# FACULTY OF ENGINEERING

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

### Subject : Building Technology and Services

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 | Mention the principles to be considered for judging plans. | (2) |
| 2 | What are the design considerations for comfort? | (3) |
| 3 | Write briefly about reverberation in buildings. | (3) |
| 4 | What are dead spots? | (2) |
| 5 | What are the essential requirements of a good trap? | (2) |
| 6 | List out safety precautions for lifts. | (3) |
| 7 | Describe the necessity of green buildings. | (3) |
| 8 | Write the principles of green building. | (2) |
| 9 | What are Boolean commands? | (2) |
| 10 | Explain the step by step procedure to draw a cylinder using Auto CAD. | (3) |

## PART – B (50 Marks)

11 (a) Explain the significance of Aspect and Prospect for residential buildings.
   (b) What is the need of ventilation in buildings? Describe briefly the functional requirements of a good ventilation system.

12 (a) Write about three characteristics of sound.
   (b) Explain in detail about Porous Absorbents and composite type of Absorbents.

13 (a) What are the different sanitary fittings normally used in buildings? Explain in detail about the function of flushing cistern.
   (b) Write a short note on Fire resistance in structural elements.

14 (a) What are building bye- laws? State the objectives of building bye laws.
   (b) Draw the circulation diagram for a residential building and explain the importance of circulation in buildings.

15 (a) Explain the meaning of Green building. State the different ratings of green buildings under LEED.
   (b) Write a short note on energy consumption in buildings.

16 Sketch the plan of an office building facing east, given the sizes of different rooms as
   (i) Principals cabin = 6m$^2$   (ii) Visitors Lounge = 12 m$^2$
   (iii) Verandah = 4.5m$^2$      (iv) Toilets two nos. =3m$^2$ each
   (iv) Administrative office = 28 m$^2$
   Provide Doors and windows where ever necessary with suitable dimensions.

17   Write short notes on the following:
   (a) Effective water conservation systems
   (b) Different views in Auto CAD 3D

\*\*\*\*\*

# FACULTY OF ENGINEERING

### B.E. 3/4 (EEE / Inst.) I – Semester (Main) Examination, December 2015

### Subject: Digital Electronics and Logic 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 | State and explain the basic Boolean logic operations. | 3 |
| 2 | Expand $A(\overline{B} + A)B$ to maxterms and minterms. | 2 |
| 3 | Differentiate between encoder and decoder. | 3 |
| 4 | What is noise margin? | 2 |
| 5 | What is a magnitude comparator? | 2 |
| 6 | With an example explain about excess-3 arithmetic. | 3 |
| 7 | Write about debouncing switch. | 3 |
| 8 | Define ring counters. | 2 |
| 9 | List out the applications of registers. | 3 |
| 10 | What is state diagram? | 2 |

### PART – B (5x10 = 50 Marks)

11 Reduce the following expressions using k-map

   a) $AB + A\overline{B}C + \overline{A}B\overline{C} + B\overline{C}$

   b) $A\overline{B}C + B + AB\overline{D} + A\overline{C}$   10

12 a) Explain about wired AND operation.   5
   b) Implement y-input multiplexer.   5

13 Implement half adder and full adder.   10

14 How does a J-K flip-flop differ from an S-R flip-flop in its basic operation? Explain.   10

15 a) What are the steps involved in design of counters.   3
   b) Give an example to realize PROM.   7

16 Discuss about
   a) ECL and   5
   b) Sequence detector   5

17 a) Minimize f(W, x, y, z) = Σ (1, 5, 6, 7, 11, 12, 13, 15).   5
   b) Explain two's complement arithmetic.   5

****

# FACULTY OF ENGINEERING
### B.E. 3/4 (ECE) I – Semester (Main) Examination, December 2015

### Subject : Analog Communications

**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   A transmitter radiates 9 kW without modulation and 10.125 kW after modulation.
    Determine depth of modulation.                                                3
2   Define the transmission efficiency of AM signal.                             2
3   Differentiate between narrow band and wide band FM signals.                  3
4   For an FM modulator with a peak frequency deviation f = 20 kHz, a modulating
    signal frequency fm = 10 kHz. Find the bandwidth using carson's rule.        2
5   Define sensitive and selectivity in radio receivers.                        3
6   Classify Radio transmitters.                                                2
7   What are the various sources of noise?                                      3
8   Define Signal to noise ratio and noise figure of a receiver.               2
9    State sampling Theorem.                                                    3
10  How is PDM wave converted into PPM system.                                  2

### PART – B (50 Marks)

11.  a)  Explain the generation of AM wave using square law modulator along with       6
         relevant diagrams and analysis.
     b)  If a sinusoidal message signal is modulated with modulation index of 0.4 and   4
         0.5, then
          (i) Find the efficiency of AM signal. (ii) When is 100% modulation achieved.
12.  a)  An FM wave is defined by s(t) =10cos(2t sin(6πt)).Find the instantaneous       4
         frequency of s(t).
     b)  Explain the working of Balanced slope detector used for FM demodulation        6
13.  a)  Explain in brief, the factors must be considered while selecting the           5
         Intermediate frequency in radio receiver. What is the value of IF chosen in
         India for radio broadcasting?
     b)  With the aid of the block diagram explain TRF receiver. Also explain the        5
         basic super heterodyne principle.
14.  a)  Derive the expression for figure of merit of AM system.                        6
     b)  Calculate the noise voltage at the input to an amplifier using a device that has  4
         200W equivalent resistance and a 300W input resistor. The bandwidth of the
         amplifier is 6 MHz and the temperature is 170 C.
15.  a)  Describe the generation and demodulation of PPM with the help of block         6
         diagram .
     b)  Discuss about the spectra of PWM signals.                                      4
16.  a)  What is the need of the following in a radio receiver, explain giving examples:   6
         (i) AGC    (ii) Mixer     (iii) Intermediate amplifier
     b)  Explain the need for pre-emphasis in FM. How is it implemented?                4
17.      Write short notes on
         a)  Vestigial Side band Modulation                                             5
         b)  Noise in Two port Networks                                                 5

*****

# FACULTY OF ENGINEERING

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

### Subject : Hydraulic Machinery and 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   A jet of water of 8 cm diameter impinges normally on a fixed plate with an velocity of 25 m/s.  The force exerted on the plate is                                     3
    a)  3141.59N          b)  3161.60N          c)  3141.72N          d)  3160.3N

2   Efficiency of a jet of water having velocity 'v' and striking vertical plates moving with a velocity 'u' is maximum when                                                3
    a)  u = 2V          b)  u = v/2          c)  u = 3v/2          d)  u = 4v/3

3   A Pump delivers 0.019 cumecs against a head of 16.76m with a rotational speed of 1750 rpm.  The specific speed of pump is                                        3
    a)  1502          b)  1505          c)  1504          d)  1508

4   If the NPSH requirement for the pump is not satisfied, then                        2
    a)  no flow will take place              b)  cavitation will be formed
    c)  efficiency will below               d)  excessive power will be consumed

5   The water flow into air vessel of a reciprocating pump when crank makes an angle of 2
    a)  $18^0$ 34' and $161^0$ 26'              b)  $0^0$ to $18^0$ 34'
    c)  $160^0$ to $180^0$                      d)  non of the above

6   A hydraulic ram utilizes water under a head of 2m and delivers against an effective head  of  20m.  If  the ratio of water raised to water wasted by the ram is 1 : 12.  The efficiency of the ram is                                               3
    a)  69.2%          b)  69%          c)  69.28%          d)  68%

7   A Pelton wheel develops 1750 kW under a head of 100 meters while running at 200 rpm  and  discharging  2500  litres  of  water  per  second.   The  unit  discharge  of  the wheel is                                                                       3
    a)  0.24 m$^3$/s          b)  0.25 m$^3$/s          c)  0.26 m$^3$/s          d)  0.23 m$^3$/s

8   A centrifugal pump is required to lift water to a total head of 40m at the rate of 50 lit/s.  If the over all efficiency is 62%.  The power required for the pump is        3
    a)  30.6 kW          b)  31.7 kW          c)  31.6 kW          d)  30 kW

..2

9  An accumulator has a ram of area 2m$^2$ and a lift of 10m.  If the water is supplied at a pressure of 150 kPa.  The capacity of the accumulator is                    2
   a)  3000 KN-m        b)  3050 kN-m        c)  3070 kN-m        d)  None of the above

10 Which of the following pump is suitable for small discharge and high heads?          1
   a)  Centrifugal pump                    b)  axial pump
   c)  mixed flow pump                    d)  reciprocating pump

**PART – B**  (5 x 10 = 50 Marks)

**Note : Any missing data may be assumed suitably and indicate the same clearly.**

11 A jet of water 8cm in diameter and moving with a velocity of 28m/s is impinging normally on a plate.  Determine the pressure on the plate when the plate is fixed and when the plate is moving with a velocity of 13m/s in the direction of the jet.  Also, determine the work done per second by the jet.

12 A single acting reciprocating pump has a plunger 200mm and stroke 400mm.  The diameter of the delivery pipe is 100mm and length 40m.  Find the power saved by fitting an air vessel on the delivery side of the pump.  The speed of the pump is 60 rpm and f = 0.02.  Assume the necessary data if required.

13 The diameters at the inlet and the outlet of the impeller of a centrifugal pump are 200mm and 400mm respectively.  The pump raises water to a height of 25m. Determine the minimum starting speed of the pump to deliver water.

14 A Francis turbine works under a head of 25m producing 3675 kW at 150 rpm. Determine the,
   i)   Unit power and unit speed of the turbine,
   ii)  Specific speed of the turbine and
   iii) Power developed by this turbine if the speed is reduced to 100 rpm

15 What are the different types of characteristics curves for turbines?  Explain briefly.

16 Explain the working principle and basic components of hydraulic circuits with a neat sketch.

17 Write short notes on the following :
   i)   Selection criteria for pumps and actuators
   ii)  Circuit for control of single and double acting actuators

\*\*\*\*\*\*

# FACULTY OF ENGINEERING

### B.E. 3/4 (Prod.) I – Semester (Main) Examination, December 2015

### Subject: 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. Sketch cutting forces of turning process.
2. What are the various sources of heat in turning process?
3. Explain the importance of +ve and –ve rake angle in machining.
4. Give the tool signature in ASA system.
5. What do you understand by a) live centre and b) dead centre of lathe?
6. When is differential indexing method is used? What is gear ratio?
7. What are the bonds used for grinding wheel manufacturing?
8. How is jig boring machine tools differ from conventional machine tools?
9. Write few motion statements in APT language.
10. differentiate between CNC and DNC.

### PART – B (5x10 = 50 Marks)

11 a) Sketch a drill bit and label all elements on it.     5
   b) Discuss various types of chips produced in machining process.     5

12 a) Define tool wear and explain in detail the types of tool wear with neat sketch.     6
   b) What are factors that influence tool wear?     4

13 a) What is tool life. Mention tailors tool life equation. Explain all the factors effecting tool life.     6
   b) How do we specify a lathe?     4

14 a) Differentiate between capstan and turret lathe.     5
   b) What is tool layout? And write the tool layout for producing hexagonal nut.     5

15 a) Sketch and explain construction and working of radial drilling machine.     5
   b) Explain with a suitable sketch working of jig boring machine.     5

16 a) Explain any one quick return motion mechanism of shaper.     5
   b) What are the different artificial bonds used in grinding wheel? What are their advantages?     5

17 Write short notes on:     10
   a) Group technology
   b) CAPP
   c) CIM

****

# FACULTY OF ENGINEERING

### B.E. 3/4 (AE) I – Semester (Main) Examination, December 2015

### Subject: Automotive Chassis Components

**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 chassis. Name the components of a chassis.
2   What are the functions of a frame in an automobile?
3   What are requirements of a good steering system?
4   Why for the front axle do we have I-section in the middle and elliptical section at the ends?
5   What is the function of Hooke's joint?
6   What are the different loads acting on the rear axle?
7   What are the functions of suspension in a motor vehicle?
8   What are the advantages of an air suspension system?
9   Why do we not use brakes with more than 80% efficiency in automobiles?
10 What are the advantages of hydraulic brakes over mechanical brakes?

## PART – B (5x10 = 50 Marks)

11 a)  Give a detailed classification of chassis with the help of suitable diagrams.
    b)  Sketch a conventional frame and name its different members. What are its design features?

12 a)  Explain briefly about sub-frames.
    b)  Explain the various steering troubles and suggest suitable remedies.

13 Explain the terms Camber, Castor, King-pin inclination, toe-in and toe-out. What are the effects of each on the steering characteristics of a vehicle?

14 a)  Discuss the construction and operation of a differential.
    b)  Distinguish between semi-floating and fully floating rear axles with suitable sketches and explain their relative merits and demerits.

15 a)  Explain in detail the construction and function of a leaf spring with suitable sketch.
    b)  What is the purpose of independent suspension? Explain any one type of independent suspension with a sketch.

16 a)  Describe any one type of mechanical brake with the help of neat sketch.
    b)  Give the main troubles of brakes, their causes and remedies.

17 Write short notes on the following:
    1)  Stub Axles
    2)  Tandem Master cylinder
    3)  Helper springs

**\*\*\*\***

# FACULTY OF ENGINEERING

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

### Subject : Software 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 personal and team process models. | 3 |
| 2 | What is a core product? | 2 |
| 3 | What is work breakdown structure? | 2 |
| 4 | What is "collaborative requirements gathering"? Enlist the guidelines for it. | 3 |
| 5 | Define use-case diagram. Explain with an example. | 3 |
| 6 | Define abstraction. | 2 |
| 7 | What is transform mapping? | 2 |
| 8 | What is regression test? | 3 |
| 9 | What is function point? How do you compute function points? | 3 |
| 10 | How are verification and validation important individually? | 2 |

## PART – B (50 Marks)

| | | |
|---|---|---|
| 11 a) | What is process framework? Explain about the umbrella activities of a software process framework? | 5 |
| b) | Explain unified process model. | 5 |
| 12 a) | What is Risk? Explain how risk is managed? | 5 |
| b) | List various requirements engineering tasks. Explain about inception in detail. | 5 |
| 13 a) | How to create a behavioural model? Explain about the state representations. | 5 |
| b) | Explain design concepts. | 5 |
| 14 | Explain architectural styles and patterns in detail. | 10 |
| 15 | Explain white-box testing and black-box testing. | 10 |
| 16 a) | Brief about top-down and bottom-up integration testing. | 5 |
| b) | What is a metric? Explain the metrics for design model? | 5 |
| 17 | Write short notes on : | |
| a) | Agile process | 4 |
| b) | Design evaluation | 3 |
| c) | Debugging | 3 |

******

# FACULTY OF INFORMATICS

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

## Subject : Operating 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 | What is a system call? | 2 |
| 2 | Explain about the concept of multithreading in detail. | 3 |
| 3 | What is a preemptive shortest job first algorithm? | 2 |
| 4 | State 3 ways to implement mutual exclusion in operating system. | 3 |
| 5 | What is the purpose of paging the page tables? | 3 |
| 6 | What problems could occur if the system allows a file system to be mounted simultaneously at more than one location? | 2 |
| 7 | What is the use of a working – Set window? | 2 |
| 8 | How does the principle of least privilege aid in the creation of protection system? | 3 |
| 9 | What are the advantages of remote procedure calls over regular message passing? | 2 |
| 10 | What are main contents of FCB? | 3 |

## PART – B (50 Marks)

11 a) Explain operating system structure.  3

b) Describe the actions taken by a thread library to content switch between user level threads.  7

12 a) With a suitable example explain the deadlock avoidance algorithms for a systems with multiple instances of a each resources type.  4

b) Explain the reader-writer problem of synchronization and explain the semaphore solution for it.  6

13 Draw the process state diagram and explain the transitions among the various states consider the following snapshot of a system.

| | Allocation | Max | Available |
|---|---|---|---|
| | A B C D | A B C D | A B C D |
| P0 | 0 0 1 2 | 0 0 1 2 | 1 5 2 0 |
| P1 | 1 0 0 0 | 1 7 5 0 | |
| P2 | 1 3 5 4 | 2 3 5 6 | |
| P3 | 0 6 3 2 | 0 6 5 2 | |
| P4 | 0 0 1 4 | 0 6 5 6 | |

Answer the following questions using the banker's algorithm.

1) What is the content of matrix need?  2

2) Is the system in a safe state  4

3) If a request from a process
P1 arriver for (0, 4, 2, 0) can the request be granted immediately.  4

14 a) Explain the advantages and disadvantages of contiguous Vs linked file allocation policies. 5

   b) Differentiate between paging and segmentation in detail. 5

15 a) What are implications of supporting Unix consistency semantics for shared access for those files that are stored as remote files system? 5

   b) Describe the different between symmetric and asymmetric multiprocessor. 5

16 Explain disk scheduling algorithms with examples in detail. 10

17 a) Discuss the strength and weakness of implementing an access matrix using access lists that are associated with objects. 5

   b) A Password may become know to other users in variety of ways. Is there a simple method for detecting that such an event occurred? Explain your answer. 5

\*\*\*\*\*\*