Code No. 3161

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II-Semester (Supplementary) Examination, Nov./Dec. 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 factor of safeties recommended by IS800 for the design of steel sections and welded connections?	3
2	List out the different types of web stiffners.	3
3	Explain about web bucking and web crippling.	3
4	Explain about block shear with sketch.	3
5	Write the guidelines for providing battens in a compression member.	3
6	Define effective length and slenderness ratio of columns.	2
7	Explain about column splicing.	2
8	List out the various loads to which a structure is subjected.	2
9	List three types of tension members with sketches.	2
10	Write the principle of designing a purlin.	2

PART – B (50 Marks)

11 Design a lap joint to connect two steel plates 10mm and 12mm thick to carry an axial load of 250kN use M18 grade 4.6 bolts. Draw neat sketches showing plan and cross section of joint. 10

12 a) Design a single angle section tension member to carry a factored load of 350kN carry out usual checks. Use Fe410 grade adopt limit state method (LSD). 6

b) Explain about block shear in tension members. 4

13 Design a single I-section compression member of unsupported length 3.5m. The column is held in position and restrained against rotation at both ends, it carries a factored axial load of 600kN. Adopt Fe410 grade steel use LSD. 10

14 A simply supported steel beam of effective span 6.5m is subjected to a working udl of 40kN/m. Self weight of the beam is 2.5 kN/m. Compression flange of the beam is laterally supported. Design the beam by limit state method, use Fe410 grade steel. 10

15 Design a gusseted base for a steel column ISMB 300. The column carries an axial load of 950kN, grade of concrete in foundation is M20. 10

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16 A laterally unsupported beam consists of ISMB 300, it has an effective span of 6m. Determine factored udl which the beam can carry. Also compute maximum deflection and shear strength of beam. 10

17 a) Explain in detail the procedure for design of purlin for dead loads, imposed loads and wind loads. 6

b) Briefly explain the procedure for design of roof truss joint for angular truss. 4

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Code No. 3167

FACULTY OF ENGINEERING

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

Subject : Electrical Machinery - 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 What are the causes of voltage drop in alternator when loaded? (3)
2 Find the mechanical and electrical angles between adjacent slots for a 4-pole synchronous machine stator with 36 slots. (2)
3 Draw a plot showing variation of regulation of alternator with power factor (leading to lagging). (2)
4 To predetermined voltage regulation of alternator, what test data are required? (2)
5 Mention different methods of starting of synchronous motors. (3)
6 What are the advantages of salient pole motor over cylindrical pole motor? (3)
7 What are the industrial applications of switched reluctance motor? (2)
8 What are the conditions to be satisfied for synchronization of alternators? (2)
9 Explain briefly the principle of Linear induction motor. (3)
10 Draw a schematic diagram of Shaded pole motor. (3)

PART – B (50 Marks)

11 (a) Derive expressions for Distribution factor, Pitch factor and Generated emf of an alternator. (6)
(b) A 3-phase ,10 pole, star connected alternator runs at 600 rpm. It has 120 stator slots with 8 conductors per slot and the conductors of each phase are connected in series. Determine the phase and line emf if the flux per pole is 56 mWb. Assume full pitched coils. (4)

12 (a) Explain how voltage regulation is obtained using Zero power factor method. (6)
(b) The effective resistance and syn. reactance of a 3-phase, 22 kVA, 415 V, star connected alternator are 0.5 Ω and 4.2Ω respectively. The field winding is supplied at 3.2 A at 230 V dc. The friction and windage loss is 310 W and iron loss is 480 W. Calculate the efficiency at half load and full load. (4)

13 (a) Describe the principle and operation of a 3-phase synchronous motor. (5)
(b) Show the effect of (i) change in prime mover input and (ii) change in excitation in one of the alternators on parallel operation of two alternators. (5)

14 Discuss the principle and operation of the following special machines with neat schematic diagrams. (a) Brushless dc motor (b) Hysteresis motor

15 (a) What is a synchronous condenser ? Explain its operation with neat phasor diagram and usefulness in industrial applications. (5)
(b) A 10 kW, 400 V, 3-phase, star connected synchronous motor has a synchronous impedance of (0.3 +j2.5)Ω. Find the voltage to which the motor must be excited to give full-load output at 0.866 leading p.f. Assume an armature efficiency of 90%. Also calculate the total mechanical power developed. (5)

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16 (a) Explain the theory and operation of Repulsion motor with neat sketch. (5)
(b) Draw and explain capacitor start 1-phase induction motor with neat circuit diagram and its speed-torque characteristics. (5)

17 Discuss the following: (10)
(a) Transient behavior of alternator under short circuit conditions
(b) O.C. and S.C. characteristics of synchronous generator

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Code No. 3172

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II-Semester (Supplementary) Examination, Nov. / Dec. 2016

Subject : Process 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 What are the elements of process control loop? Draw the block diagram of process control loop? 2

2 Calculate the resistance of flow metering device having relation $q = h^n$? 3

3 Write the analytical equation of PID controller and its transfer function. 3

4 What is meant by reverse and direct action of controlling. 2

5 Explain why rate controller is called anticipatory control. 3

6 In P and ID symbology the following abbreviations stand for 2
i) ES ii) AS iii) GS iv) NS

7 Elaborate selection of control valves. 3

8 List out different valve accessories. 2

9 What are the different programming methods of PLC. 3

10 Explain the advantage of PLC over conventional relay logic circuits. 2

PART – B (50 Marks)

11 Derive the transfer function for interacting and non-interacting systems with relevant block diagrams. 10

12 Show that for a single time constant process with integral controller the reset time $T_i = 4RT/9$ when the damping ratio is $1/3^{rd}$?

13 Explain the effect of PI control on liquid process in detail. 10

14 With neat diagrams explain direct and reverse acting pneumatic actuators. 10

15 Draw the block diagram of PLC and explain its principle of operation? Discuss in detail the PLC software functions with examples. 10

16 Given 10
$G_1(S) = K_p$; $G_2(S) = R_1 / T_1S(T_2S+1)$; $N(S) = R_1 / T_1S (T_2S+1)$

a) Draw the closed loop automatic control block diagram
b) Calculate the proportional sensitivity
c) Static error and offset

17 Write short notes on : 10
a) Floating controller mode
b) Tuning methods for controllers

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Code No. 3176

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II - Semester (Suppl.) Examination, November / December 2016

Subject : Digital Signal Processing

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. Sate and prove the convolution property of DFT. (3)
2. Explain bit reversal as related to FFT. (2)
3. Define phase delay and group delay. (2)
4. What are the desirable features of window functions? (3)
5. Compare the pass band and stop band characteristics of Butterworth and Chebyshev filters. (3)
6. What is meant by frequency warping? (2)
7. Discuss briefly the effects of down sampling and decimation. (2)
8. Describe the factors to be considered while deciding the decimation and interpolation values for multistage implementation. (3)
9. Explain how the rounding operation is carried out by the adder/ multiplier units of TMS320C54XX. (3)
10. Compare RISC and CISC processors. (2)

PART-B (50 Marks)

11 (a) Evaluate the circular convolution of $x_1(n)=\{1, 1, 2, 2\}, x_2(n)=\{1, 2, 3, 4\}$ using DFT and IDFT . (6)

(b) State and prove correlation theorem. (4)

12 (a) Describe the steps involved in the design of FIR filter. (4)

(b) Design linear phase FIR digital BPF of length 9 to meet given Specifications.Pass band 1 kHz – 2 kHz, F_s = 8 kHz using Bartlett window. (6)

13 (a) Design a Butterworth filter for the following specification using impulse Invariance method. (7)

$$H(e^{j\omega}) \le 0.2 \quad \text{for } 0 \le \omega \le 0.2\pi$$

$$0.8 \le H(e^{j\omega}) \le 1 \quad \text{for } 0.6\pi \le \omega \le \pi$$

(b) Compare FIR and IIR digital filters. (3)

14 (a) Explain in detail the following applications of multirate signal processing. (6)
(i) Design of phase shifters
(ii) Design of sub band coding of speech signals.
(iii) Interfacing of digital systems with different sampling rates
(b) Derive and explain with the help of neat diagrams how decimation by 'D' can be achieved. (4)

15 (a) Explain the various addressing modes and salient features of TMS320C54XX. (6)
(b) Compare DSP processor and microprocessor. (4)

16 (a) Derive the necessary and sufficient condition for FIR filters to exhibit linear phase response. (5)
(b) Evaluate IDFT of the sequence X[k] = {3, 2+j,1,2-j}. (5)

17 (a) Explain the Instruction sets of TMS320C54XX processor. (5)
(b) Obtain direct form and FIR linear-phase realization of the system function given by $H(z) = (1 + z^{-1} + z^{-2})(1 + z^{-1} + z^{-2})$. (5)

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Code No. 3181

FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) II - Semester (Suppl.) Examination, November / December 2016

Subject : Metal Cutting and Machine tool Engineering

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 Write the chemical composition of HSS and few application of HSS.
2 What do you understand from Lee Shafer theory?
3 What machinability index?
4 State the various sources for heat generation in metal cutting.
5 Differentiate between up milling and down milling.
6 Mention three types of tool holding and work holding devices in Lathe.
7 Name various bonding methods used in grinding wheel.
8 Define grinding ratio.
9 Explain the principle and operation of ECM.
10 Explain 3-2-1 location principle.

PART – B (50 Marks)

11 (a) Explain the single point cutting tool nomenclature of ORS system.
(b) Differentiate between orthogonal cutting and oblique cutting.

12 (a) Explain various types of chips and chip breakers.
(b) A carbide cutting tool lasted for 100 minutes while machining mild steel work piece at 50m/min. Compute the tool life if similar tool is used for machining mild steel at 20% higher speed. Also calculate the cutting speed if the tool is required to machine for 150 minutes without failing (take n = 0.27).

13 (a) Explain toll wear mechanism with a neat sketch.
(b) Mention the use of cutting fluids and list the required properties of cutting fluids.

14 (a) Explain taper turning by taper turning attachment with the help of neat sketch.
(b) Suggest indexing method and perform 119 divisions using a universal dividing head.

15 (a) Explain the broaching operation and its application draw a simple sketch of push broach.
(b) How a grinding wheel is selected ? Explain with a suitable example.

16 (a) Explain the principle of jigs and fixtures.
(b) Explain principle and operation of EDM and mention in MRR and applications.

17 Write short notes on the following:
(a) Thread milling
(b) AJM
(c) Boring

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Code No. 3187

FACULTY OF ENGINEERING

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

Subject : Metal Casting and 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 State the Composition of Green sand moulding.
2 What do you understand the absorption of gases during melting.
3 List the application of investment casting and specify their advantages.
4 When do you prefer shell moulding.
5 State the principle of Atomic hydrogen welding.
6 What do you understand by Solid state welding.
7 Differentiate between thermoplastics and thermosetting plastics.
8 What are the application of MEMS in metal casting and welding
9 How do you join aluminum alloy?
10 What is the importance of process variation in a welding?

PART – B (50 Marks)

11 a). Explain Riser design procedure
b). Explain coupola furnace with a suitable figure and clearly mention various chemical reactions

12 a). Explain Die casting process with the help of sketch
b). Explain any two inspection and testing methods in casting

13 a). Explain Directional solidification
b). Explain various casting defects and also state causes and remedies for them

14 a). Explain types of flames used in gas welding with the help of figures and mention their application
b). Explain atomic hydrogen welding

15 a). Explain the joining procedure of low carbon steels
b). What are the various defects in welding

16 a). Explain blow moulding process
b). How to avoid cold cracks and hot cracks in welding

17 Write short notes on the following
a). Cruciform Test
b). Plasma arc welding
c). Weldability of materials

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Code No. 3190

FACULTY OF ENGINEERING

B.E. 3/4 (AE) II-Semester (Supplementary) Examination, Nov. / Dec. 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 (25 Marks)

1 Explain drag coefficient.
2 Explain the term traction effort.
3 List the various parts of a power transmission system.
4 Why do automatic transmission systems use epicyclic gear train?
5 List out the conditions which effects on fuel economy.
6 Explain vehicle safety.
7 Name the four different types of steering linkage.
8 What are the types of front end suspension?
9 Name any four fault finding tests.
10 How the clutch is tested? Explain.

PART – B (50 Marks)

11 a) How to determine the centre of gravity (C.G.) of a vehicle?
b) Explain briefly the forces and moments acting on a car body.

12 Explain briefly the following
a) Free wheel
b) Planetary gear box
c) Overdrive

13 Describe a Rigid axle front suspension using longitudinal leaf spring.

14 a) Explain scavenge efficiency and thermal efficiency.
b) Draw the braking arrangement of air brakes and explain briefly.

15 Explain briefly chassis dynamometer testing.

16 Explain the mechanics of rack and pinion steering assembly and also explain the principle of operation.

17 Explain the following :
a) Vaccum test
b) Compression test
c) Ignition test

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Code No. 3195

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II-Semester (Supplementary) Examination, Nov. / Dec. 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 imperative and declarative languages.	3
2	Write about programming environments.	2
3	What is Principle of Qualification?	3
4	Write about Macro expansion.	2
5	Differentiate between type equivalence and structural equivalence.	3
6	What is a Generic subroutine?	2
7	How do you implement rendezvous in Ada?	3
8	What is interleaving of threads?	2
9	How do you implement lazy evaluation in LISP?	3
10	Write about basic components of PROLOG.	2

PART – B (50 Marks)

11 Write the EBNF syntax for conditional statement in C language. 10

12 a) Write iterative function in LISP to compute the length of a list. 5
b) Explain how information hiding is provided in an Ada package. 5

13 a) Write about iteration control structure. 4
b) Compare iteration recursion. Explain about tail recursion with example. 6

14 Explain virtual and non-virtual methods. Explain the importance of virtual methods for object closures with examples. 10

15 a) Explain how backtracking works in PROLOG. 5
b) What is the relationship between resolution and unification in PROLOG? 5

16 Explain any two language implementation techniques for bridging the gap between high and low level languages, with neat figures, and their advantages and disadvantages. 10

17 Write short notes on any two of the following : 2 x 5 = 10
a) Semaphores
b) Higher order functions
c) Modules

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Code No. 3202

FACULTY OF INFORMATICS

B.E. 3/4 (IT) II-Semester (Supplementary) Examination, Nov. / Dec. 2016

Subject : Design and Analysis of Algorithms

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

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

PART – A (25 Marks)

1 What is Profiling? 2
2 What are dictionaries? Give example. 3
3 Write control abstraction for divide and conquer approach. 2
4 Write an algorithm for Greedy approach. 3
5 Define merging and purging rules in 0/1 knapsack problem. 2
6 What do you mean by forward and backward approach of problem solving in dynamic programming? 3
7 List any two properties of LC search. 2
8 Differentiate brute force approach with backtracking. 3
9 Define non deterministic algorithm. 2
10 What is node covering problem? 3

PART – B (50 Marks)

11 a) Solve the following recurrence relation

$$T(n) = \begin{cases} T(1) & n = 1 \\ a\,T(n/b) + f(n) & n > 1 \end{cases}$$

for the following choices of a, b and f(n) (c is constant)

i) a = 1, b = 2, and f(n) = cn
ii) a = 5, b = 4 and f(n) = cn^2
iii) a = 28, b = 3 and f(n) = cn^3

b) If there are n elements in a universal set, what is the maximum possible number of UNION operations and the corresponding order of magnitude of the number of steps required? 6+4

12 a) Sort the following elements using Quick sort (5, 1, 7, 3, 4, 9, 8, 2 and 6). Show each step.
b) Write general algorithm for Greedy approach. 5+5

13 a) Solve the following sales person problem instance using dynamic programming. Graph is given by adjacency matrix.

$$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$$

b) Write an algorithm for recursive DFS. 5+5

..2

14 a) Find the solution to 0/1 knapsack problem using LCBB
m = 15, n = 4, (p1, p2, p3, p4) = (10, 10, 12, 18) and (w1, w2, w3, w4) = (2,4,6,9)
b) Draw the state space tree for m-coloring when n = 3 and m = 3. 5+5

15 a) State Cooks theorem and prove it.
b) Discuss the relationship of P and NP classes 6+4

16 a) Define the properties of heap data structures and explain how heaps can be used as priority queues.
b) Explain Reliability design problem. 5+5

17 Write short notes on :
a) Collapsing FIND in set operations
b) Lower bound theory 5+5

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