AR13

CODE: 13CE2007   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2016

HYDRAULICS AND HYDRAULIC MACHINERY
(CIVIL ENGINEERING)

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

PART-A

Answer all questions   **[1 x 10 = 10 M]**

1. a) What is dimensional homogeneity?
   b) List out any two methods of Dimensional analysis
   c) Define specific energy?
   d) What is most economical section?
   e) A jet of water 5 cm in diameter is striking a vertical plate with velocity of 3 m/s. Find the force exerted on the plane
   f) Define velocity of flow
   g) Define hydraulic efficiency of impulse turbine
   h) Define specific speed of turbine
   i) Define single stage centrifugal pump
   j) What is priming?

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a   State Buckingham's π theorem.   4M

   b   Prove that the resistance F of Sphere of diameter d moving at a constant speed ν through a fluid of density ρ and dynamic viscosity μ may be expressed as F= $\frac{\mu 2}{\rho}\phi(\frac{\nu d\rho}{\mu})$ 8M

(OR)

3. a   State Raleigh's method of dimensional analysis?   4M
   b   A fluid of density ρ and viscosity μ flow through a pipe of diameter d . Show by dimensional analysis the resistance per unit area of surface is given by F=ρν² μ (Re) where ν is the mean velocity of flow and Re is the Reynolds number.   8M

UNIT-II

4. a) Show that for a most economical trapezoidal channel section the hydraulic mean depth is half of the depth of flow.   5M
   b) A trapezoidal channel has sides of slopes of 1 horizontal to 2 vertical and the slope of the bed is 1 in 1500. The area of the section is 40m². Find the dimensions of the section if it is most economical. Determine the discharge of the most economical section if C=50   7M

(OR)

5. a   What is specific energy curve? Draw the specific energy curve and derive the expression for critical depth and critical velocity.   5M
   b   A sluice gate discharges water into a horizontal rectangular channel with velocity of and depth of flow 1m/s and depth of flow of 1m. Determine the depth of flow after the jump and consequent loss in total head.   7M

CODE: 13CE2007   **SET-1**

UNIT-III

6.	a	Derive an expression for force exerted by jet on stationary curved plate?	5M
	b	A jet of water moving at 12 m/sec impinges on concave vane shaped to deflect the jet through 120^0 when stationary. If the vane is moving at 5 m/sec, find the angle of the jet so that there is no shock at inlet, what is the absolute velocity of the jet at exit in magnitude and direction and work done per second. Assume that the vane is smooth.	7M

(OR)

7.	a	Derive an expression for force exerted by jet on inclined moving flat plate?	5M
	b	A 75 mm diameter jet having a velocity of 30 m/sec strikes a flat plate , the normal of which is inclined at 45^0 to the axis of the jet . Find the normal pressure on the plate a) When the plate stationary and b) when the plate is moving with velocity of 15 m/sec and away from the jet.	7M

UNIT-IV

8.	a	Write any five comparisons between Impulse and reaction turbines.	5M
	b	A pelton wheel working under a head of 35 m supplied with 0.75 m3/sec of water, the mean bucket speed being 12m/sec. The bucket deflects the jet by 160^0 when stationary. The coefficient of Velocity is 0.98, Find the power developed and hydraulic efficiency. Neglect friction of the buckets.	7M

(OR)

9.	a	Briefly explain the Characteristic curves of the turbines.	5M
	b	A hydraulic turbine under ahead of 27 m develops 7357.5 kW running at 120 rpm .What is the Specific Speed of the turbine. What type of turbine is this. Find also the normal speed and output, if the head on the turbine is reduced 20 m.	7M

UNIT-V

|			
10.	a	Classify the centrifugal pumps	4M
	b	Explain with sketch the working of single stage centrifugal pump	8M

(OR)

11.	a	What do mean by multi stage centrifugal pump	4M
	b	A Three stage centrifugal pump has impellors 400 mm diameter and 20 mm wide at outlet. The vanes are curved back at the outlet at 45^0 and reduce the circumferential area by 10% the mano metric efficiency is 90% and the overall efficiency is 80%.Determine the head generated by the pump when running at 1000 rpm delivering 50 lt per second.	8M

Code: 13EE2009
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2016

CONTROL SYSTEMS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

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

PART-A

Answer all questions   **[1 X 10 = 10 M]**

1. (a) Define ' Transfer function'
   (b) Distinguish between closed loop and open loop control system.
   (c) What is the effect of feedback on signal to noise ratio.
   (d) What are standard test signals?
   (e) Define 'settling time'.
   (f) What is the effect of increasing the type of the system on steady state error?
   (g) What is meant by dominant pole.
   (h) Define state space, state vector.
   (i) What is the significance of centroid in Root locus.
   (j) What is compensating network.

PART-B

Answer one question from each unit   **[5 X 12=60M]**

UNIT-I

2. a) Determine the transfer function $\dfrac{X_2(S)}{F(S)}$.   [6M]
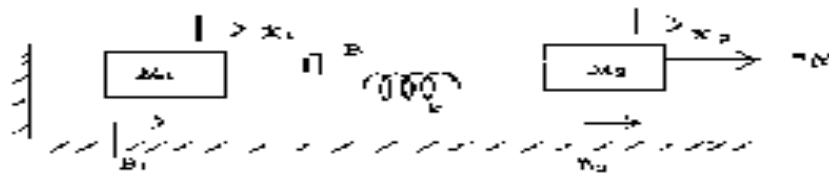
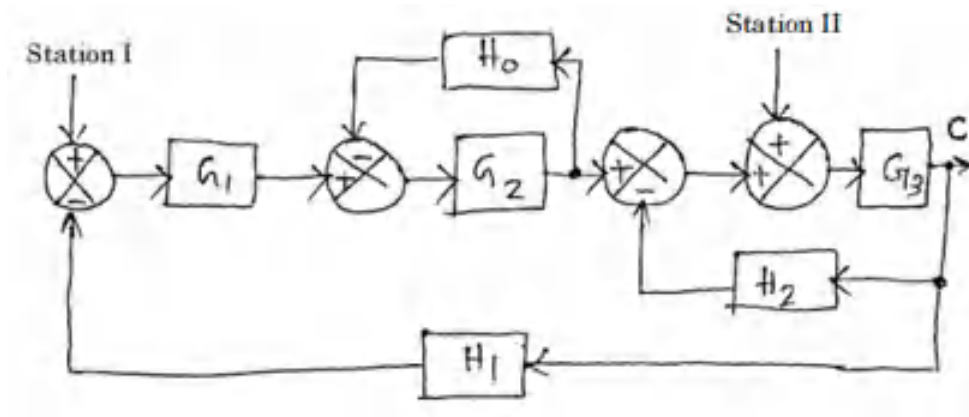   b) Derive the transfer function of field controlled DC shunt motor.   [6M]

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(OR)

3. For the system represented by the block diagram shown in fig below, evaluate the closed loop transfer function, when the input 'R' is
   (i) At station I   (ii) At station II

                                                        [12M]

UNIT-II

4. a) Explain the effect of adding zeros on the performance of over shoot, rise time and bandwidth.   [5M]

   b) A unity feed back system has an open-loop transfer function $G(S) = \frac{K}{S(S+10)}$. Determine K so that the system will have a damping ratio 0.5. For this value of K, determine peak over shoot and time for peak over shoot for the unit step input.   [7M]

(OR)

5. a) Define the error constants Kp, Kv, and Ka.   [6M]
   b) Explain about AC servomotor with relevant figures.   [6M]

UNIT-III

6. Sketch the complete Root locus, $G(s)H(s) = \frac{K}{S(S+2)(S^2+8S+20)}$ as 'K' varies from 0 to ∞.   [12M]

(OR)

7. a) Consider the sixth order system with the characteristic equation $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$. Use Routh - Hurwitz criterion to examine the stability of the system.   [6M]

   b) Determine the range of 'K' such that the characteristic equation $s^3+3(k+1)s+(7k+5)s+(4k+7)=0$ has roots more negative than 'S= -1'   [6M]

UNIT-IV

8. Consider a unity feedback open loop transfer function
   $G(s) = \dfrac{100}{s(1+0.1s)(1+0.2s)}$. Draw the bode plot and find the phase and
   gain cross over frequencies, phase and gain margin and the stability of the
   system.   [12M]

(OR)

9. Sketch the polar plot of the unity feedback system with open loop
   transfer function $G(s) = \dfrac{1}{s(s+1)^2}$. Also find the frequency at which $\left|G(j\omega)\right|$=1.   [12M]

UNIT-V

10. a) Describe about Lead-Lag compensators design procedure.   [6M]
    b) Obtain the state transition matrix for the state model whose system
       matrix 'A' is given by $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$.   [6M]

(OR)

11. a) Obtain the state model of the system described by the following
       transfer function $\dfrac{y(s)}{u(s)} = \dfrac{5}{s^3+6s+7}$.   [6M]
    b) A system is represented by the state equation $\dot{X} = AX + BU$;
       Y= CX where $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & -1 & 1 \\ 0 & -1 & -10 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 0 \\ 10 \end{bmatrix}$ and C=[1 0 0] .
       determine the transfer function of the system.   [6M]

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AR13

CODE: 13ME2010   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2016
DESIGN OF MACHINE MEMBERS - I
(MECHANICAL ENGINEERING)

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

PART-A
ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) What is difference between modulus of elasticity and modulus of rigidity?
   b) How factor of safety is determined under steady and varying load by different methods?
   c) What material is used for rivets?
   d) Define the following terms i) pitch ii) lead.
   e) Write the expression for thickness of a dished head that is riveted or welded to the cylindrical wall.
   f) What is the effect of keyway cut into the shaft?
   g) What are the applications of flexible coupling?
   h) What type of stresses are induced in the shaft?
   i) What is the function of leaf spring in automobile?
   j) How welded joint differs from riveted joint?

PART-B

Answer one question from each unit   **[5x12=60M]**
UNIT-I

2. **a** Explain distortion energy theory with neat sketch   **4M**
   b The stresses induced at a critical point in a machine component made of Steel **8M** 45C8 (S_{yt}=380N/mm^2) are as follows.
   σ_x= 100N/mm^2; τ_{xy}= 80N/mm^2; σ_y= 40N/mm^2 Calculate the factor of safety by
   i) the maximum normal stress theory ii) the maximum shear stress theory iii) the distortion energy theory

(OR)

3. a) Explain the following terms. i) Stress concentration factor   **6M**
   ii) Factors to be considered to avoid fatigue failure
   b) A bar of steel has an ultimate tensile strength of 700MPa, a yield point stress of **6M** 400MPa and fully corrected endurance limit of 220 MPa. The bar is subjected to a mean bending stress of 60MPa and stress amplitude of 80MPa. Superimposed on it is a mean torsional stress and torsional stress amplitude of 70 and 35 MPa respectively. Find the factor of safety by soderberg method

UNIT-II

4. a) Show by neat sketch the various ways in which riveted joint may fail.   **4M**
   b) A double riveted lap joint with chain riveting is to be made for joining two plates **8M** 16 mm thick. The allowable stresses are 140 N/mm^2 in tension, 110 N/mm^2 in shear and 240 N/mm^2, in crushing. Find the rivet diameter, pitch of rivets and distance between rows of rivets.Also find the efficiency of the joint

(OR)

5. a) What are the assumptions made in the design of welded joint? **4M**

   b) A steel plate , 80 mm wide and 10mm thick is joined to another steel plate by means of single transverse and double parallel fillet weld as shown in figure. The strength of the welded joint should be equal to the strength of the plates to be joined. The permissible tensile and shear stresses for the weld material and plates are 100N/mm^2 and 70N/mm^2 respectively. Find the length of each parallel fillet weld. Assume that the tensile force passes through centre of gravity of three welds. **8M**

UNIT-III

6. A steam engine of effective diameter 300mm is subjected to a steam pressure of 1.5N/mm^2. The cylinder head is connected by 8 bolts having yield point 330MPa and endurance limit at 240 MPa. The bolts are tightened with an initial pre load of 1.5 times the steam load. A soft copper gasket is used to make the joint leak proof. Assuming factor of safety 2 find the size of bolt required. The stiffness factor for copper gasket may be taken as 0.5 **12M**

(OR)

7. a) Explain various types of ends used for pressure vessel giving practical applications of each. **6M**

   b) A cast iron pipe used in a hydraulic circuit is subjected to an internal pressure of 50MPa. The inner and outer diameters of the pipe are 20mm and 40mm respectively. Determine the distribution of principal stresses across the pipe thickness. **6M**

UNIT-IV

8. Design and draw a cotter joint to support a load of 90 KN. Assume the permissible stresses as follows **12M**

   σ_l= 50MPa; τ= 60MPa; σ_c= 90MPa

(OR)

9. A shaft is supported by two bearings placed 1m apart. A 600 mm diameter pulley is mounted at a distance of 300mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having maximum tension of 2.25 KN. Another pulley 400mm diameter is placed 200 mm to the left of right hand bearing and is driven with help of electric motor and belt, which is placed horizontally to the right. The angle of contact for both the pulleys is 180^0 and μ = 0.24. Determine the suitable diameter of the solid shaft allowing working stress of 63 N/mm^2 in tension and 42 N/mm^2 in shear for the material of shaft. Assume that the torque on one pulley is equal to that on other pulley. **12M**

UNIT-V

10. A protective flange coupling is used to connect two shafts and transmit 7.5 KW power at 720 rpm. The design torque is 150% of the rated torque. The shafts and bolts are made of plain carbon steel 30C8(S_{yt}=400N/mm^2) and the factor of safety is 5. Assume S_{yc}=1.5 S_{yt} and S_{sy}=0.5 S_{yt}. The flanges are made of cast iron. Calculate i) diameter of shafts; ii) number of bolts iii) diameter of bolts. **12M**

(OR)

11. a) Explain the following i) Wahl's factor ii) Nipping of leaf spring **4M**

    b) Design a closed coil helical compression spring for a service load ranging from 2250N to 2750N. The axial deflection of the spring for the load range is 6mm. Assume a spring index of 5. The permissible shear stress intensity is 420N/mm^2 and modulus of rigidity G=84KN/mm^2. Neglect the effect of stress concentration. Draw a fully dimensioned sketch of the spring**. **8M**

Code: 13EC2009
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2016

ANALOG COMMUNICATIONS
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours   **Max Marks: 70**
PART-A
Answer all questions   **[1 X10 = 10 M]**

1   a) Draw the phasor diagram of AM wave?
    b) Define sensitivity and selectivity of a receiver?
    c) What is Carsons Rule?
    d) What is the maximum efficiency for transmission in DSBFC modulation?
    e) Define modulation index for FM?
    f) What is the function of AFC?
    g) What is the purpose of limiter in FM receiver?
    h) What is the SNR for FM?
    i) Define equivalent noise temperature?
    j) Calculate the figure of merit of AM when the modulation index is 60%.
PART-B
Answer One Question From Each Unit   **[5X12=60M]**
UNIT-I
2   a) What is amplitude modulation? Derive the expression for modulation index and
       transmitted power in terms of carrier power and modulation index?   [5M]
    b) The signal m(t) = 2Cos(400πt)+Sin(800πt) modulate a carrier 2 Cos(2X10^{6}t). The
       modulation index is   m=0.6. Find out the power in the carrier and sideband
       components of the modulated signal.   [7M]
(OR)
3   a) Draw and explain the circuit diagram of switching modulator?   [6M]
    b) An AM modulator has an output given by S(t)= A cos(2πX300t)+B cos(2πX200t)+C
       cos(2πX400t). The carrier power is 100 watts and the efficiency is 40%. Find the
       values of A, B, C and Modulation index.   [6M]
UNIT-II
4   a) Explain about the quadrature null effect of coherent detector?   [6M]
    b) Consider the message signal m(t) containing the frequency components 100, 200 and
       400 Hz. This message signal is applied to an SSB Modulator together with a carrier at
       100kHz with only USB retained. The coherent detector employed at the receiver uses a
       local oscillator that gives a sine wave of frequency 100.02kHz. Determine the
       frequency components of the detector output.   [6M]

(OR)

5   a) Explain the concept of quadrature carrier multiplexing?   [5M]

b) Considering the modulating and carrier waves as sinusoids, explain the single tone modulation of DSBSC wave with necessary expressions, wave-forms and spectrums. Find the percentage of power saved in DSBSC when compared with AM system.   [7M]

UNIT-III

6   a) Explain the principle of Angle Modulation. Derive and explain phase deviation, Modulation index, frequency deviation and percent modulation.   [7M]

b) An Armstrong modulator is required in order to transmit an audio signal of bandwidth 500Hz to 20 kHz. The narrowband phase modulator used for this purpose utilized crystal controlled oscillator to provide a carrier frequency of fc_1=0.25MHz. The output of the narrowband phase modulator multiplied by a multiplier with multiplication constant $n_1$and passed to mixer with local oscillator frequency of fc_2=10.5MHz. The desired FM wave at the transmitter output has a carrier frequency of 90 MHz, and frequency deviation Δf =75kHz, which is obtained by multiplying the mixer output frequency with n_2 using another multiplier. Find n_1 and n_2. Assume that NBFM produce deviation of 25 Hz for the lowest baseband signal.   [5M]

(OR)

7   a) Explain the principle of Armstrong FM generation. How is narrow band FM converted to wideband FM to achieve the desired carrier frequency and deviation?   [5M]

b) Give the procedure to determine the effective bandwidth of an FM signal?   [4M]

c) Compare wideband FM and Phase modulation methods?   [3M]

UNIT-IV

8   a) Draw the block diagram of AM transmitter and explain the function of various stages with respective to wave forms?   [7M]

b) In a broad cost super heterodyne receiver having an RF amplifier. The loaded Q of the antenna coupling circuit is 100. If the intermediate frequency is 455kHz, calculate image frequency and its rejection ratio at 1000kHz and 10 MHz.   [5M]

(OR)

9   a) Explain how the phase discriminator demodulate the FM Wave?   [8M]

b) What is AGC? What are its functions?   [4M]

UNIT-V

10 a) Explain how pre-emphasis and de-emphasis circuits are used to improve the threshold?
                                                                                  [7M]

b) A PAM TDM system transmits 10 messages, each having pulse width of 120µsec, in 1.4 msec. Find the guard time. If the same guard time is maintained and 15 PAM messages are to be transmitted, how narrow the pulses should be?   [5M]

(OR)

11 a) Derive an expression for SNR in coherent reception with DSBSC?   [6M]

b) The carrier reaching an envelope detector in an AM receiver has an RMS value equal to 1volt in the absence of modulation. The noise at the input of the envelope detector has a PSD equal to 10^{-3}Watts/Hz.If the carrier is modulated to a depth of 100% and message bandwidth, W=3.2kHz, Find $[SNR]_o$.   [6M]

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AR13

CODE: 13CS2005   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July, 2016

SOFTWARE ENGINEERING
(COMMON TO CSE & IT)

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

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1.   a)   Explain Software Myths?
   b)   Define Process Pattern.
   c)   Explain phases of the unified process?
   d)   What are various phases of SDLC?
   e)   Define cohesion and Coupling?
   f)   Explain Unit Testing?
   g)   Define Cyclomatic Complexity?
   h)   What is V&V?
   i)   Explain Regression Testing?
   j)   Define Function Point?

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2.   a)   Describe in detail about personal and team process models.   [6M]
   b)   Compare the waterfall, incremental process and evolutionary process models with   [6M]
           respect to methodology, advantages and disadvantages.

(OR)

3.   a)   Define Software Engineering and write about characteristics of Software   [6M]
           Engineering?
   b)   Explain the various CMMI levels.   [6M]

UNIT-II

4.   a)   What are the differences between the functional and non functional requirements?   [6M]
   b)   Write short notes on the following: [6M]
           i) Context models
           ii) Behavioral models

(OR)

5.   a)   What is software requirements document?   [6M]
   b)   Explain briefly Requirements elicitation and analysis?   [6M]

UNIT-III

6. a) What are the characteristics of a good design? Explain in detail.   [6M]
    b) What are the fundamental design concepts? Discuss.   [6M]

(OR)

7. a) Discuss the classification of architectural styles.   [6M]
    b) Explain about golden rules in interface design.   [6M]

UNIT-IV

8. a) What is the overall strategy for software testing?   [6M]
    b) Explain various types of Software Metrics.   [6M]

(OR)

9. a) What is meant by integration testing? Discuss about Top-down integration and   [6M]
        Bottom-up integration.
    b) Distinguish between Black-Box testing and white-box testing   [6M]

UNIT-V

10. a) Explain about statistical software quality assurance.   [6M]
     b) Describe about ISO 9000 quality standards.   [6M]

(OR)

11. a) When do we conduct the Formal Technical Reviews? What are the guide lines?   [6M]
     b) Explain RMMM Plan   [6M]