FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I – Semester (Main) Examination, December 2015
Subject : Estimating and Specifications

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 the relation between plinth area and carpet area?	3
2	Explain cubic rate method of estimation.	2
3	Explain the term contract.	3
4	What is M book?	2
5	Estimate the cost of labour charges towards double coat painting and one coat wood primer if the rate is Rs.15/- sq.ft. for a door opening of 2.1m x 1.2m with a bearing of 10cm and shutters are having a 2.5cm thick and frame of 10cm x 7.5cm.	3
6	What are the units in which DPC and skirting of a floor measured?	2
7	Find out the proportions of various materials required to prepare a 1 cubic meter of 1 : 4 cement mortar.	3
8	Explain the use of security money.	2
9	What is bar bending schedule?	3
10	When do you know the actual cost of the project?	2

PART – B (5 x 10 = 50 Marks)

11 Estimate the following items from the fig.1 by using centre line method.   10
    i)   Excavation of foundation
    ii) First class brick work from ground to plinth
    iii) 12mm interior cement plastering for rooms in 1 : 6

12 Estimate the steel and concrete for the stair case shown in the fig.2.   10

13 a) What is revised estimate? Explain briefly.   5
    b) Differentiate between lift and lead.   5

14 a) Explain terms of contracts.   5
    b) Distinguish between BOT and BOOT projects.   5

15 a) Differentiate between open specifications and restricted specifications.   5
    b) Explain briefly about the specifications to be considered in RCC.   5

16 Compute the unit rate for 1 : 4 : 8 with over burnt brick for 7.5 cm thick cement flooring. The labour requirement per cum is Head Mason 1/2no, Masons 10 nos and mazdoors 20 nos and the corresponding rate are Rs.450/-, Rs.400/-, Rs.350/- respectively. The cost of cement bag is Rs.350/- brick chips 20mm down Rs.2000/- per cum and sand Rs.1200/-cum.   10

17 Estimate the quantity of earthwork required for the following data for a road work.   10
The standard length of chain used is 20m.

Chainage	15	16	17	18	19	20	21
Ground level, m	88.1	87.54	87.6	88.2 9.4	90.75	90.25	89.9

The formation level at chainage 15 is 88.6m and the road has a rising gradient of 1 in 100. The formation width of road is 9m and the side slopes in cutting 1 : 1 and banking 2 : 1. Draw the longitudinal section of portion for the proposed road.
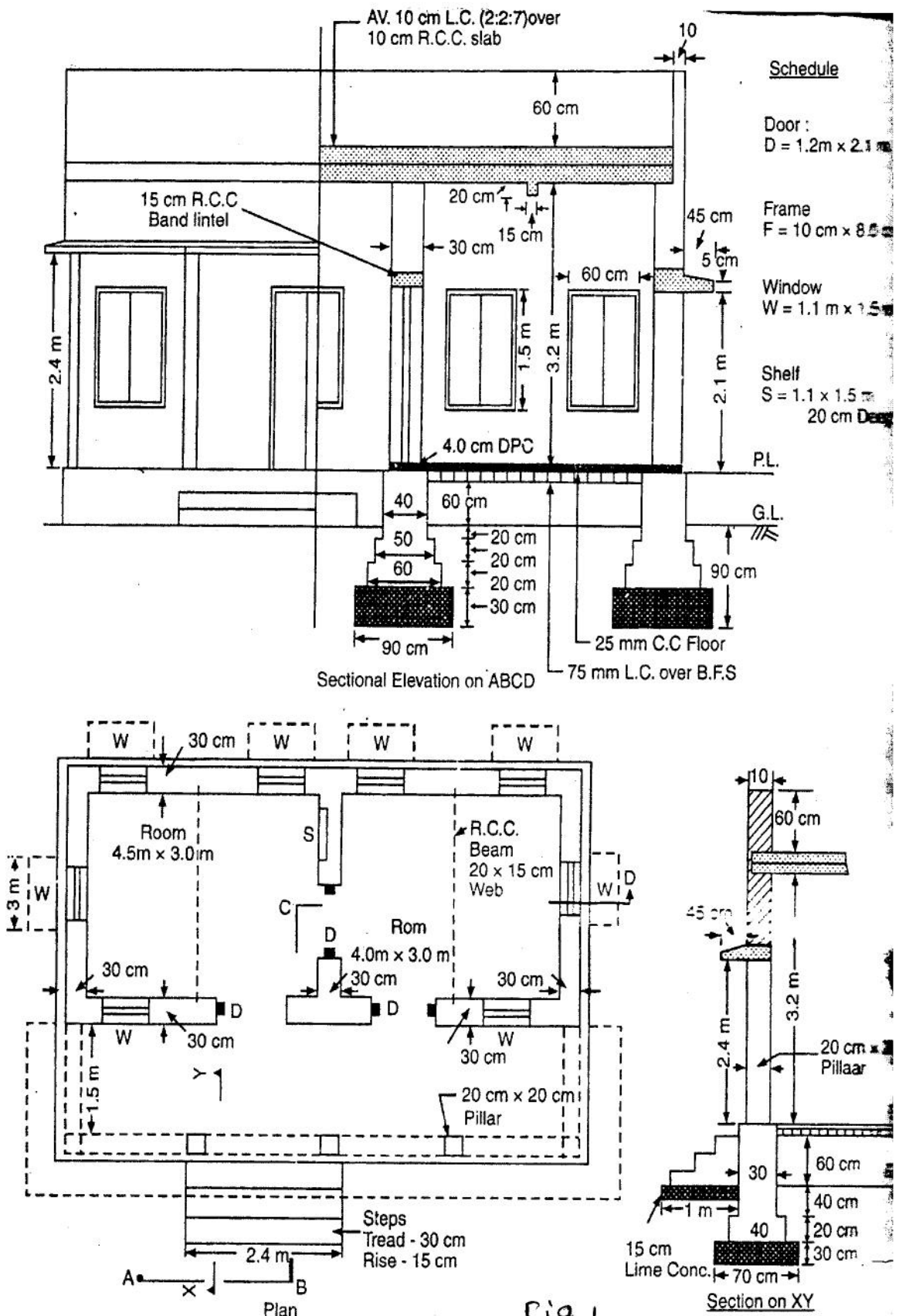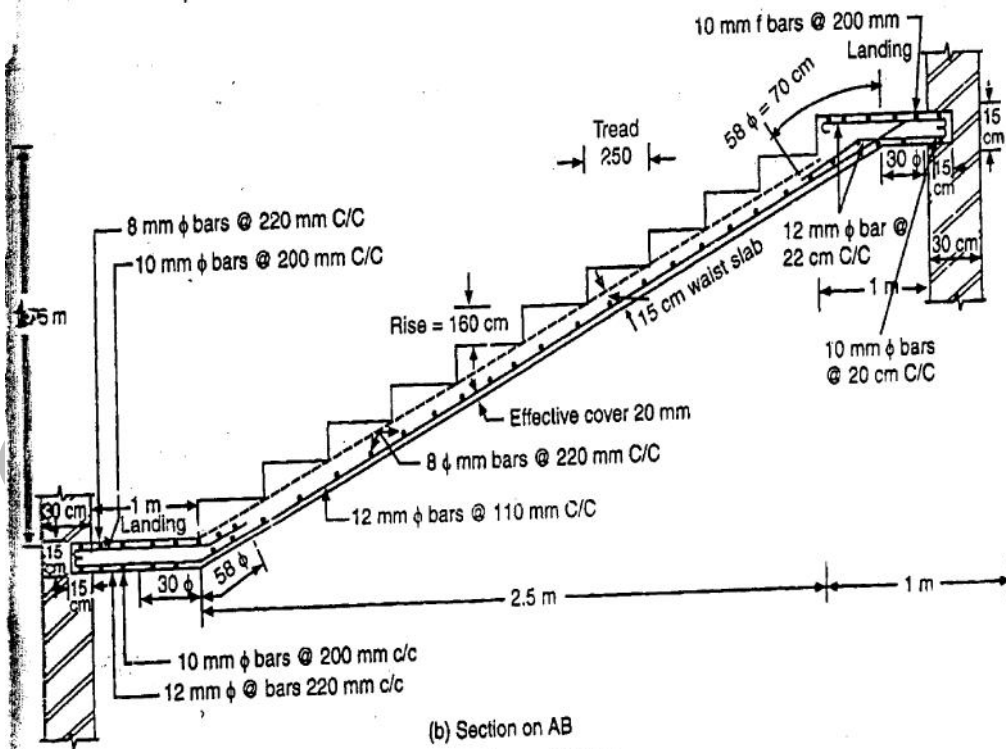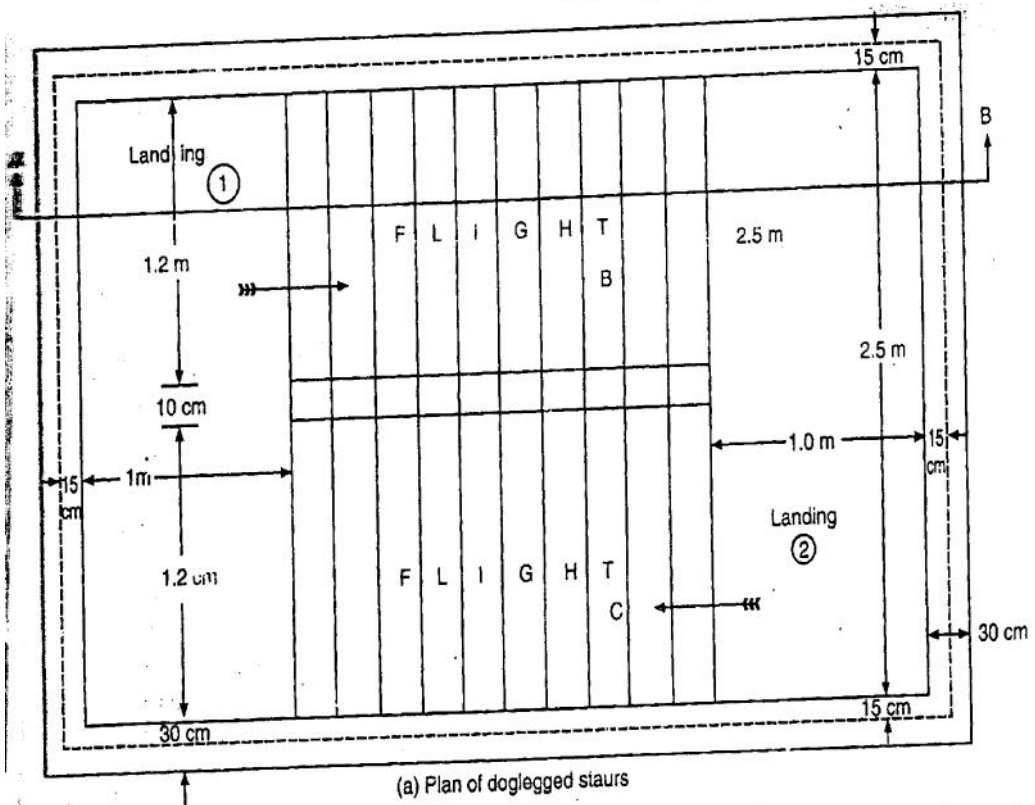
..2

AV. 10 cm L.C. (2:2:7)over
10 cm R.C.C. slab

60 cm

10

15 cm R.C.C
Band lintel

20 cm

30 cm

15 cm

60 cm

45 cm

5 cm

Schedule

Door :
D = 1.2m × 2.1 m

Frame
F = 10 cm × 8.5 cm

Window
W = 1.1 m × 1.5 m

Shelf
S = 1.1 × 1.5 m
20 cm Deep

2.4 m

1.5 m

3.2 m

2.1 m

4.0 cm DPC

P.L.

40

60 cm

G.L.

50

20 cm

60

20 cm

20 cm

30 cm

90 cm

90 cm

25 mm C.C Floor

75 mm L.C. over B.F.S

Sectional Elevation on ABCD

W   30 cm   W   W   W

3 m

W

Room
4.5m × 3.0 m

S

R.C.C.
Beam
20 × 15 cm
Web

W

D

C

D

Rom
4.0m × 3.0 m

30 cm

30 cm

30 cm

30 cm

D

D

W

W

30 cm

30 cm

1.5 m

Y

20 cm × 20 cm
Pillar

10

60 cm

45 cm

2.4 m

3.2 m

20 cm ×
Pillar

Steps
Tread - 30 cm
Rise - 15 cm

2.4 m

A   B

Plan

30

60 cm

1 m

40 cm

40

20 cm

15 cm
Lime Conc.

70 cm

30 cm

Section on XY

Fig.1

(a) Plan of doglegged staurs

(b) Section on AB

Flight B or C
Thickness of waist slab

= 150 = mm
size of tread = 250 mm

Fig.2

******

FACULTY OF ENGINEERING
B.E. 4/4 (Inst.) I – Semester (Main) Examination, December 2015
Subject : Opto-Electronics 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 Explain the process of population inversion in Lasers.	3
2 Mention the biomedical application of laser.	2
3 Define optical feedback in lasers.	2
4 In a Michelson's interferometer 200 finger are in the field of view when the movable mirror is moved through 0.0589 mm calculate the wavelength of light used.	2
5 Based on performance and cost compare the various techniques of laser fabrication.	3
6 Calculate the radius of curvature for optical fibre bend loss given core refractive index = 1.49 and cladding refractive index = 1.46 for a wavelength of 850 nm.	3
7 Describe the principle of operation of fibre optic phase sensor.	3
8 What are the characteristics of optical fibre which are useful for sensor design?	2
9 List various photo detectors used for optical instruments.	2
10 When a LED has 2v applied to its terminals, it draws 100 mA and produces 2 mw of optical power what is the LED's conversion efficiency.	3

PART – B (50 Marks)

11 With its construction and energy level diagram explain ND-YAG laser.	10
12 Describe Q-switching and explain any two methods of Q-switching in detail.	10
13 a) Explain threshold condition laser losses with necessary equations.	5
b) Explain Beam modulation telemetry in laser.	5
14 a) Explain laser strain gauge with a diagram.	5
b) Explain any two applications of laser machining.	5
15 a) With a diagram explain double crucible method of fibre perform manufacturing.	6
b) Explain electric arc fusion optical fibre splicing.	4
16 Explain measurement of the following parameters using optic fibre sensor. i) Voltage ii) Pressure	10
17 a) Explain the features of plasma display and draw its structural diagram.	5
b) With an equivalent circuit explain PIN photo diode.	5

*****

FACULTY OF ENGINEERING

B.E. 4/4 (ECE) 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	Write any four compiler directives in verilog HDL.	2
2	Give a verilog model for a D-flip-flop.	2
3	What are the input to synthesis process?	2
4	What is a netlist?	2
5	Explain latch-up effect and how to prevent latch-up problem.	3
6	What is chemical vapour deposition and oxidation?	3
7	Name six layers in CMOS circuit.	2
8	Draw the layout of CMOS NAND gate.	3
9	Draw the schematic diagram of BICMOS inverter.	3
10	Draw the logic diagram of NOR based ROM.	3

PART – B (50 Marks)

11 a) Explain various data types available in verilog.   4

   b) Write a verilog program for 4-bit full adder using 1-bit full adder.   6

12 a) What is synthesizer.   3

   b) Describe steps involved in a synthesis process.   4

   c) What are the various HDL synthesizer.   3

13 a) Derive an expression for ID in both linear and saturation region of a MOSFET.   5

   b) Draw the circuit diagram and characteristics of an inverter with various types of pull ups.   5

14 a) Design a CMOS circuit for OAI function.   4

$$f = \overline{(a+b) \cdot (a+c) \cdot (b+d)}$$

   b) How do you estimate delays in CMOS circuits?   6

15 a) Draw the stick diagram and layout of 3-input CMOS NOR gate.   5

   b) Explain lambda based design rules that are to be followed while drawing layouts.   5

16 Compare SRAM and DRAM. Explain read and write operations of SRAM and DRAM also explain 4T SRAM operation.   10

17 Write short notes on :

   a) Barrel shifter   5

   b) FSMS   5

******

FACULTY OF ENGINEERING

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

Subject : Metrology and Instrumentation

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   What are the application of different grades of slip gages?

2   What is the principle of the auto-collimator used in angle division?

3   What are different applications of micrometer in component geometry measurement?

4   What are the basic mechanisms used designs of dial gages?

5   Explain the surface finish term "Ra" with help of neat diagram.

6   What are gear geometries that are tested for functionality?

7   Explain the term accuracy of measuring instrument with help of neat diagrams.

8   Explain the principle of LVDT with help of neat diagram.

9   What is the relationship between electrical resistance with temperature?

10 On what principle the cutting tool temperature is measured?

PART – B (5 x 10 = 50 Marks)

11 a) Draw a neat sketch for the assembly 14h10G7 and indicate tolerances (hole and shaft), sizes (minimum and maximum) and both deviations (lower and upper) from the given data: shaft basis system –diameter 'd' range for hole 14-18, IT10=64i,
IT7=16i.

   b) Explain the procedure for manufacturing the end standards to geometry-rectangular bars.

12 a) The autocollimator readings were noted at 10 positions with equal length of 10mm. The angles measured in terms of seconds are noted below.

Positions	1	2	3	4	5	6	7	8	9	10
Reading Angle(")	4	4	6	-7	8	-12	10	22	-22	10

   Find the straightness of geometry of the surface.

   b) Explain the working of back pressure gage for different measurement with help of neat diagram.

13 a) Draw neat sketches of lay symbols =, X, M, C, R for surface finish.
   b) Draw neat diagram to geometric tests on the lathe machine for bed, spindle.

14 a) Explain the working the peizo-electric load cell.
   b) Derive the output response (Q_0) of first order system with ramp signal for given input signal (Qi).

15 a) Explain with help of neat diagram the working of vibrometer using seismic transducer.
   b) Explain the working of bulk modulus gage in pressure measurement.

16 a) Explain the various geometrical features measured using pneumatic jet gages with help of neat diagram.
   b) Explain the method used measure Cupola furnace temperature.

17 a) Draw the different thread pitch errors for metric thread.
   b) Derive the mathematical relationships between input and output for first and second order measuring systems.

******

FACULTY OF ENGINEERING

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

Subject : Artificial Intelligence

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 Heuristic search? Define a heuristic function for 8 tiles problem.   3

2 Represent in predict calculus the knowledge contained in the following sentences.   2
   a) All men are motral
   b) In some cities there are policemen who have been beaten by every thief in the city.

3 Define a frame in knowledge representation. Give an example.   2

4 What is a fluent? Write down a fluent for the following configuration of blocks.   3

```
   ┌───┐
   │ A │
   ├───┤   ┌───┐
   │ C │   │ B │
───┴───┴───┴───┴───
        Floor
```

5 Differentiate BFS and DFS algorithms in artificial intelligence.   3

6 Give a solution for the 4-queens problem using the constraint graph.   2

7 How do you represent time in A.I.? Define two relations between time intervals and represent it using a predicate calculus well-formed formula.   2

8 Explain in 4 or 5 sentences the two communication models among agents.   3

9 Draw a two-layer, feed-forward network with two inputs, two hidden modes and one output mode.   3

10 Differentiate between a crisp set and a fuzzy set. Define membership function in fuzzy systems.   2

PART – B (50 Marks)

11 Dr. Somebody, Dr. Anybody and Dr. Nobody are computer scientists. We know the following facts about them.   10
   (a) Dr. Somebody is an associate professor.
   (b) Dr. Nobody is an assistant professor and has published papers with Dr. Anybody.
   (c) Dr. Anybody is either an associate professor or an assistant professor but not both and has published papers with Dr. Somebody.
   Use resolution reputation to prove that an assistant professor has published papers With an associate professor.

12 Write short notes on :   10
   a) The minimax procedure
   b) The Alpha-beta procedure

13 What are the components of strips operator? Give an illustration of how forward search method proceeds by applying recursive strips. Draw a search graph generated by applying one operator.   10

14 Consider the example of "whether to wait for a table in a restaurant"? Specify a list of attributes required for illustrating this example as a learning problem. Apply decision tree learning algorithm and draw the resultant tree.   10

15 For a fuzzy room cooler form the fuzzy profiles and rules for the terms strong negative, negative, low negative, medium, low positive, positive and high positive for the water flow rate. The value of flow rate ranges from 0 to 1.6 and degree of membership ranges from 0 to 1.2. Draw the graph for the profile. Defuzzify the fuzzy output low positive.   10

16 Illustrate the three different pattern of inference using Baye's network with examples.   10

17 a) Explain heuristic repair algorithm with an example.   5
    b) Explain iterative deepening search algorithm with a diagram.   5

******