(28)

(a) Discuss Mutual-exclusion implementation with test and set instruction

(b) State the Critical Section problem. Illustrate a software based solution to the Critical Section problem. 7 x 1 = 7

5. **Attempt any *one* part of the following:**

(a) Consider the following process

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Draw Gantt chart and find the average waiting time and average turnaround time

(i) FCFS Scheduling

(ii) SRTF Scheduling

(b) Consider the following process

Process	Arrival Time	Burst Time	Priority
P1	0	6	3
P2	1	4	1
P3	2	5	2
P4	3	8	4

Draw Gantt chart and find the average waiting time and average turnaround time

(i) SRTF Scheduling

(ii) Round robin (time quantum 3)

6. **Attempt any *one* part of the following:** 7 x 1 = 7

(a) What do you mean by Belady's anomaly ? Which algorithm suffers from Belady's anomaly and how can it be rectified?

(b) What is Thrashing? What is the cause of Thrashing ? How does the system detect Thrashing? What can the system do to eliminate this problem?

7. **Attempt any *one* part of the following:** 7 x 1 = 7

(a) Discuss the Linked, Contiguous and Index and multilevel Indexing file allocation schemes. Which allocation scheme will minimize the amount of space required in directory structure and why?

(b) Write short notes on :

i) I/O Buffering

ii) Disk storage and scheduling

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Printed Pages: 02

Sub Code: REC405

Paper Id: 131414

Roll No.

B. Tech.

(SEM IV) THEORY EXAMINATION 2017-18

INTRODUCTION TO MICROPROCESSORS

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a) Describe the logic devices for interfacing.

b) Describe the function of ALE signal.

c) Explain the programming techniques of Looping and Counting.

d) Explain the difference between RLC and RAL.

e) What is a subroutine? Explain the concept of multiple calling for a subroutine.

f) List the various modes of 8254/ 8253 programmable interval timer IC.

g) Explain the function of DMA controller.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a) Draw the block diagram of 8085 microprocessor and explain its various blocks and signals. Explain the programming model of 8085. Explain the flag register bits.

b) Describe the concept interfacing input and output devices with 8085 microprocessor by interfacing 8-DIP switches as input devices and Seven-segment LED display as output device to 8085.

c) Describe the various Interrupts of 8085 microprocessor. What are vectored interrupts? Describe the vector address of 8085 interrupts.

d) Explain the concept of BCD addition using a suitable example. Write a assembly level program for the addition of two unsigned BCD numbers.

e) Explain the function of Programmable peripheral interface IC 8255 with the help of a block diagram. Describe the Ports of IC8255 with their available modes of operation.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain how the op-code is fetched from the memory. Explain the op-code fetch cycle with the help of a timing diagram

(b) Differentiate between absolute decoding and partial decoding schemes of address decoding. Design a scheme to generate Read/Write control signals for memory and I/O from microprocessor signals IO/M', RD', WR'.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a) (i)The memory location 2050H holds the data byte F7h. Write instructions to transfer the data byte to the accumulator using thee different opcodes: MOV, LDAX, and LDA.

(ii) Explain the various addressing modes of 8085 with suitable examples.

(30)

(b) Classify the instruction set of 8085 on the basis of their functions. Write the different instructions and explain their function.

5. **Attempt any *one* part of the following:** **7 x 1 = 7**

(a) Draw the flowchart and write a program and for a zero-to-nine (module ten) counter.

(b) Explain the concept of stack memory and stack pointer. Describe the various conditional call and conditional return instructions.

6. **Attempt any *one* part of the following:** **7 x 1 = 7**

(a) A multiplicand is stored in memory location 2050H and a multiplier is stored in the location 2051H. Write a main program to transfer the two numbers from memory locations to the HL registers and store the product in the output buffer at 2090H. Write a subroutine to multiply two unsigned numbers placed in registers H and L and return the result in to the HL pair

(b) (i) Explain the function of instructions: XCHG, XTHL, SHLD, and SPHL.

(ii) Registers BC contain 8538H and registers DE contain 62A5H. Write instructions to subtract the contents of DE from the contents of BC and place the result in BC.

7. **Attempt any *one* part of the following:** **7 x 1 = 7**

(a) Describe the block diagram of 8259A programmable interrupt controller and explain each block. Describe the priority modes of the 8259.

(b) Describe the function of BIU and EU in the architecture of 8086 microprocessor. Explain the Register organization of 8086 microprocessor. Explain the function of signals: TEST', LOCK'.

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Printed Pages: 03
Paper Id: 120416

Sub Code: REE409
Roll No.

B TECH
(SEM IV) THEORY EXAMINATION 2017-18
ELECTRICAL MACHINES AND CONTROLS

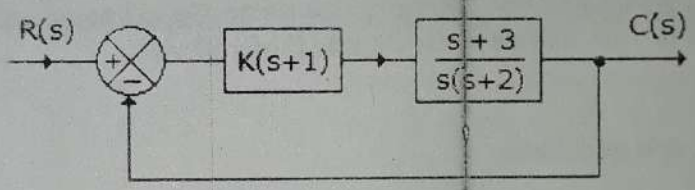
MM.-70

TIME: 3:00HRS

SECTION A

Q.1-Attempt all the question: - (2*7=14)

a) Write down the equation for frequency of emf induced in an Alternator.
b) Why are Alternators rated in kVA and not in kW?
c) What is meant by armature reaction in Alternators?
d) What is meant by synchronous impedance of an Alternator?
e) Name the various methods for predetermining the voltage regulation of 3-phase Alternator.
f) What are different types of Control Systems?
g) For the system in the given figure the characteristic equation is



SECTION B

Q.2- Attempt any *three* questions (7*3=21)

a) A 10 KVA, 200/400 V, 50 Hz, single phase transformer gave the following test results:
Open circuit testfrom L.V. side: 200 V, 1.3 A, 120 W
Short circuit test from H.V. side: 22 V, 30 A, 200 W
   i. Draw the equivalent circuit of the transformer referred to H.V. side.
   ii. The efficiency of the transformer at 90% loading with load 0.8 power factor.

a) What is an autotransformer? State its merits and demerits over two winding transformer. An 1100/2200 V single phase transformer is rated at 1000KVA; if the two winding are connected in series to form an autotransformer determine its voltage and power.

b) Why is starter necessary for starting of a dc motor? Explain briefly working of 3-point starter. A 220 V d.c. shunt motor having an armature resistance of 0.25 Ω carries an armature current of 50 A and runs at 600 r.p.m. if the flux is reduced by 1% by field regulator, find the speed of motor, assuming the torque to remain same.

c) Derive the equation for the torque developed by a 3-phase induction motor. Draw a typical torque-slip curve and deduce the condition for maximum torque.

d) Determine the voltage regulation of 3-phase, star connected alternator of terminal voltage $2000\sqrt{3}$ Volt producing a current of 100 A at
   (i) 0.8 load p.f. lagging
   (ii) 0.707 p.f. leading
The full load current of 100 A is produced on short-circuit test on a field excitation of 2.5 Amp. An emf of 500 V is generated on open circuit test on the same excitation current of 2.5 Amp. (Given $R_a = 0.8\Omega$)

SECTION C

Q.3- Attempt any one questions (7*1=7)

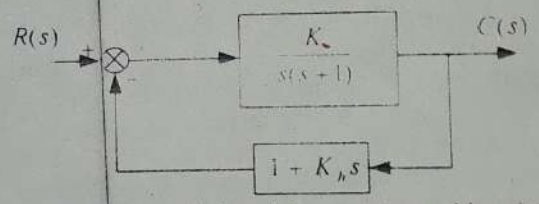
a) What is two-phase servomotor? Draw its torque-speed characteristics for various control voltages

b) A unity feedback control system $G(s)=\dfrac{K(s+1)(s+2)}{(s+0.1)(s-1)}$ has an open loop transfer function

Using the Routh stability criterion, determine the range of value of K for which the close loop system has 0, 1 or 2 poles in the right half of s-plane.

Q.4- Attempt any one questions (7*1=7)

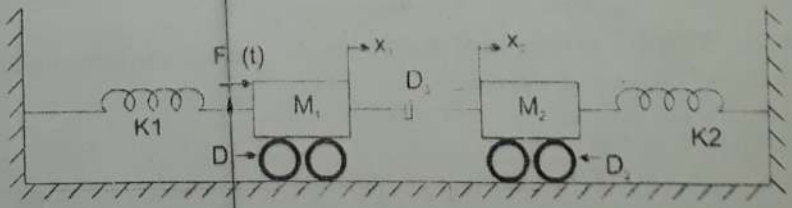
a) For the system shown below, determine the values of gain K and velocity feedback constant K_h so that the maximum overshoot is 0.2 and the peak time is 1 sec. With the obtained values of K and K_h, obtained the rise time and settling time.



b) Differentiate between open loop and closed loop system with suitable examples. What are the advantages of feed-back?

Q.5- Attempt any one questions (7*1=7)

a) Obtain the differential equation of the mechanical system and Sketch the mechanical equivalent representation for the system shown below.



b) A unity feedback system has an open-loop transfer function

$G(s)=\dfrac{K}{s(s^2+4s+13)}$. Sketch the root locus plot of the system determining the following:–

(i) Centroid , number and angle of asymptotes.
(ii) Break away point if any
(iii) The value of K and the frequency at which the root locus cross the jω-axis.
(iv) Angle of departure of root locus from the poles

Q.6- Attempt any one questions (7*1=7)

a) Discuss the affect of following controllers on the second order control system:
(i) PI controller
(ii) PD controller
(iii) Rate-feedback controller.

b) Consider the system with the following open loop Transfer function

$$G(S) = \frac{K}{S(T_1 S + 1)(T_2 S + 1)}$$

Determine stability of system using NyquistCriterian for

i) the gain K is small.

ii) The gain K is large

Q.7- Attempt any one questions **(7*1=7)**

a) Draw the Bode plot for the transfer function

$$G(s) = \frac{75(1+0.2s)}{s(s^2+16s+100)}$$

(i) Gain cross over frequency

(ii) Phase cross over frequency

(iii) Gain Margin and Phase margin

(iv) Stability of the given system

b) Determine the resonant frequency wr, resonant peak Mp and Bandwidth of system whose T.F is given by

$$\frac{C(S)}{K(S)} = \frac{5}{S^2 + 2S + 1}$$

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Printed Pages: 02
Paper Id: 140410

Sub Code: RME401
Roll No. | | | | | | | | | | |

B. TECH.
(SEM IV) THEORY EXAMINATION 2017-18
MEASUREMENT AND METROLOGY

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a) Define Metrology.

b) What is sensitivity?

c) Explain function of sensors.

d) List some of the instruments for temperature measurement.

e) Define Zero Error.

f) Differentiate between sensor and transducer.

g) Define range and span. What is the difference between both?

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a) Explain with a block diagram the generalized measurement system, showing its various stages with suitable example.

b) Define various types of sensors and along with their applications, advantages, and limitations.

c) Enlist some of the pressure measuring devices for low pressure. Discuss the working principle of McLeod Pressure Gauge.

d) Define Interferometry. On what principles interferometry works? Discuss some of the applications and usage of Interferometry.

e) What is CMM? Explain with a neat sketch its constructional features. Discuss types of CMM. Also explain its applications and advantages.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

a) Explain Taylor's principle of gauge design. Determine the dimensions of hole and Shaft for a fit $30H_7/hg$. Also determine the allowance and maximum clearance.

b) Explain in brief:

i. Limits Fits and Tolerance.

ii. Comparators.

4. Attempt any *one* part of the following: **7 x 1 = 7**

a) Write short notes on

i. Johansson's Microkrator

ii. Accelerometer

iii. Strain rosettes.

b) With a neat sketch explain the construction and working of optical pyrometers. Discuss its significance in measurement.

5. **Attempt any *one* part of the following:** **7 x 1 = 7**

a) Describe the constructional details of Autocollimator. How it is useful in finding straightness, flatness and roundness of a surface?

b) Elaborate with neat sketch:

i. Hole basis system.

ii. Shaft basis system.

6. **Attempt any *one* part of the following:** **7 x 1 = 7**

a) Classify different types of strain gauges and their application. Explain the working of Wheatstone bridge under balanced and unbalanced conditions?

b) Discuss in brief

i. Stroboscope

ii. Thermistor

iii. Seismic instruments

7. **Attempt any *one* part of the following:** **7 x 1 = 7**

a) For a platinum resistance thermometer, the resistance at 22°C is 130Ω the resistance coefficient for temperature for wire is 0.004Ω/Ω°C find the resistance at 40°C and temperature at which resistance will 8.5Ω.

b) A strain gauge is bounded to a 0.2m long workpiece that has a cross sectional area of $6cm^2$ and E = $210GN/mm^2$ and unstrained resistance is 240Ω and G.F = 2.2. When load is applied the resistance of this plate changes by 0.013Ω. Calculate the change in length and the force applied.

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Printed Pages: 2
Paper Id: 140411

Sub Code: RME402
Roll No.

B.TECH
(SEM IV) THEORY EXAMINATION 2017-18
MANUFACTURING SCIENCE & TECHNOLOGY-I

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. What are the major classifications of manufacturing processes?
b. What is recrystallization temperature?
c. What is forging? What are the common forging processes?
d. What is the angle of bite for rolling and on what does it depend?
e. Distinguish between blanking and punching process.
f. Compare hot chamber and cold chamber die casting process.
g. What is the unconventional metal forming process? Enlist unconventional metal forming processes.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. List and explain different defects in rolling process. Also list their causes and remedies.
b. What is the use of power metallurgy process? Discuss the various steps involved in power metallurgy process.
c. What is deep drawing? List and explain the different defects in deep drawing operation.
d. How does compound die differ from progressive die? Explain the compound die with suitable diagram.
e. What are the advantages of bottom gating system? Derive the expression for the bottom gating system, time taken to fill the mould cavity.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a) What is centrifugal casting? Explain about different types of centrifugal casting methods.
(b) Enumerate some common casting defects. Explain their causes and remedies.

4. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Briefly describe with neat sketch, working and application of explosive forming.
(b) Write short note on: 3-2-1 principle of location & jigs and fixtures.

5. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Define trimming, shaving, notching, lancing and nibbling operations.
(b) Derive an expression of radial stress in deep drawing of a cup.

6. Attempt any *one* part of the following: **7 x 1 = 7**

(a) What is wire drawing operation? In a wire drawing operation initial wire diameter is 6 mm and final wire diameter is 5 mm, the half die angle $\alpha = 10^0$.

Find the drawing stress considering friction if $\mu = 0.1$ and $K = 18$ MPa. Also calculate the maximum possible reduction.

(b) Briefly explain the principle and mechanism of rolling process. Calculate the bite angle when rolling 15 mm thick plate using rolls of 400 mm diameter. Final thickness of plate is 12 mm.

Attempt any *one* part of the following: **7 x 1 = 7**

(a) Derive an expression for average pressure for forging of a disc with sticking friction condition.

(b) A strip of lead with initial dimension $24 \times 24 \times 150$ mm is forged between two flat dies to a final size of $6 \times 96 \times 150$ mm and if the coefficient of friction is 0.25, determines the forging force. The average yield stress of lead in tension is 7 N/mm^2.

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Printed pages: 03

Paper Id: 140412

Sub Code: RME 403

Roll No:

B.Tech.

(SEM. IV) THEORY EXAMINATION 2017-18

APPLIED TERMODYNAMICS

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections.

2. If require any missing data: then choose suitably.

3. Use of Steam Tables and Mollier chart is permitted.

SECTION A

1. **Attempt *all* questions in brief.** 2 x 7 = 14

a. Write the difference between the Otto cycle and Diesel cycle.

b. What is meant by cogeneration in steam power plant?

c. Enumerate the characteristics of good fuel.

d. How equivalent evaporation is used for comparison of boilers?

e. Define degree of reaction and state point locus.

f. What is enthalpy of formation?

g. Differentiate between gas turbine and I.C. engine.

SECTION B

2. **Attempt any *three* of the following:** 7 x 3 = 21

a. The following data relates to two stroke oil engine during the trial: Room temperature = 21 ℃, bore = 20 cm, stroke = 26 cm, speed = 400 rpm, brake drum diameter = 120 cm, rope diameter = 3 cm, net brake load = 460 N, indicated mean effective pressure = 2.8 bar, oil consumption 3.7 kg/h, calorific value of oil = 42000 kJ/kg of fuel, mass flow of cooling in jacket = 456 kg/h, rise in temperature of cooling water 28 ℃, temperature of exhaust gas entering in calorimeter = 320 ℃, temperature of exhaust gas leaving from calorimeter = 220 ℃, rise in temperature in calorimeter water = 8 ℃, flow rate cooling water in calorimeter is 8 kg/min. Calculate indicated power, brake power, mechanical efficiency and brake thermal efficiency. Also draw up heat balance sheet.

b Explain the working procedure of the Orsat apparatus for flue gases determination with suitable sketch. Also determine the air fuel ratio of C_3H_8 with 150 percent theoretical air supplied

c. Explain the principle of working of steam impulse turbine. Why are steam turbines compounded? Explain the pressure-velocity compounding with neat diagram.

d. Calculate the mass of the flue gases flowing through chimney when the drought produced is equals to 1.9 cm of water. Temperature of the flue gas is 290 ℃ and the ambient temperature is 20 ℃. The flue gas formed per kg of fuel burnt are 23 kg. Neglect the losses and take the diameter of the chimney as 1.8 m.

e. Define the Steam Nozzle. Also derive the expressions for **velocity** of steam and **discharge** through steam nozzle.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) Derive an expressions of efficiencies of Carnot cycle and Brayton cycle with suitable assumptions.

(b) In an air standard diesel cycle with compression ratio 14, the conditions of air at the start of compression stroke are 1 bar 300K. After addition of heat at constant pressure, the temperature rises to 2775K. Determine the thermal efficiency of the cycle, net work done per kg of air and the mean effective pressure. (take: R= 287 J/kg K and γ=1.4)

4. Attempt any *one* part of the following: 7 x 1 = 7

(a) A boiler which was originally designed to use coal as the fuel is converted into oil fired boiler. The details are: Equivalent evaporation from and at 100 °C using coal = 8.5 kg/kg of coal. Equivalent evaporation from and at 100 °C using oil = 14.5 kg/kg of oil. C.V. of oil = 42000 kJ/kg. Assuming thermal efficiency of the boiler to be same before and after conversion, find (i) Calorific Value of coal, (ii) Thermal efficiency of the boiler, (iii) Mass of oil consumed equivalent to 1000 kg of coal burnt.

(b) A simple Rankine cycle works between pressures 28 bar and 0.06 bar, the initial condition of steam being dry saturated. Calculate the dryness fraction, cycle efficiency, work ratio and specific steam consumption.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) Define the blade efficiency. Derive an expression for maximum blade efficiency for an impulse turbine. $(\eta_{blade})_{max} = \cos^2\alpha$

(b) In an impulse turbine the steam issues from the nozzle with a velocity of 1200