 6M

## UNIT-IV

7. a) Write short notes on i) Basis path testing ii) Orthogonal testing. 6M
- b) What do you mean by boundary value analysis ? Give two examples of boundary value testing. 6M

**(OR)**

8. a) Describe unit testing and integration testing in detail? 6M
- b) List out the differences between verification and validation testing ? 6M

## UNIT-V

9. a) What is COCOMO model ? Explain in detail about COCOMO model ? 6M
- b) Explain about architectural design metrics in detail. 6M

**(OR)**

10. a) Describe about Statistical Quality Assurance. 6M
- b) What are Formal Technical Reviews? How they are conducted ? 6M



# AR16

**CODE: 16CE3014**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**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) Compare various road development plans? 7M  
b) What are the objectives of highway planning? 7M  
(OR)
2. a) Write about various road patterns? 7M  
b) Give list of reports to be submitted for highway alignment. Explain. 7M

**UNIT-II**

3. a) Define super elevation and derive an expression for super elevation. 10M  
b) What are the types of transition curves. 4M  
(OR)
4. a) Write about overtaking sight distance. 7M  
b) Calculate the extra widening required for a pavement of width 7m on a horizontal curve of radius 250m if the longest wheel base of vehicle expected on the road is 7m, design speed 80kmph. 7M

**UNIT-III**

5. a) Write about aggregate crushing test. 7M  
b) Compare various abrasion tests. 7M  
(OR)
6. a) Discuss viscosity test of bitumen. 7M  
b) What are the requirements of bitumen mixes? 7M

**UNIT-IV**

7. a) Explain the relationship between Volume, Speed and Density. 7M  
b) How the traffic volume study results are presented? 7M  
(OR)
8. a) Describe the parking study procedures. 7M  
b) Compare Collision and Condition diagram. 7M

**UNIT-V**

9. a) Explain various types of intersection with neat diagrams. 6M  
b) Write about Design procedure of a rotary intersection. 8M  
(OR)
10. a) Explain about cloverleaf with traffic movement systems. 7M  
b) What are the advantages of grade separated intersection? 7M

# AR16

**CODE: 16EE3015**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**ELECTRICAL MEASUREMENTS**

**(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) Describe the construction and working principle of PMMC instrument. Derive an expression for the deflecting torque and write advantages of PMMC. 8M  
b) The inductance of a moving iron ammeter is given by the  $L=(20+10\theta-30\theta^2) \mu H$ , where  $\theta$  is the angle of deflection in radians. Determine the deflection in the meter for a current of 8A, if the spring constant is  $10 \times 10^{-6}$  Newton meters/radians. 6M
- (OR)
2. a) With neat figure, explain the construction and operation of moving Iron instrument and derive an expression for the deflecting torque. Give the advantages of such instruments. 10M  
b) What is the difference between MI and MC instruments? 4M

## UNIT-II

3. a) Draw the equivalent circuit and phasor diagram of a potential transformer. Derive the expression for ratio and phase angle errors. 8M  
b) Explain the errors in electro dynamometer type wattmeter. 6M
- (OR)
4. a) Draw the equivalent circuit and phasor diagram of a Current transformer. Derive the expression for ratio and phase angle errors. 8M  
b) Explain why Electrodynamometer type can be used on both AC&DC. Derive equation for the Instantaneous deflecting torque? 6M

## UNIT-III

5. a) With neat sketch explain 1-Ø Moving Iron type power factor meter 7M  
b) With neat sketch explain 1-Ø electro dynamo type power factor meter 7M
- (OR)
6. a) Explain the calibration of Energy meter by Phantom loading? 7M  
b) Explain the working principle and operation of induction type energy meter 7M

## UNIT-IV

7. a) How to measure the low value of resistance by using Kelvin's double bridge? 7M  
b) Derive the equation for balance in the case of Maxwell's induction bridge. 7M
- (OR)
8. a) Derive the balance equation for Anderson's bridge and draw phasor diagram. 7M  
b) How Schering bridge is used for the measurement of unknown capacitance. Derive its balance equation. 7M

## UNIT-V

9. a) Explain the working principle of DC Crompton's Potentiometer and its applications 8M  
b) Discuss in brief the process of standardisation.? 6M
- (OR)
10. a) Describe a method of experimental determination of flux density in a specimen of magnetic material. 7M  
b) Explain the principle of operation of Ballistic galvanometer with neat diagram. 7M

# AR16

**CODE: 16ME3014**

**SET-2**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**KINEMATICS & DYNAMICS OF MACHINERY**

**(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

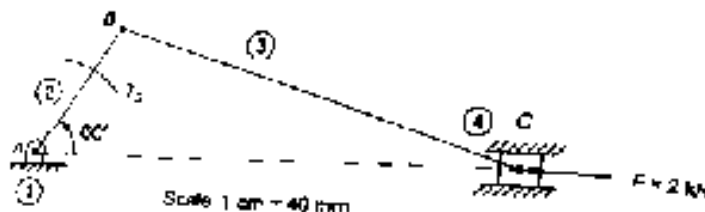
1. a) Classify Kinematic Pairs. Also show the degrees of freedom for a screw pair and a cylindrical pair with the help of neat sketches 7M  
b) Explain in what way a grass hopper mechanism is a derivation of the modified Scott-Russel mechanism 7M
- (OR)
2. a) Define the following: Mechanism, Machine, Kinematic Chain 6M  
b) Illustrate the various inversions of slider crank mechanisms by mentioning relevant applications for each inversion 8M

## UNIT-II

3. The crank of a reciprocating engine is rotating at 210 rpm. The lengths of the crank and connecting rod are 20 cm and 100 cm respectively. Find the velocity of the piston, when the crank has turned through an angle of  $45^\circ$  with the horizontal 14M
- (OR)
4. a) In the single slider crank mechanism, the crank OA rotates at 20 r.p.m. clockwise with an angle of 45 deg from IDC, and gives motion to the sliding blocks B. The dimensions of the various links are OA = 300 mm; AB = 1200 mm. Determine: 1. velocities of sliding at B 2. Angular velocity of AB 3. Linear velocity connecting rod at point D a part of distance 500 from A. 3. Linear velocity connecting rod at mid point 8M  
b) What do you mean by coriolis component of acceleration? Explain in detail. 6M

## UNIT-III

5. a) What is meant by the expression 'friction circle'? Deduce an expression for the radius of friction circle in terms of radius of journal and angle of friction. 7M  
b) In the slider crank mechanism shown below, the value of the force applied to the slider 4 is 2kN. The dimensions of the various links are AB=80 mm, BC =240 mm,  $\theta=60^\circ$ . Determine the forces on various links and the driving torque  $T_2$  7M

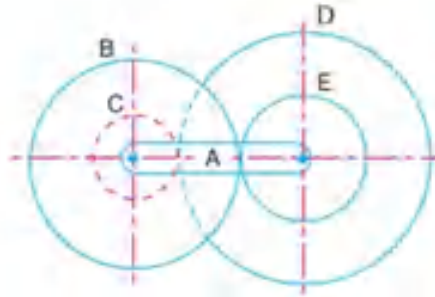


(OR)

6. a) What do you mean by gyroscopic couple? Derive a relation for its magnitude 7M  
 b) 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. 7M

#### UNIT-IV

7. In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm 'A' makes 100 r.p.m. clockwise. 14M



(OR)

8. a) What is a differential gear of an automobile? How does it function? 6M  
 b) A compound gear train consists of four gears. The number of teeth on gears A, B, C, D are 54, 75, 36, 81 respectively. Gears B and C constitute a compound gear. Determine the torque on the output shaft if the gear A transmits 9kW at 200 rpm and the train efficiency is 80% 8M

#### UNIT-V

9. a) What do you mean by fluctuation of energy and fluctuation of speed of crank-shaft? Also explain the terms maximum fluctuation of energy and maximum fluctuation of speed 6M  
 b) A Hartnell governor having a central sleeve spring and two right-angled bell crank levers moves between 290 r.p.m. and 310 r.p.m. for a sleeve lift of 15 mm. The sleeve arms and the ball arms are 80 mm and 120 mm respectively. The levers are pivoted at 120 mm from the governor axis and mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed. Determine: **1.** loads on the spring at the lowest and the highest equilibrium speeds, and **2.** stiffness of the spring. 8M

(OR)

10. a) What is the condition for isochronism in governors? Find the required condition for isochronism in case of a Hartnell governor 6M  
 b) Each arm of a porter governor is 200 mm long and is pivoted on the axis of the governor. The radii of rotation of the balls at the minimum and the maximum speeds are 120 mm and 160 mm respectively. The mass of the sleeve is 24 kg and each ball is 4 kg. Find the range of speed of the governor. Also determine the range of speed if the friction at the sleeve is 18 N 8M

# AR16

**CODE: 16EC3013**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**DIGITAL COMMUNICATIONS**

**(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) With the help of neat diagrams, explain the transmitter and receiver of PCM. 7M

- b) A DM system is designed to operate five times the Nyquist rate for a signal with 3 KHz bandwidth. Determine the maximum amplitude of a 1 kHz input sinusoid for which the DM does not have slope overload. Quantization step size is 250mV. 7M

**(OR)**

2. a) What is delta modulation and mention its drawbacks. 7M  
b) Explain about adaptive delta modulation and how it can be eliminated the draw backs of delta modulation. 7M

## UNIT-II

3. a) Explain the BFSK System with a neat block diagram. 10M  
b) Draw and explain the signal space diagram of QPSK and show the signal constellation. 4M

**(OR)**

4. a) Explain the basic structure of a binary baseband receiver with a neat block diagram. 7M  
b) Derive an expression for the probability of symbol error for the BPSK scheme. 7M

## UNIT-III

5. a) Explain the concept of entropy and its properties. 10M  
b) An analog signal band limited to 10kHz is quantized in 8 levels of a PCM system with probabilities of 1/4, 1/5, 1/5, 1/10, 1/10, 1/20, 1/20 and 1/20 respectively. Calculate the entropy and the rate of information. 4M

**(OR)**

6. a) Derive the expression for the channel capacity of a discrete memory less channel. 7M  
b) A discrete memory less source has the letters A, B, C, D, E, F and G with corresponding probabilities {0.08, 0.2, 0.12, 0.15, 0.03, 0.02, 0.4}, design Huffman code for the above source and determine the average length of the codeword and coding efficiency. 7M

#### **UNIT-IV**

7. Briefly explain about the linear block codes with an example. 14M
- (OR)**
8. a) Explain hamming code with an example. 7M
- b) Taking  $x^3+x+1$  as the generator polynomial for the (7,4) cyclic linear block code, determine the code vectors in systematic form for the following message sequences: 7M
- (i) 1011 (ii) 1111

#### **UNIT-V**

9. Explain about the convolution code in time domain and transform domain with the necessary diagrams. 14M
- (OR)**
10. a) A particular convolutional code is described as an (n, k, L) code. What do these letters n, k and L represent? Explain. 7M
- b) The generators of a 1/3 rate convolutional code are:  $g1=[1\ 0\ 0]$ ;  $g2=[1\ 0\ 1]$  and  $g3=[1\ 1\ 1]$ . Draw the encoder circuit and Trellis diagram corresponding to this code. 7M

# AR16

**CODE: 16CS3013**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, November-2021**

**SOFTWARE ENGINEERING**

**(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-I**

1. Explain the incremental process models with advantages and disadvantages (14M)  
(OR)
2. a) What is water fall model with diagram (7M)  
b) Explain software myths (7M)

## **UNIT-II**

3. a) What are functional and non functional software requirements (7M)  
b) Discuss the purpose of software requirement document (7M)  
(OR)
4. a) Write short notes on data models (7M)  
b) Write short notes on object models (7M)

## **UNIT-III**

5. a) What is software architecture (7M)  
b) Discuss design quality (7M)  
(OR)
6. a) What is interface analysis (7M)  
b) List out interface design steps (7M)

## **UNIT-IV**

7. a) Differentiate two categories of metrics (7M)  
b) Explain testing strategies (7M)  
(OR)
8. a) Discuss black box testing methods (7M)  
b) Briefly discuss COCOMO II model (7M)

## **UNIT-V**

9. Explain risk management in detail (14M)  
(OR)
10. a) Discuss about software quality (7M)  
b) What is software reliability (7M)

# AR13

CODE: 13CS3011

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, November-2021

COMPILER DESIGN  
(Common to CSE & IT)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) List the errors encountered in the analysis part of a compiler.  
b) Write the rules for construction of FOLLOW sets.  
c) What are the components of LR parser?  
d) List the two kinds of intermediate representations.  
e) Construct syntax tree for the expression  $x = a^* - b + a^* - b + a$ .  
f) List any two issues in the design of a code generator.  
g) Give an example to eliminate the left recursion with rules.  
h) What is a three-address code?  
i) What are the advantages of heap storage allocation?  
j) Define Object code.

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. a) Describe how various phases could be combined as a pass in a compiler? 6M  
b) Consider the following code fragment of C code:  $z = x * y;$  6M  
Write the output at all phases of the compiler for the above code.  
(OR)
3. a) Define regular expression. Write about the identity rules for regular expressions. 6M  
b) Briefly explain design of a lexical analyzer generator. 6M

### UNIT-II

4. a) Consider the grammar 6M  
 $E \rightarrow T E'$   
 $E' \rightarrow + T E' \mid \epsilon$   
 $T \rightarrow F T'$   
 $T' \rightarrow * F T' \mid \epsilon$   
 $F \rightarrow (E) \mid id.$   
Construct a predictive parsing table for the grammar given above.  
b) Discuss in brief about left recursion and left factoring with examples. 6M  
(OR)
5. a) Illustrate with an example how ambiguity occur in a grammar? 6M  
b) What is dangling else ambiguity? How to reduce it? 6M



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## UNIT-III

6. a) Explain three address codes and mention its types. How would you implement the three address statements? Explain with suitable examples. 6M  
b) Define symbol table. Explain about the data structures used for symbol table. 6M  
(OR)  
7. a) Translate the expression  $(a+b)*(c+d)+(a+b+c)$  into quadruple, triple and indirect triple. 6M  
b) Illustrate how to evaluate postfix expression? 6M

## UNIT-IV

8. a) Discuss in detail loop optimization. 6M  
b) What is a DAG? Explain its applications. 6M  
(OR)  
9. a) Explain in detail about the issues in the design of a code generator. 6M  
b) Explain how copy propagation can be done using data flow equation. 6M

## UNIT-V

10. a) Discuss about problems in code generation. 6M  
b) What are the various machine dependent code optimization techniques? 6M  
(OR)  
11. a) Briefly discuss about code generation algorithm. 6M  
b) Explain about register allocation and assignment 6M