Code No. 5208

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I - Semester (Main) Examination, December 2015

Subject : Structural Engineering Design and Detailing – II (Steel)

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A and answer any one question from each unit of a Part-B.

PART – A (25 Marks)

1 Under what circumstances plate girders are used instead of rolled steel beams.
2 What is economical depth of a plate girders? How is it fixed?
3 How the flanges of a plate girder are proportional?
4 Explain the term “maximum static wheel load” as applied to crane girders.
5 Explain the condition to be considered for finding maximum bending moment in the design of gantry girder.
6 List the different types of bearings used for bridges.
7 Draw typical cross section of a deck type plate girder bridge, showing the details.
8 How the impact loads are handled in the bridge design?
9 How is the economical span of a bridge fixed?
10 List the different types of I.S standard railways loadings.

PART – B (50 Marks)

Unit-I

11 A welded plate girder is made of a web 2000 mm x 20 mm and flange 500 mm x 40 mm thick. The span of the girder is 25 m and total load per metre inclusive its own weight is 27 kN/m. Design a suitable welded connection between the web and the flange and also design the bearing stiffeners and intermediate stiffness. The shear in weld should not exceed 110 N/mm^2.

OR

12 Design a welded plate girder, simply supported to carry a super imposed distributed load of 50 kN/m. In addition to this the girder supports two concentrated loads of 600 kN each on the top flange at 5 m from ends. The effective span of the girder is 15 m. The compression flange of the girder is laterally supported. End bearing stiffeners need not be designed use fe.410 steel. Use Limit State design.

Unit-II

13 Design a simply supported gantry girder to carry one electric overhead travelling crane, given span of crane girder = 16m, crane capacity = 250 kN, self weight of crane girder, excluding trolley = 200 kN, self weight of trolley = 50 kN, minimum hook approach = 1.0m, distance between wheels = 3.5m, and self weight of the rails = 0.3kN/m

OR

14 Design the rocker bearing for the following data: Effective span of the plate girder deck type bridge = 32 m (single track main line broad guage). Reaction due to DL+LL+IL=1000kN, vertical load due to wind = 200 kN, lateral load due to which on the bearing = 80 kN. Assume the longitudinal loads from bridge rules.

Unit-III

15 Design a deck type plate girder bridge, for broad guage single main line loading, if the effective span = 20 m. Illustrate the details by neat sketches.

OR

16 Design a through type truss bridge (single lane) for broad guage main line loading. The effective span of the bridge = 25 m. Assume suitable data wherever necessary. Neatly sketch the design details.

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Code No. 5219

FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I – Semester (Main) Examination, December 2015

Subject: Power System Operation and Control

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 List out state, control and disturbance variables in load flow studies. 3

2 Formulate Y_{BUS} for the network shown in Fig. 1. The values given are admittances. 3

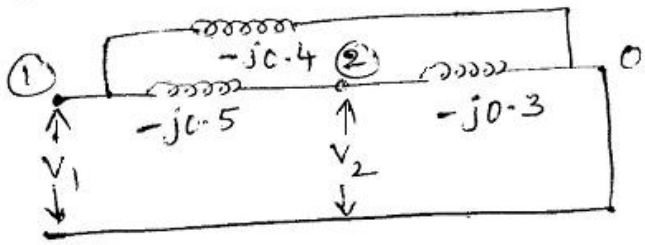

fig.1

3 Draw the heat rate curve of a thermal plant. 2

4 Define flat frequency control. 2

5 What is the importance of load flow study? 2

6 Write the advantages of pool operation. 2

7 List out the methods of improving steady state stability limit. 3

8 A 50 Hz, 4-pole turbo generator rated 20 MVA, 11 kV has an intertia constant of H=9.0 kW.Sec/KVA. Find the acceleration if the input less the rotational losses is 26,800 hp and the electrical power developed is 16 MW. 3

9 Define the steady state stability criterion of a given system. 2

10 Write the objectives of FACTS controllers. 3

PART – B (5x10 = 50 Marks)

11 For the system shown in Fig. 2, the data is given in Table 1. Find Q_2, ¢$_2$, V_3, V_4 at the end of first G-S iteration. Given: $0.2 \le Q_2 \le 1$.

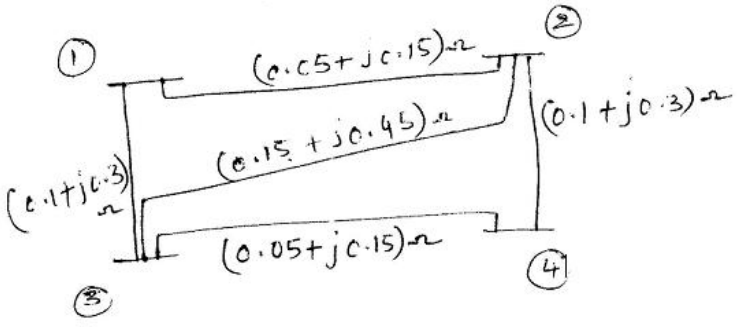

Fig.2

Table 1 – Input data

Bus	P_i(P.U)	Q_i (P.U)	¬$_i$ (P.U)	Remarks
1	--	--	$1.04 \angle 0^\circ$	Slack Bus
2	0.5	--	1.04	PV Bus
3	-1.0	0.5	--	PQ Bus
4	0.3	-0.1	--	PQ Bus

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12 a) Develop load flow equations and explain decoupled load flow method. 5
b) Compare GS method and NR method of load flow solutions. 5

13 a) Derive an expression for optimum load distribution between the Planks with transmission losses. 6
b) Incremental fuel costs in Rs/MWh for a plant consisting of two units are given by $\frac{dF_1}{dP_1}$ = 0.008 P_1 + 8; $\frac{dF_2}{dP_2}$ = 0.0096 P_2 + 6.4. The total load varies from 250 to 1250 MW and the maximum and minimum loads on each unit are to be 625 and 100 MW respectively. Find the incremental fuel cost and allocation of load between units for minimum cost of various total loads. 4

14 Develop complete block diagram of load frequency control of an isolated power system. 10

15 a) Explain equal area criterion. 5
b) Find the steady state power limit of a system consisting of a generator equivalent reactance 0.5 pu connected to an infinite bus through a series reactance of 1.0 pu. The terminal voltage of the generator is held at 1.2 pu and the voltage of the infinite bus is 1.0 pu. 5

16 a) With neat diagram explain the principle of operation of STATCOM. 5
b) Explain reactive power generation by synchronous generators. 5

17 Write short notes on:
a) Automatic voltage regulator 5
b) Mathematical formulation of voltage stability problem. 5

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Code No. 5228

FACULTY OF ENGINEERING

B.E. 4/4 (Inst.) I – Semester (Main) Examination, December 2015

Subject : Virtual Instrumentation

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part–A. Answer any FIVE questions from Part–B.

PART – A (25 Marks)

1 What is data flow technique?

2 What are the features of SCXI?

3 Explain File I/O VI.

4 What are the advantages of PCMCLA?

5 What are local variables?

6 Explain timing interrupts in DMA.

7 Explain graphical programming in VI.

8 Compare RS232 AND RS485 interfacing buses.

9 What are the disadvantages of GPIB.

10 Explain clusters in VI programming.

PART – B (50 Marks)

11 Explain the block diagram of Virtual Instrumentation in detail.

12 Explain image acquisition and processing application in VI.

13 Explain VISA and IVI in detail.

14 a) Timers and counters used in VI programming.
b) PC hardware structures in VI data acquisition.

15 Explain any three VI programming techniques in detail.

16 Compare the graphical programming with the conventional programming in VI.

17 Explain motion control application in LAB view.

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Code No. 5235

FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I - Semester (Main) Examination, December 2015

Subject : Computer Networks

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 What are the features of OSI model? 3

2 What do you mean by framing? 2

3 What are the differences between spanning tree algorithm and source routing algorithms? 3

4 Explain two army problems. 2

5 Compare ALOHA and slotted ALOHA. 2

6 What are wireless LAN protocols? 2

7 Describe briefly the architecture of ATM. 3

8 What is the function of routing table? 2

9 What are three parts of URL? 3

10 Compare SNMP, SMTP protocols. 3

PART – B (50 Marks)

11 a) What is CSMA protocol? Explain non-persistent CSMA, 1 persistent CSMA persistent protocols and compare their performance. 6

b) Explain routing in circuit switched and packet switched networks? 4

12 a) What is network topology? Explain mesh topology. An organization has a fully connected mesh consisting of 7 devices. Calculate total no of communication links and no. of ports for each device. If ring is used instead of mesh, what are the advantages and limitations. 6

b) Explain TCP/IP model. What are advantages of TCP/IP over OSI model. 4

13 a) Explain interior and exterior gateway routing protocols. 5

b) Explain leaky bucket and token bucket algorithms. What are the differences between them? 5

14 a) Explain distance vector routing algorithm. 5

b) Differentiate between IEEE 802.3, 802.4, 802.5 standards. 5

15 a) Explain the elements of transport layer. 5

b) What is IPV6? Explain its advantages over IPH, explain its frame format? 5

16 a) Describe authentication protocols in detail. 5

b) Describe architecture of E-mail and World Wide Web (WWW). 5

17 Write short notes on : 10

a) CIDR

b) ARQ protocols

c) X.25

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Code No. 5244

FACULTY OF ENGINEERING

B.E. 4/4 (Mech.) I – Semester (Main) Examination, December 2015

Subject: Thermal Turbo Machines

Time: 3 Hours **Max.Marks: 75**

Note:

i. Answer all questions in part-A and any five questions from Part-B
ii. Answer to the questions of Part-A must be at one place and in the same order as they occur in the question paper
iii. Candidate is advised not to attempt more questions than required.
iv. Missing data if any may suitably be assumed
v. Use of data of book is permitted
vi. Unless otherwise stated ¥=1.4, Cp=1.005 kJ/kg for air.

PART – A (Compulsory) [10×2.5=25 Marks]

1 State adiabatic energy equation in various forms

2 Prove that maximum enthalpy on Rayleigh curve is a function of Mach number.

3 Explain flow through convergent-divergent nozzle and how normal shocks are formed

4 What are the applications of Fanno curve

5 Define surging of a rotary compressor and what are the affects of it.

6 What are the differences between axial flow compressor and centrifugal compressor

7 Draw pressure-velocity variations across the blades in pressure compounded impulse turbine

8 Explain the differences between impulse steam turbine and reaction turbine.

9 Draw the configuration diagram and temperature-entropy diagram for open cycle gas turbine with regeneration

10 List out the merits and demerits of solid propellant over liquid propellant

PART – B [5×10=50 Marks]

11 Air at p_o=10 bar and T_o=400 K is supplied to a 50 mm diameter pipe. The friction factor for the pipe for the pipe surface is 0.002. If the Mach number changes from 3.0 at entry to 1.0 at the exit diameter. Determine i) the length of the pipe and ii) the mass flow rate.

12 The conditions of a gas in a combustion chamber at entry are; p_1=0.343 bar, T_1= 310K and c_1= 60m/s. Determine the Mach number, pressure, temperature and velocity at the exit if the increase in stagnation enthalpy of the gas between entry and exit is 1175 kJ/kg.

13 a) Distinguish between reciprocating compressor and rotary compressor.
b) Discuss with suitable example for Euler equation for energy transfer between fluid and rotor.

14 A centrifugal compressor running at 9600 rpm delivers 10 m^3 /s of free air. The air is compressed from 1 bar and at 290 K to a pressure of 5 bar with an isentropic efficiency of 85%. Blades are radial at outlet of impellor and the flow velocity of 60 m/s is assumed constant throughout the impellor. The outer radius of impellor is twice the inner radius

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and slip factor is assumed as 0.88. The blade area coefficient of 0.85 may be assumed at inlet. Determine; i) final temperatures of air, ii) theoretical power required iii) impellor diameters at inlet and outlet, iv) breadth of impellor at inlet v) impellor blade angle at inlet and vi) diffuser blade angle at inlet.

15 An axial flow compressor with an overall isentropic efficiency of 82% draws air at 17^{o}C and compresses it in the pressure ratio of 5:1. The mean blade speed and flow velocity are constant throughout the compressor. Assume 50% reaction blading and taking blade velocity as 240 m/s and work input factor as 1.05, calculate i) flow velocity and ii) number of stages. Assume α = 15^{o} and θ = 45^{o}.

16 In a simple impulse turbine the nozzles are inclined at 20^{o} to the direction of motion of the moving blades. The steam leaves the nozzles at 375 m/s. The blade speed is 165 m/s, Find suitable inlet and outlet angles for the blades in order that the axial thrust is zero. The relative velocity of steam as it flows over the blade is reduced by 15% by friction Determine also the power developed for a flow rate of 10 kg/s.

17 a) Define a Gas turbine. And write its classifications and working principle of each.
b) Explain the working principle with proper diagrams of Ramjet engine, pulse jet engine.

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Code No. 5257

FACULTY OF ENGINEERING

B.E. 4/4 (Prod.) I – Semester (Main) Examination, December 2015

Subject: Control System Theory

Time: 3 Hours **Max.Marks: 75**

Note: i) Answer all questions from Part A. Answer any five questions from Part B.
ii) Answer to the questions of Part-A must be at one place and in the same order as they occur in the questions paper.
iii) Semilog papers have to be permitted.

PART – A (25 Marks)

1 Define open loop control and closed loop control systems with examples. 2

2 Obtain the transfer function of thermal systems. 3

3 Draw the time domain specifications of 2nd order control systems. 2

4 For a unity feedback system whose open loop transfer function is $G(s)=\frac{Ks^2}{(1+0.2s)(1+0.02s)}$ find the position, velocity and acceleration error constants. 3

5 Determine the range of values of 'K' for the system represented by $F(s) = s^3+3s^2+(K+2)s+5k$ to be stable. 2

6 What are the advantages of frequency response techniques over time domain techniques? 3

7 Sketch the polar plot for $G(s) = \frac{1}{(1+s)(1+4s)}$. 2

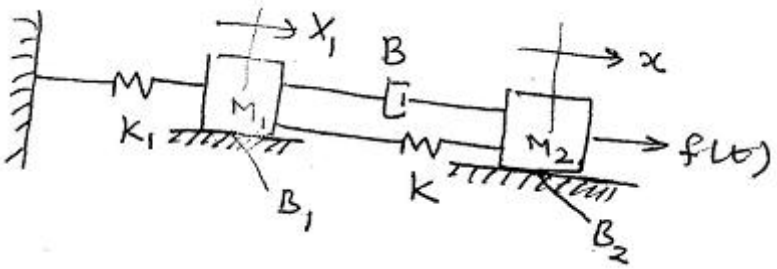
8 Briefly explain the importance of PID controller. 3

9 State the properties of State Transition Matrix (STM). 3

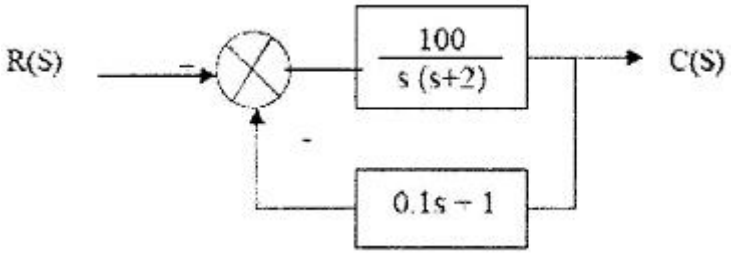
10 Define zero input response (ZIR) and zero state response (ZSR). 2

PART – B (5x10 = 50 Marks)

11 Write the differential equations governing the mechanical system, also find the transfer function $\frac{X(s)}{F(s)}$. 10



12 A positional control system with velocity feedback is shown in fig. What is the response of the system for unit step input? 10



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13 Sketch the Root locus for the following open loop transfer function $\frac{K}{s(s+2)(s^2+2s+5)}$ and find the limiting value of 'K'? 10

14 Plot the Bode diagram for the transfer function G(s)= $\frac{Ks^2}{(1+0.2s)(1+0.02s)}$ and obtain the gain and phase cross over frequencies. Determine the value of 'K' for a gain crossover frequency of 20 rad/s. 10

15 With the help of Nyquist criterion, determine the stability of a system of unity feedback system whose open loop transfer function is G(s)H(s)= $\frac{K}{s(s^2+2s+2)}$. 10

16 a) Determine the state model of the system characterized by the transfer function $\frac{Y(s)}{U(s)} = \frac{s^2+3s+4}{s^3+2s^2+3s+2}$. 5

b) Test the controllability and observability of the system whose state space representation is given as by $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} \mu(t), t > 0.$ 5

17 Write short notes on: 10

a) Nyquist criterion for stability

b) Lead compensator

c) Importance of Mathematical modeling in control system

d) Concept of state, state variable and state model.

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Code No. 5261

FACULTY OF ENGINEERING

B.E. 4/4 (AE) I - Semester (Main) Examination, December 2015

Subject : Transport Management

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 What are the types of interview?

2 State different types of ownerships of Motor transport organization.

3 Explain advantages of motor transport.

4 What is vehicle utilization?

5 What is running time?

6 What is the purpose of maintenance?

7 Name different break down equipment.

8 What is Route Survey?

9 What are cautionary signs?

10 Discuss daily maintenance briefly.

PART – B (50 Marks)

11 (a) Explain Training objectives and their advantages. (5)
(b) Explain the procedure of conducting interview. (5)

12 (a) What is stand time? Write the procedure to work out stand time. (5)
(b) Explain fixed costs and variable costs. (5)

13 (a) Explain the requirements of a good fare system. (5)
(b) Explain designing of stage and fare structure. (5)

14 What are the different types of Traffic signs? Show them with two examples of each sign. (10)

15 Explain causes for uneven tyre wear and their remedies. (10)

16 Explain facilities required at a depot and draw the layout of a Depot. (10)

17 Write short notes on the following:
(a) Ticketing system and types of tickets (5)
(b) Layout of a central work shop (5)

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Code No. 5269

FACULTY OF ENGINEERING

B.E. 4/4 (CSE) I - Semester (Main) Examination, December 2015

Subject : Distributed Systems

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Define distributed systems. Give examples of distributed systems.	3
2	What is middleware? What are its limitations?	3
3	List the differences between a process and a thread.	3
4	Define RPC and RMI.	3
5	Illustrate happened. Before relation with an example.	2
6	What is Byzantine agreement problem?	3
7	What are the Fault tolerant services?	2
8	Write about dirty-read and premature-write problem.	2
9	What are the distributed file system requirements?	2
10	Explain sequential and release consistency.	2

PART – B (50 Marks)

11	a)	Describe the architectural models of distributed systems.	8
	b)	Differentiate between Monolithic Kernal and Micro Kernel.	2
12	a)	Explain about client-server communication.	7
	b)	What are the design issues of RMI?	3
13	a)	What are the advantages of clock synchronization algorithms? Explain any one clock synchronization algorithm.	6
	b)	Write short notes on “mutual exclusion”.	4
14		Explain about 2 phase commit protocol (2 PC). How does 3 phase commit protocol differ from 2 PC.	10
15		Explain in detail about CODA file system architecture.	10
16		Discuss about DSM-implementation issues and approaches to DSM.	10
17		Write short notes on :	
	a)	Failure model	5
	b)	Snapshot algorithm	5

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Code No. 5280

FACULTY OF INFORMATICS

B.E. 4/4 (IT) I - Semester (Main) Examination, December 2015

Subject : VLSI Design

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	What is Moore's law?	2
2	What are the different types of capacitances present in MOS transistor?	3
3	Draw layout of CMOS inverter and identify all the layer names.	3
4	What is latch up in CMOS logic? Give its prevention techniques.	2
5	What are lambda based design rules? Why they should be followed?	3
6	Define rise time, fall time and delay time.	3
7	What are the advantages of dynamic logic over static logic?	2
8	Differentiate between SRAM and DRAM.	2
9	What is data flow modeling? Give one example.	2
10	Implement XOR logic gate using CMOS logic.	3

PART – B (50 Marks)

11	a)	Explain the operation of NMOS transistor and derive its current equation in linear region.	5
	b)	Design 4 to 1 multiplexer using transmission gate logic.	5
12	a)	Draw the layout of the function $Y = \overline{A + BC}$ using CMOS logic.	5
	b)	How do you design n+ and p+ regions? Give appropriate equations.	5
13	a)	Draw and explain the CMOS fabrication process flow.	5
	b)	Derive the expression for propagation delay of two input NAND gate.	5
14	a)	Draw the block diagram of differential cascade voltage switch logic. Design a two input XOR and XNOR logic gate using above model.	5
	b)	Explain read and write operation of 6T SRAM cell.	5
15	a)	Design a full adder using CMOS logic. Give its truth table.	5
	b)	What high speed adders? Implement carry look ahead adder.	5
16	a)	What is interconnect? Derive the delay modeling of an interconnect.	5
	b)	What is mean by crosstalk? Explain the different techniques to optimize the cross talk.	5
17	Write s short notes on :		
	a)	Pseudo NMOS logic	4
	b)	Barrel shifter	3
	c)	Stick diagram	3

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