Code No. 5162 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II – Semester (Suppl.) Examination, January 2016

Subject: Steel Structures

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 advantages of stainless steel? 2

2 List the loading combination to be considered when considering only DL, LL and EL. 3

3 What is the difference between pitch and staggered pitch? 2

4 Two plates of thickness 12 mm and 10 mm are to be jointed by a groove weld. The joint is subjected to a factored tensile force of 275 kN. Assuming an effective length of 150 mm, check the safety of the joint for a) Single V groove weld joint and (ii) Double V groove weld joint. 3

5 What is meant by shear lag? 2

6 Differentiate between local and lateral buckling of beams. 2

7 State the possible failure modes of an axially loaded column. 3

8 How the residual stresses affect the column strength? 2

9 How is the spacing of purlin fixed? 3

10 When are bending moments to be considered in the design of the top chord of trusses? 3

PART – B (5x10 = 50 Marks)

11 a) The plates of a 6mm thick tank are connected by a single bolted lap joint with 20 mm diameter bolt at 60 mm pitch. Calculate the efficiency of the joint. Take Fu of plate as 410 MPa and assume 4.6 grade bolts. 7

b) Design a connection to joint two plates of size 250x12 mm of grade Fe410 to mobilize full plate tensile strength using shop fillet welds if a double cover butt joint is used. 3

12 Select suitable angle section to carry a factored tensile force of 150 kN assuming (a) a single row of M16 bolts (b) welded end connection. Assume design strength Fy = 250 N/mm^2. 10

13 Design a simply supported section of span 5m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The uniformly distributed load is made up of 20 kN/m imposed load and 20 kN/m dead load (section is stiff against bearing). Assume Fe 410 grade steel. 10

…2.

14 a) An ISHB 300 is to be used as short column carrying axial load. Is its compressive strength likely to be affected by local buckling, assuming Fe 540 steel with a design strength of Fy = 410 MPa. 5

b) Calculate the compressive resistance of the leg of a transmission line tower consisting of 200x200x20 angle section of height 3.0 m. Assume that the conditions at both ends of the z-z and y-y planes are such as to provide simple support. Take design strength of steel as 250 N/mm^2 and assume that load is applied concentrically to the angle. 5

15 Design a laced column 10 m long to carry a factored axial load of 1100 kN. The column is restrained in position but not in direction at both ends. Provide single lacing system with bolted connection. Design the column with two channels back to back. 10

16 Design the base plate for an ISHB 350 column to carry a factored load of 1200 kN. Assume 410 grade Steel and M_{25} Concrete. 10

17 The trusses for a factory building are spaced 3 m c/c and the purlins are spaced at 1.2 m c/c. The pitch of truss is 1/4 and span of roof is 16 m. The vertical load from roof sheets is 3000 N/m^2 and wind load normal to roof is 1600 N/m^2. Design an angle section purlin. 10

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Code No. 5168 / S

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) II - Semester (Suppl.) Examination, January 2016

Subject : Electrical Machinery (Elective – III)

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 Define short –circuit ratio and write its importance. (3)
2 Write the advantages of parallel connection of synchronous generator. (2)
3 Explain why power factor of a synchronous motor changes with change in excitation. (3)
4 State why the regulation of an alternator is negative at leading power factor loads. (3)
5 Draw the phasor diagram of over excited synchronous motor. (2)
6 Explain why the speed of synchronous motor does not vary with load. (2)
7 Explain transient stability in synchronous motor. (3)
8 Draw the characteristics of AC servo motors. (2)
9 Write the applications of linear induction motors. (2)
10 Explain Hunting and its prevention in synchronous motor. (3)

PART – B (50 Marks)

11 Explain the need for using damper winding in synchronous machines and discuss in detail about three phase windings of synchronous machines. (10)

12 A 3-ϕ 200 KVA, 400V, 50HZ Alternator has per phase armature resistance and synchronous reactance of 0.1Ω and 1.2Ω respectively. Determine the induced emf when the machine is delivering rated current at a load power factor of unity. Draw the phasor diagram also. (10)

13 Explain voltage regulation and discuss different methods of determining regulation of synchronous generator. (10)

14 (a) Explain the effects of change of excitation of a synchronous generator connected to an infinite bus-bar. (5)
(b) Explain the different starting methods of synchronous, motors. (5)

15 (a) Explain the principle of shaded pole motor. (5)
(b) Describe the working of a Hysteresis motor and its applications. (5)

16 (a) A synchronous generator with a synchronous reactance of 1.3 pu is connected to an infinite bus whose voltage is 1.0 pu through an equivalent reactance of 0.2. p.u. the maximum permissible output is 1.2. Compute the excitation voltage current, power angle and power factor. (5)
(b) Discuss in detail the transient and subtransient conditions of synchronous generator with necessary phasor diagrams. (5)

17 Write short notes on the following:
(a) Two phase servomotors working principle and applications. (5)
(b) Variable reluctance motor working principle and applications. (5)

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Code No. 5173 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II - Semester (Suppl.) Examination, January 2016

Subject : Process Control

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 Explain thermal element lag.
2 Define liquid process and gas process.
3 Give an example of electronic controller.
4 Explain single speed floating control.
5 Describe the difference between open loop control and closed loop control.
6 Explain velocity error.
7 Describe solenoid valves.
8 Explain how valve performance is measured?
9 With an example explain discrete control.
10 Describe how PLC is programmed.

Part-B (50 marks)

11 (a) With a diagram explain use of momentary push button switches and a relays to implement a latch.
(b) Explain programmable logic controller with basic block diagram.

12 (a) Describe PID controller with schematic diagram.
(b) With a diagram explain pneumatic proportional mode controller.

13(a) Explain the characteristics of two position control. Define and explain the concept of Neutral Zone.
(b) Obtain output expression for P+I controller and obtain its electronic implementation.

14 (a) Describe the steps involved in controller setting using Ziegler Nichols method.
(b) Design a proportional derivative mode controller using op.amps. Assume suitable values for components.

15 (a) Explain ladder diagram with an example.
(b) Describe valve limit switch.

16 (a) Explain gas process with an example.
(b) Define actuator .mention a few types actuators briefly.

17 Write short notes on
(a) Process variables.
(b) Discrete state process.
(c) Relay controller circuit.

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Code No. 5177 / S

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Suppl.) Examination, January 2016

Subject : Digital Signal Processing

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 meant by In-place computation in FFT?
2 Distinguish between DFT and DTFT.
3 Calculate the number of multiplications needed in the calculation of DFT using FFT algorithm, with 32-Pt sequence.
4 Compare Hamming window with Kaiser window.
5 Explain finite word length effects.
6 Using impulse invariant techniques obtain
$H(z)$ if $H(s) = \frac{1}{(s+1)(s+2)}$ assume T = 1 sec.
7 Differentiate between General purpose and DSP processor.
8 What are the applications of multirate signal processing?
9 List out various addressing modes of TMS320C54xx.
10 Explain interpolation and decimation.

PART – B (50 Marks)

11 a) Find the DFT of x[n]={1, 2, 3, 4}.
b) Determine and sketch the magnitude phase response
$$y(n) = \frac{1}{3}[x(n) + x(n-1) + x(n-2)] .$$

12 Determine the output response y(n) of h(n) = {1, 1, 1} and x(n) = {1, 2, 3, 1} by obtaining linear convolution using DFT and IDFT.

13 Compute the eight point DFT of the sequence x(n) = {0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0} by radix -2 DIT algorithm.

14 Design an ideal HPF whose desired frequency response is
$$H(e^{iw}) = \begin{cases} 1 & ® < |W| \le 0.6® \\ 0 & \text{Otherwise} \end{cases}$$
Using Hamming window.

15 Using the BLT technique, design a high pass filter monotonic in pass band with cut-off frequency 1000Hz and down 10dB at 350Hz, the sampling frequency is 5000Hz.

16 Draw and explain the functional block diagram of TMS320C54xx processor.

17 a) Explain the algorithm to increase the sampling frequency by a factor – I.
b) Explain the multistage implementation of sampling rate conversion.

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Code No. 5182 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) II – Semester (Suppl.) Examination, January 2016

Subject : Metal Cutting and Machine Tool Engineering

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 Differentiate between orthogonal cutting and oblique cutting.
2 Sketch the drill tool geometry and mention various elements on it.
3 What do you understand the economics of machining?
4 What are the desirable properties of a cutting fluids?
5 How a lathe is specified?
6 Distinguish between planner and shaper.
7 List out various super finishing operations.
8 What do you understand by thread grinding?
9 Explain the working principle of EBM.
10 State the principles of Jigs and fixtures.

PART – B (50 Marks)

11 a) Derive the equation for shear angle in machining. 6
b) Explain the importance of clearance angle, rake angle, and primary plan approach angle. 4

12 a) Explain Taylor's modified tool life equation. What are the variable affecting tool life? 6
b) Explain heat distribution in machining with help of neat sketch. 4

13 a) Derive an expression for cutting force in turning. 5
b) Explain various indexing methods. 5

14 a) Explain lapping and honing. 6
b) Explain thread milling. 4

15 a) Explain 3-2 – 1 location principle. 5
b) Explain the working principle of USM with help of sketch mention its application and MRR. 5

16 a) Explain various cutting tool materials and their required properties. 5
b) Explain economic of machining for maximum production. 5

17 Write short notes on : 10
a) Boring
b) Burnishing
c) Clamping devices

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Code No. 5188 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) II-Semester (Suppl.) Examination, January 2016

Subject: Metal Casting & Welding

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 pattern allowances? (3)
2 What is the importance of Sievert's law? (2)
3 What are the applications and limitations of cold chamber die casting? (3)
4 Enlist the advantages and limitations of investment casting. (2)
5 Briefly explain the principle of thermit welding. (3)
6 What are the applications of SAW process? (2)
7 Differentiate between resistance spot and seam welding methods? (3)
8 Discuss briefly the weldability of stainless steels? (2)
9 What are causes and remedies for weld defects cold and hot cracks? (3)
10 What do you understand by the term "MEMS"? (2)

PART.- B.(50 Marks)

11 (a) How are moulding sands classified? Give the composition of green sand. (5)
(b) Name the main types of furnaces used in foundries and explain an induction furnace with labeled sketch. (5)

12 (a) Explain the steps in shell moulding process. State applications and limitations. (5)
(b) What factors are responsible for defects in castings? Explain the causes and remedies for following defects: blow holes, misrun, scab and hot tear. (5)

13 (a) Explain the principle, applications and limitations of MIG welding with aid of neat sketch. (5)
(b) Giving suitable diagram, explain the atomic hydrogen welding process and also give its scope of application. (5)

14 (a) Compare the welding aspects of low carbon steels and Aluminium. (5)
(b) Explain the principle and application of projection welding. (5)

15 (a) Explain the testing procedure of Cruciform weldability test. Give its limitations and applications. (5)
(b) Discuss the working principle of blow moulding process with help of neat sketch. State its applications and advantages. (5)

16 (a) Differentiate between soldering and brazing in terms of principle, application and limitations. (5)
(b) With aid of neat sketches discuss the defects in welds, their causes and remedies. (5)

17 Write short notes on any three of the following. 10)
(a) Types of flames in gas welding
(b) Cupola furnace
(c) Injection moulding
(d) Continuous casting process

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Code No. 5191 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Automobile Engg.) II – Semester (Suppl.) Examination, January 2016

Subject : Performance and Testing of Automotive Vehicles

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

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

PART – A (10 x 2.5 = 25 Marks)

1 Explain Aerodynamic drag.
2 Explain the effect of pressure (Air) on power output.
3 List out types of Automotive gear box.
4 Draw a neat sketch of cone clutch.
5 Write short notes on vehicle safety.
6 Will tyre and road condition effects the fuel economy? How?
7 List out various types of automotive suspension system.
8 Draw a neat sketch of torsion bar.
9 Write short notes on chassis dynamo meter.
10 How the clutch and gear box is to be tested?

PART – B (50 Marks)

11 Explain with neat sketch.
a) Forces and moments acting on a car body 5
b) Types of Resistance acting on a carbody. 5

12 a) Describe the construction and working of single plate clutch. 4
b) Derive an expression for frictional torque acting on the ring of single plate clutch. 6

13 a) Explain any 3 engine efficiencies. 6
b) Will traffic conditions and driving habits effects the fuel economy? How? 4

14 Explain the effects of body roll and irregular road surfaces on suspension geometry with the help of neat sketch. 10

15 (a) Explain the effect of pressure, temperature and humidity on power output. (6)
(b) Explain Brake testing on the Road. (4)

16 Explain the mechanics of a hydraulic braking system
Force on the front pedal = 110 N
Pedal leverage ratio = 4
Master cylinder stroke (LM) be 1 cm and area = 4.5 cm^2
Front Piston area = 22 cm^2
Rear Piston area = 6 cm^2

17 Explain the following :
a) Testing of major components of vehicle like suspension and engine 6
b) Differentiate between dependent and independent suspension system. 4

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Code No. 5196 / S

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Suppl.) Examination, January 2016

Subject : Principles of Programming Languages

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	Differentiate between declarative languages and imperative languages.	2
2	Define microcode.	2
3	List out the three basic operations which are used to build complex regular expressions from simpler regular expressions.	3
4	What is binding time?	2
5	What does it mean for a scope to be closed?	2
6	What are Macros? Discuss the problems caused by using them.	3
7	What is lazy evaluation?	2
8	What is garbage? List out various means of solving this problem.	3
9	Explain race condition in concurrency.	3
10	What is busy waiting?	3

PART – B (50 Marks)

11	a)	Describe the work performed by principal phase of compiler.	5
	b)	Discuss about stack allocation.	5
12	a)	Explain the differences between applicative and normal order evaluation of expressions with proper examples.	5
	b)	What is an object closure? Explain the relation between subroutine closure and object closure.	5
13	a)	Discuss in brief about structural and name equivalence for types with proper examples.	5
	b)	What are default parameters? How are they implemented?	5
14	a)	What is binary rewriting? How does it differ from binary translation and dynamic optimization?	5
	b)	Explain various forms of recursion with examples.	5
15	a)	Discuss about scheme programming language.	5
	b)	Explain the features of logic programming languages.	5
16	a)	Explain the concept of binding in functional and imperative languages.	5
	b)	Explain how exception are handled in programming languages.	5
17	Write short notes on :		
	a)	Context Free Grammars	5
	b)	Events	5

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Code No. 5203 / S

FACULTY OF INFORMATICS

B.E. 3/4 (I.T.) II - Semester (Suppl.) Examination, January 2016

Subject : Design and Analysis of Algorithms

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

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

PART – A (25 Marks)

1 Define the weighing rule and write an algorithm for union of two sets using this rule. (3)

2 What is Single source shortest path problem? (3)

3 Differentiate between feasible and optimal solution. (3)

4 Define space complexity and time complexity. (2)

5 Define Optimal Binary Search Tree. (2)

6 Define Bi-connected component in a connected graph. (2)

7 What are NP complete problems? (3)

8 Differentiate between explicit and implicit constraints. (3)

9 State Cook's Theorem. (2)

10 State n-queen problem. (2)

PART – B (50 Marks)

11 Consider the array [40, 80, 35, 90, 45, 50, 70].

(a) Derive the MIN heap (3)

(b) Write the algorithm for inserting an element in the MIN heap and find its complexity. (4)

(c) Show the steps for removing the element 40 from the MIN heap. (3)

12 (a) Write a general algorithm for Divide and Conquer method. (4)

(b) Sort the array [17, 28, 31, 35, 65, 25, 42, 86, 45, 52] using Merge Sort. Show each step. (6)

13 (a) Write Prim's algorithm to find the minimum cost spanning tree. Explain with an example. (6)

(b) Differentiate between greedy subset paradigm and ordering paradigm. State an example in each case. (4)

..2

14 (a) Explain the Branch and Bound technique. (4)
(b) Explain the graph coloring problem and write an algorithm solution using Back tracking. (6)

15 (a) What are Non-Deterministic algorithms? Write its functions. (5)
(b) Explain reliability design problem with an example. (5)

16 Find the shortest path from S to T for multistage graph seen in figure 1 using Dynamic programming using backward approach. (10)

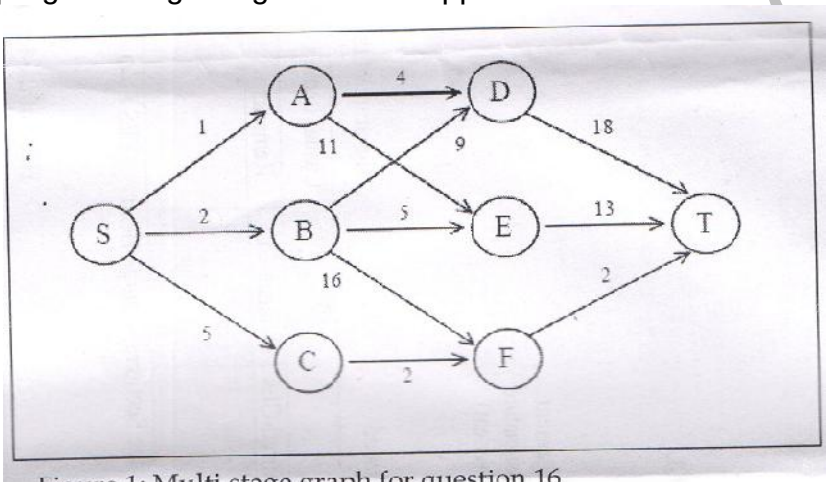

Figure 1: Multi stage graph for question 16.

17 Write short notes on the following:
(a) Hamiltonian cycle (5)
(b) Backtracking Technique (5)

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