

FACULTY OF ENGINEERING**B.E. 3/4 (Civil) II – Semester (Main & Backlog) Examination, May / June 2018****Subject: Steel Structures****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part A & any five questions from Part B.****PART – A (10x2.5 = 25 Marks)**

- 1 Write short notes on plastic and compact sections.
- 2 Explain with neat sketches failure of a bolt in double shear.
- 3 Explain about block shear with the help of sketch.
- 4 Calculate shape factor for rolled ISMB 350 at 52.4kg/m.
- 5 How do you design lacing in built up columns using IS 800.
- 6 Write short notes on splicing of a compression member.
- 7 Under what conditions a beam is said to be under high shear, what is the formula for moment capacity of such beam?
- 8 How do you calculate the thickness of slab base (base plate) for a steel column?
- 9 What are the permissible slenderness ratios for tension members, compression members and members subjected to reversal of loads?
- 10 What are the live loads to be considered for roof trusses with roof slopes (i) less than 10° (ii) slope of 15° .

PART – B (5x10 = 50 Marks)

- 11 Design a double row chain bolting to connect two steel plates 200mm wide and 10mm thick which are connected by single cover butt joint. The plate carry an axial load of 350 kN. Use Fe410 steel and grade 4.6, M18 bolts. Use limit state method.
- 12 A single angle tension member carry a working load of 200 kN. Design the member if it is connected to the gusset plate through single row bolted connection. Adopt limit state method. Use Fe410 steel and grade 6.8, M20 bolts at a pitch of 80 mm.
- 13 Design a simply supported steel beam which has an effective span of 6.2 m. It is subjected a factored load of 50 kN/m, design the beam if it is laterally supported. Use limit state method.
- 14 Design a built up column consisting of two channels back to back and carry a factored load of 1400 kN, design suitable lacing. Effective column height is 8 m. Use Fe410 grade steel. Design by limit state method.
- 15 Design a gusset base for steel column ISWB 400 at 66.7 kg/m. The column carry a load of 1200 kN. Permissible stress in concrete base is 7 N/mm^2 . Use suitable steel and bolts.
- 16 Design a purlin for a factory building if trusses are spaced at 5.8 m center to center and purlins are spaced at 2.2 m center to center. Pitch of the truss is $1/5$ and span of truss is 10 m. Dead load from sheets, purlins etc is 350 N/m^2 and wind load normal to the roof is 1600 N/m^2 . Use Fe 410 grade steel.
- 17 Write short notes on
 - a) Block shear.
 - b) Theory of plastic design.
 - c) Unfinished bolts (black bolts) and high strength friction grip bolts (HSFG bolts).

FACULTY OF ENGINEERING**B.E. 3/4 (EEE) II – Semester (Main & Backlog) Examination, May / June 2018****Subject: Electrical Machinery – III****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part A & any five questions from Part B.****PART – A (25 Marks)**

- 1 Define pitch and slots in synchronous machine. 3
- 2 Write the significance of voltage regulation of an alternator. 2
- 3 Write the effects of harmonics on a synchronous machine. 3
- 4 Draw the phasor diagram of an alternator at leading power factor showing voltages, currents and voltage drops. 2
- 5 What steps are to be taken before disconnecting one alternator from parallel operation? 3
- 6 Write the importance of synchronous condenser. 2
- 7 Write the consequences of instability of synchronous machines. 3
- 8 Write the applications of hysteresis motors and switched reluctance motors. 3
- 9 Draw the functional representation of linear induction motors. 2
- 10 Find the frequency of emf generated in a 8-pole alternator running at 900 r.p.m. 2

PART – B (5x10 = 50 Marks)

- 11 a) Discuss in detail the various types of windings in synchronous machines with a neat layout. 3
- b) The armature of an 8-pole, 3-phase, 50 Hz alternator has 18 slots and 10 conductors / slot. A flux of 0.04 Wb is entering the armature from one pole. Calculate the induced emf per phase. Assume the necessary data. 4
- 12 a) Draw the phasor diagrams of alternator with non-salient poles and discuss in detail the importance of O.C and S.C. characteristics. 5
- b) A 3-phase star connected alternator with synchronous impedance of $0+j5\ \Omega$ per phase is connected to an 22 KV system. The alternator power output is found to be 20 MW and reactive power output as 3 MVA. Compute the magnitude of excitation voltage, load angle, line current and power factor. 5
- 13 a) Discuss in detail the ZPF methods of finding regulation of synchronous generator. 5
- b) A 2000 V, 3-phase, star-connected synchronous motor has resistance and synchronous reactance per phase of $0.2\ \Omega$ and $1.9\ \Omega$ respectively. Calculate the generated emf per phase with an input of 800 KW at 0.8 lagging power factor. 5

- 14 a) Explain in detail the hunting phenomenon in synchronous machine and how it can be prevented. 5
- b) Explain from physical considerations, how a synchronous motor can be made to operate at leading or lagging power factors and verify with suitable phasor diagrams. 5
- 15 a) Explain steady state stability limit and how it can be improved for synchronous machine. 5
- b) Explain the principle and operation of hysteresis motors and give their applications. 5
- 16 a) Discuss in detail the working principle and characteristics of two-phase servo motors. 5
- b) Explain how the synchronous impedance affects the value of the load angle to maximum power delivered when the machine acts as motor. 5
- 17 Write short notes on: 10
- a) Synchronous condenser Vs synchronous motor
- b) Linear induction motors
- c) Switched reluctance motors.

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II-Semester (Main & Backlog) Examination, May / June 2018

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 Explain the characteristics of a Physical Systems. | 2 |
| 2 A Thermometer requires one minute to indicate 98% of the response. What is the time constant? | 3 |
| 3 With a block diagram explain the Final Control Element. | 3 |
| 4 Explain the Electronic Controller. | 2 |
| 5 What is meant by Tuning of controller? | 2 |
| 6 A temperature controller has a range of 200 to 340 and a set point of 284K. Find the percent of span error when the temperature is 279K. | 3 |
| 7 What is Offset error? | 2 |
| 8 Elaborate the selection of control valves. | 3 |
| 9 With a neat circuit diagram explain the Relay controller. | 3 |
| 10 Write the Ladder Logic for an AND gate. | 2 |

PART – B (5 x 10 = 50 Marks)

- | | |
|--|---|
| 11 a) With a Schematic Diagram explain Gas Process. | 5 |
| b) With a Schematic Diagram explain the Pressure Element Lag. | 5 |
| 12 a) Explain PID controller with analytical expression. | 5 |
| b) A proportional derivative controller has a sensitivity K_e of 1.0 and a derivative time (T_d) of 1.0 minute. If the deviation is sinusoidal calculate the phase of oscillation of the manipulated variable. | 5 |
| 13 a) With a block diagram explain ON-OFF Controller. | 5 |
| b) With a Schematics diagram explain single speed floating control. | 5 |
| 14 a) With a neat diagram explain the Hydraulic Actuator. | 5 |
| b) With a neat diagram explain Pneumatic valve positioner. | 5 |
| 15 a) Explain the programming pattern of PLC with suitable example. | 5 |
| b) Draw the block diagram of PLC and explain its principle of operation. | 5 |
| 16 a) Explain ladder diagram with an example. | 5 |
| b) An equal percentage valve has a maximum flow of 50 cm ³ /s and a minimum of 2 cm ³ /s. If the full travel is 3 cm. Find the flow at 1 cm opening. | 5 |
| 17 Write short notes on : | |
| a) Thermal Processes | 4 |
| b) Two Position Floating Controller | 3 |
| c) Integral control mode | 3 |

FACULTY OF ENGINEERING
B.E. 3/4 (ECE) II - Semester (Main & Backlog) Examination, May / June 2018

Subject: Digital Signal Processing

Time: 3 Hours

Max. Marks: 75

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

PART-A (25 Marks)

- | | | |
|-----|--|---|
| 1. | Differentiate between Linear convolution and Circular convolution | 3 |
| 2. | Find DTFT of unit step sequence | 3 |
| 3. | List the characteristics of FIR filters designed using window functions | 3 |
| 4. | What is Gibb's phenomenon? | 2 |
| 5. | What is Prewarping? | 2 |
| 6. | Apply impulse invariant transformation to $H(S) = 2/(S+1)(S+2)$ With $T = 1$ sec and find $H(z)$ | 2 |
| 7. | Explain the necessity of Multi rate digital Signal processing | 3 |
| 8. | Define Upsampling and Down Sampling operations in Multirate DSP. | 2 |
| 9. | Explain Sub-band Coding of Speech signals | 3 |
| 10. | List the on-chip peripherals in TMS320C54XX processor | 2 |

PART-B (50 Marks)

- | | | |
|--------|---|----|
| 11. a) | Find the DFT of the sequence $x(n) = \{1, 2, 3, 4, 4, 2, 3, 1\}$ using DIT algorithm | 4 |
| b) | Given $X(k) = \{28, -4+j9.656, -4+j4, -4+j1.656, -4, -4-j1.656, -4-j4, -4-j9.656\}$, find $x(n)$ using IFFT algorithm using DIT Method. | 6 |
| 12. a) | Design a FIR high pass filter of length 11 to approximate the ideal characteristics with cutoff frequency 1 KHz. Assume suitable sampling frequency. Use hamming window | 6 |
| b) | State the desirable properties of windows/salient features of windows | 4 |
| 13. a) | Obtain the direct form I, Direct form II, cascade and parallel realization for the following system $y(n) = -0.1x(n-1) - 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$. | 7 |
| b) | Discuss the limitation of designing and IIR filter using impulse invariant method | 3 |
| 14. a) | Determine digital Butter worth filter satisfying the following specifications:
$0.707 \leq H(e^{j\omega}) \leq 1$, for $0 \leq \Omega \leq \pi/2$
$H(e^{j\omega}) \leq 0.2$, for $3\pi/4 \leq \Omega \leq \pi$
Assume $T = 1$ sec. Apply bilinear transformation method. | 10 |
| 15. a) | Explain how to achieve sampling rate conversion by a factor of I/D with relevant diagrams | 7 |
| b) | Explain the sampling rate conversion by an Arbitrary factor | 3 |
| 16. a) | Explain the Circular and Bit-Reversed Addressing modes of DSP processor | 4 |
| b) | Explain how the rounding operation is carried out by the adder/multiplier units of TMS320C54XX | 6 |
| 17. | Write any Two of the following: | 10 |
| a) | On – Chip memory and Off-chip memory | |
| b) | Merits and demerits of FIR filters | |
| c) | Overlap save method of convolution | |

FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) II-Semester (Main & Backlog) Examination, May / June 2018

Subject : Metal Cutting & 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 What are the properties of cutting tool materials?
- 2 Differentiate between orthogonal and oblique cutting.
- 3 Define tool wear and mention various types of tool wear.
- 4 What is machinability and machinability index?
- 5 How do you specify a lathe machine?
- 6 What are various operations possible on drilling machine?
- 7 Briefly explain about abrasives used in grinding wheel.
- 8 Explain the concept of thread milling.
- 9 Differentiate between jigs and fixtures.
- 10 List out various factors to be considered in choosing an appropriate unconventional machining process.

PART – B (50 Marks)

- 11 a) List out various cutting tool materials and explain any one of them.
b) Explain about continuous chips with built up edge along with its adverse effects.
- 12 a) Discuss about the role of using cutting fluids in metal cutting.
b) Define tool life and explain Taylor's tool life equation.
- 13 a) Differentiate between Capstan Lathe and Turret Lathe.
b) Give the nomenclature of drill bit with a neat sketch.
- 14 a) How do you specify a grinding wheel? Give an example.
b) Explain the concept and salient features of gear lobbing.
- 15 Explain in detail about the working principle and salient features of Electric Discharge Machining (EDM) with a neat sketch.
- 16 a) Give the nomenclature of single point cutting tool by ASA system.
b) Explain the concept of broaching and burnishing.
- 17 Write short notes on any three of the following :
 - a) Chip breakers
 - b) Merchant's analysis
 - c) Indexing methods
 - d) Quick return motion mechanism

FACULTY OF ENGINEERING**B.E. 3/4 (Prod.) II-Semester (Main & Backlog) Examination, May / June 2018****Subject : Metal Casting and Welding****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 State Siverts Law
- 2 State various colour codes for patterns
- 3 When do you prefer continuous casting? And mention its advantages.
- 4 What is necessity of casting inspection?
- 5 What is brazing? When do you prefer brazing?
- 6 State the chemical reaction in thermit welding
- 7 Explain the principle of resistance welding.
- 8 Suggest a method to join two dissimilar methods
- 9 Differentiate between thermo plastics and thermo setting plastics.
- 10 What do you understand from MEMS?

PART – B (5 x 10 = 50 Marks)

- 11 a) Explain directional solidification in casting.
b) Briefly explain the procedure of rise design.
- 12 a) Explain the principle of centrifugal casting with the help of sketch.
b) Explain the principle of die casting and mention its applications.
- 13 a) Explain the principle of operation of any two solid state welding process.
b) Explain plasma arc welding process.
- 14 a) Explain the difficulties to weld the two stainless steel plates.
b) Explain the process of welding of Aluminum alloys.
- 15 a) Explain any two tests used of welding.
b) Explain the principle of operation of blow moulding and mention its applications.
- 16 a) Explain the process of charge calculating in cupola furnace.
b) Explain the process of electro-slag welding.
- 17 Write short notes on :
 - a) Composite materials
 - b) GTAW

FACULTY OF INFORMATICS

B.E. 3/4 (IT) II-Semester (Main & Backlog) Examination, May / June 2018

Subject : Data Warehousing & Data Mining

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 mining? 2
- 2 What is concept hierarchy? Give few examples. 3
- 3 What is binning? Smooth the following data by bin means and bin boundaries :
4,8,15,21,21,24,25,28,34. 3
- 4 Define correlation analysis. 2
- 5 Define a) Item set b) Frequent item set c) Candidate set 3
- 6 What are ensemble methods? Explain briefly. 3
- 7 Mention the applications of clustering. 2
- 8 What is cluster property? 2
- 9 What are various measures use in text mining? 3
- 10 Define web mining. 2

PART – B (50 Marks)

- 11 a) Explain various data mining functionalities. 5
b) Discuss various issues in data mining. 5
- 12 a) Explain the multitier architecture for a data warehouse. 5
b) How do you design a data warehouse? Explain. 5
- 13 A database has five transactions. Let min-sup=60% and min-conf=80%

TID	Items-bought
T100	{M,O,N,K,E,Y}
T200	{D,O,N,K,E,Y}
T300	{M,A,K,E}
T400	{M,U,C,K,Y}
T500	{C,O,O,K,I,E}

Write and explain Apriori algorithm to find all frequent item sets and strong association rules for the above database. 10

- 14 a) What are the metrics for evaluating classifier performance? Explain briefly. 5
b) Explain the techniques to improve classification accuracy. 5
- 15 a) What are the requirements for cluster analysis? 5
b) How do we measure clustering quality? Explain. 5
- 16 a) Explain outlier detection in high-dimensional data. 5
b) What is spatial mining and multimedia mining? 5
- 17 Write short notes on the following :
 - a) Proximity measures for binary attributes 3
 - b) Metadata repository 3
 - c) K-nearest neighbors 4

FACULTY OF ENGINEERING
BE 3/4 (CSE) II-Semester (Main & Backlog) Examination, May / June 2018

Subject: Design & Analysis of Algorithms

Time: 3 Hours

Max. Marks: 75

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

PART-A (25 Marks)

1. In the algorithm given, check whether you can reduce the execution time by any means; [2]


```

      Fun (n)
      if n=1 then
      return 1;
      else
      return fun (n-1)+fun(n-1)
      
```
2. An array has 'n' nodes, filled with set {0,1,.....} There are no duplicates. Design an O(n) worst case algorithm to find which element from the above set is missing [3]
3. What is the drawback of greedy algorithm? [2]
4. Show the intermediate steps when the number {123, 23, 1, 43, 54, 36, 75, 34} are sorted using merge sort. [3]
5. Why multistage graphs are needed? [3]
6. What is Knapsack Problem? [2]
7. Define chromatic number of a graph. [2]
8. Define a strongly connected digraph and give the minimum in-degree of all nodes in the graph [3]
9. State node covering decision problem [2]
10. What is NP completeness? [3]

PART-B (50 Marks)

11. (a) Define asymptotic notation with examples with time and space complexity estimation [4]
- (b) Write Binary search algorithm and analyze its time complexity [6]

12. (a) Using Divide and conquer approach find max and min in a set of 'n' elements.

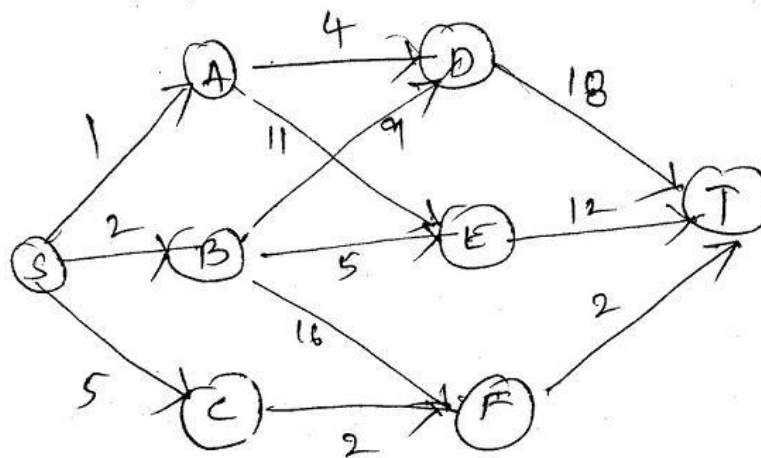
Also find the recurrence relation for the number of elements compared [5]

(b) Find an optimal solution to the Knapsack instance $n=7$, $m=15$

$(P_1, P_2, P_3, \dots, P_7) = (10, 5, 15, 7, 6, 18, 3)$

$(W_1, W_2, \dots, W_7) = (2, 3, 5, 7, 1, 4, 1)$ [5]

13. (a) Using dynamic programming solve the following graph using backward approach [10]



14. Using backtracking, find optimal solution to Knapsack problem for instance $n=7$,

$m=110$ $(P_1, P_2, \dots, P_7) = (11, 21, 32, 33, 43, 53, 55, 65)$ and $(W_1, \dots, W_7) = (1, 11,$
 $21, 33, 43, 53, 55, 65)$ [10]

15. (a) What is NP-Hard code generation problem [5]

(b) Give details about logic programming in perspective problem. [5]

16. What is Hamiltonian problem? Explain with example using backtracking [10]

17. Write a short notes on

(a) Lower Bound Theory [5]

(b) Heapsort working procedure [5]

FACULTY OF ENGINEERING**B.E. 3/4 (AE) II– Semester (Main & Backlog) Examination, June 2018****Subject : Performance & Testing of automotive Vehicles****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A & Part-B & any five questions from Part-B.****PART – A (25 Marks)**

1. Define Tractive Resistance?
2. Explain the term draw bar pull?
3. List out the various types of clutches.
4. What do you understand by over drive?
5. Explain Engine Rating.
6. What are the factors affecting the Mechanical efficiency of an engine?
7. What is the function of a stabilizer bar in suspension systems?
8. Give the main troubles of brakes and their causes.
9. What is ignition timing and How to test the ignition timing?
10. Explain emission testing.

**PART – B (5x10 = 50 Marks)
(Essay Answer Type)**

- 11.a) Discuss the method of determining CG of a vehicle? [5]
b) Explain the differences between traction and tractive effort with neat sketch [5]
12. Explain briefly the working principle of simple Epicyclic gear and explain how to calculate the gear Ratios for 1st, 2nd and Reverse gear Ratio? [10]
13. Explain the following [3]
a) Scavenge efficiency [3]
b) SAE Rating [4]
c) In-complete combustion [3]
14. Discuss the control systems in automobile Braking systems and its characteristics. [10]
15. List out the types of engine testing? Explain any two briefly with neat sketch. [6]
(a) Vehicle testing on chases dynamometer [4]
(b) Types of engine noise's and reasons associated with each [4]
16. A single plate clutch, with both sides effective, has outer and inner diameters 300 mm and 200 mm respectively, the maximum intensity of pressure at any point in the maximum intensity of pressure at any point in the contact surface is not to exceed 0.1 N/mm^2 . If the coefficient of friction of 0.3, determine the power transmitted by a clutch at a speed 2500 rpm. [10]
17. a) Draw the Rack and pinion steering gear mechanism, and explain the principle of operation. [5]
b) In hydraulic Braking system calculate the total force on front and Rear brakes taking input forces as 100N, Area of master cylinder is 4 cm^2 , Front disc caliper piston area 20 cm^2 Rear wheel cylinder Area 10 cm^2 take leverage ratio as 4. [5]
