Code No. 5164 / S

FACULTY OF ENGINEERING

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

Subject: Structural Engineering Design and Detailing – I (RCC)

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

Note: Answer all questions from Part A. Answer any one questions from each unit of Part B.

PART – A (25 Marks)

1	Explain the need for the design of strap beam.	2
2	Differentiate between retaining wall and counterfort retaining wall.	3
3	Explain need for combined forting.	3
4	Give the limitations of the design of water tanks.	3
5	What is Pigeaud's method?	3
6	What is need for the design of bracings in water tanks?	2
7	What is the nominal reinforcement provided for the design of domes?	2
8	How do you arrive the design bending moments and design shear forces in design of bridge slabs?	3
9	What is the advantage of effective width method?	2
10	Differentiate between class AA loading and class 70R loading.	2

PART – B (5x10 = 50 Marks)

Unit - I

11 Design a combined rectangular footing for two columns A and B carrying loads 750 kN and 1500 kN respectively using the following data:

Cross-section of column A = 400 mm x 400 mm
Cross-section of column B = 600 mm x 600 mm
Spacing of columns = 5 m c/c
SBC of soil at site = 150 kN/m^2
Use M20 grade concrete and Fe 415 grade steel. (15)

OR

12 Design a counterfort-type retaining wall to support a soil embankment with sloping discharge:

Height of fill retained by wall = 9 m
Surcharge angle = 10^o
Density of soil = 16 kN/m^3
Angle of internal friction ¤ = 30^o
Coefficient of friction between soil and base slab = 0.5
SBC of soil = 250 kN/m^2
Materials used = M30 and Fe 415
Design the counterfort retaining wall and sketch the reinforcement details. 15

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Unit - II

13 A circular water tank (RC) of 5 m diameter and 3 m height is supported by a tower consisting of six RC columns on a circle of 5 m diameter. The tank is to be designed to hold water upto a depth of 2.75 m. Design suitable dome, circular water tank and staging using following details:

Height of tower = 12 m
Spacing of bracings = 4 m
Intensity of wind pressure =1.5 kN/m^2
SBC of soil at site = 190 kN/m^2
Materials = M25 and Fe 500
Sketch the reinforcement details in the over head tank. 15

OR

14 Design an Intze type water tank of capacity 1.5 million litres, supported on an elevated tower comprising 10 columns. The base of the tank is 18 m above the ground level and the depth of foundations is 1.2 m below ground level. Adopt M25 grade concrete and Fe 415 grade steel. Detail the sectional elevation of the tank with suitable reinforcements. 15

Unit - III

15 Design an RC slab culvert for a national highway to suit the following data:

A two lane carriage way = 7.6 m wide
Footpaths on either side = 1 m wide
Clear span = 7 m
Wearing coat = 90 mm
Width of bearing = 0.5 m
Materials = M30 and Fe500
Design the RC deck slab and sketch the details of reinforcements in the longitudinal and cross-sections of the slab. 20

OR

16 The RC slab panel of an RC T-beam and slab deck is 2 m wide between main T-beams and 4 m long between cross girders. The type of loading used is IRC class 'AA'. Use M25 and Fe415. Give the reinforcement details for the section. 20

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Code No. 5170 / S

FACULTY OF ENGINEERING

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

Subject: Microprocessors and Microcontrollers

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

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

PART – A

1 Mention differences between microprocessor and microcontroller. (2)
2 What are the advantages of memory segmentation? (2)
3 With an example explain the following 8086 directives (i) DW (ii) ORG (3)
4 Mention the special functions of general purpose register in 8086. (3)
5 Write important features of (PPI) 8255 I/o mode. (3)
6 List hardware interrupts of 8086 microprocessor. (2)
7 Mention salient features of 8253 timer. (2)
8 Draw the format of interrupt enable (IE) special function register of 8051 microcontroller. (3)
9 Write the interrupt vector table for 8051. (3)
10 How many times/counters do 8051 have? Mention the registers used to configure them? (2)

PART – B

11 Explain with examples following group of 8086 instructions (10)
   i) Data movement Instructions
   ii) Program control jump instructions

12 Draw the pin diagram of 8086 and explain the operation of all maximum mode pins. (10)

13 (a) Write a 8086 assembly language program to find the sum of squares of a given 8 bit number using indirect addressing mode. (6)
   (b) Write a 8086 ALP for subtraction of two 16 bit numbers using direct addressing mode. (4)

14 (a) Explain the control word format of 8253 timer. (5)
   (b) Explain the reentrant and recursive procedures in 8086 microprocessor. (5)

15 With an architecture diagram explain the features of 8051 microcontroller and its flag register. (10)

16 With an example explain the following instructions of 8051 microcontroller. (10)
   (i) DJNZ (ii) ORL (iii) CLR (iv) XCHD (v) JNZ

17 (a) With a diagram explain keyboard interface using 8051. (6)
   (b) Write a 8051 program to generate a square waveform. (4)

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Code No. 5179 / S

FACULTY OF ENGINEERING

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

Subject : Computer Organization and Architecture

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 main four components of any general purpose computer? (2)

2 Differentiate between single precision and double precision IEEE standard floating point representations. (3)

3 What are the commonly flags used by the processor to keep track the information about the results of various operations? (3)

4 Define (i) Micro operation (ii) Microcode (2)

5 Show the block diagram of the hardware that implements the following register transfer statement: yT : R2 ← R1, R1← R2 (2)

6 Draw a space-time diagram for a six-segment pipeline showing the time it takes to process eight tasks. (3)

7 Discuss synchronous and asynchronous buses. (3)

8 What are the functions of an interface circuit? (2)

9 What do you mean by Memory-interleaving? (2)

10 What do you mean by direct mapping method to determine the cache location to store memory block? (3)

PART – B (50 Marks)

11 (a) Describe the characteristics of various generations of computer. (5)
(b) Write and explain non-restoring division algorithm using a suitable example. (5)

12 Explain micro programmed control. Give basic organization of a micro programmed control unit. (10)

13 (a) The memory unit of a computer has 256K words of 32 bits each. The computer has an instruction format with four fields: an operation code field, a mode field to specify one of the seven addressing modes, a register address field to specify one of 60 processor registers, and a memory address. Specify the instruction format and number of bits in each field if the instruction is in one word memory. (4)
(b) Explain the following addressing modes with examples: (6)
(i) Immediate mode (ii) Relative mode (iii) Auto increment

14 (a) Design a parallel priority interrupt hardware for a system with four interrupt sources. (5)
(b) Explain how programmed I/O and interrupt initiated I/O operations are carried out. (5)

15 (a) Consider a memory consisting of 64K words of 8bits each. Give the organization to implement this memory using 16K x 1 static memory chips. (5)
(b) Explain the need of memory hierarchy with the help of a block diagram. What is the reason for not having one large memory unit for storing all information at one place? (5)

16 (a) Explain the features of a CISC processor in detail. (4)
(b) What is the need for Virtual memory organization? Explain different mapping techniques used. (6)

17 Write a brief note about any **two** of the following: (10)
(i) Common bus system
(ii) Array processors
(iii) CPU-IOP communication

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Code No. 5184 / S

FACULTY OF ENGINEERING

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

Subject: Heat Transfer

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 the concept of critical radius of insulation and state any two applications of the same.
2 A composite slab consists of 250 mm fire clay brick (K=1.09 W/mK) inside, 100 mm fired earth brick (0.26W/mK) and outer layer of common brick (0.6 W/mK) of thickness 50mm. If inside surface is at 1200^{o}C and outside surface is at 100^{o}C find (a) heat flux (b) the temperatures of the junctions (iii) the temperature at 200 mm from the outer surface of the wall.
3 One and of a very long metal rod is connected to a wall at 140^{o}C, while the other end protrudes into a room, whose air temperature is 15^{o}C. The rod is 3mm in diameter and the heat transfer coefficient between the rod surface and environment is 300 W/m^{2}K. Estimate the total heat dissipated by the rod taking its thermal conductivity as 150 W/mK.
4 What are Biot and Fourier numbers? Explain their physical significance.
5 Define and explain the significance of Reynolds number for Heat heat transfer calculations.
6 State the expression for velocity distribution for laminar flow in tube.
7 What do you understand by the hydrodynamic and thermal boundary layers? Illustrate with reference to flow over a flat heated surface.
8 Distinguish between (i) Surface resistance and space resistance (ii) absorptivity and emissivity
9 Distinguish between filmwise and dropwise condensation, which of the two gives a higher heat transfer coefficient and why?
10 Discuss the advantages of NTU method over the LMTD method of heat exchanger design.

PART – B (50 Marks)

11 A plane wall 10 cm thick generates heat at the rate of 4 x 10^{4}W/m^{3} when an electric current is passed through it. The convective heat transfer coefficient between each face of the wall and the ambient air is 50 W/m^{2}K. Determine (a) the surface temperature (b) the maximum temperature in the wall.
Assume the ambient air temperature to be 20^{o}C and the thermal conductivity of the wall material to be 15 W/mK.

12 A large slab of aluminium at a uniform temperature of 250^{o}C is suddenly exposed to a convective environment at 50^{o}C with a heat transfer coefficient of 500 W/m^{2}K. Estimate the temperature at a depth of 5 cm after 1 hour.
The thermal diffusivity and thermal conductivity of aluminium are 8.4 x 10^{-5} m^{2}/s and 215 W/mK respectively.

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13 Air at 20^{o}C flows with a velocity of 8m/s over a 1.5m x 6m flat plate whose temperature is 140^{o}C. Determine the rate of heat transfer from plate, if air flows (i) Parallel to 6m long side (ii) Parallel to 1.5 m long side comment on the results.

14 Two opposite parallel infinite planes are maintained at 400^{o}C and 460^{o}C respectively. Calculate the net radiant heat flux between these planes if one has an emissivity of 0.6 and the other an emissivity of 0.4.

15 (a) Draw and explain Pool Boiling curve.
(b) In a double pipe counter flow heat exchanger, 10,000 kg/hr of an oil having a specific heat of 2095 J/kg K is cooled from 80^{o}C to 50^{o}C by 8000 kg/hr of water entering at 25^{o}C. Determine the heat exchanger area for an overall heat transfer coefficient of 300 W/m^{2}K. Take specific heat of water as 4.18 kJ/kgK.

16 Define and explain the significance of the following dimension less numbers in heat transfer.
(i) Prandtl number (ii) Grasshof number (iii) Nusselt number

17 Write short notes on the following:
(a) Absorptivity, reflectivity and transmissivity
(b) Parallel flow and counter flow heat exchange in double pipe neat exchangers
(c) Lumped heat capacity analysis

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Code No. 5187 / S

FACULTY OF ENGINEERING

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

Subject : Turbo Machinery

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 turbo machine and how they are classified.
2 What is priming and why it necessary?
3 Define specific speed of a pump and its significance.
4 Draw inlet and outlet velocity triangles for centrifugal and axial flow compressors.
5 Distinguish between impulse and reaction turbine.
6 What is the working principle of Kaplan turbine?
7 What is the function of draft tube?
8 Define critical pressure ratio.
9 Mention the methods of improving gas turbine cycle efficiency.
10 Explain the term degree of reaction.

PART – B (50 Marks)

11 Derive Euler's equation for energy transfer for a two machines. 10

12 Draw a Francis turbine and explain its working principle and also derive the expressions for work output and efficiencies 10

13 A Pelton wheel has a mean bucket speed of 11 m/sec with a jet of water flowing at the rate of 700 liters/sec under ahead 32m. The bucket deflects the jet through an angle of 160^0 calculate the horsepower and the efficiency of the turbine. (Assume co-efficient of velocity as 0.98). 10

14 In a single stage impulse turbine, the nozzle angle is 30^0 to the tangential direction and the blade speed is 210 m/sec the steam speed is 550 m/sec blade friction coefficient is 0.85. Assuming axial exit and flow rate of 700kg/hr, determine the blade angles and power developed by the turbine. Also find the absolute velocity of steam at exit. 10

15 In a gas turbine plant air is compressed from 1 bar and 15^0C through a pressure ratio 4 : 1. It is then heated to 650^0C in a combustion chamber and expanded back to atmospheric pressure of 1 bar in a turbine. Calculate the cycle efficiency and the network output. The isentropic efficiencies of turbine and compressor are 80% and 85% respectively. 10

16 a) Discuss the importance of blade angles of centrifugal pump and how it helps to finding efficiencies of centrifugal pump. 5
b) Distinguish between axial flow and centrifugal compressor. 5

17 Write short notes on the following :
a) Losses in turbo machines 5
b) Compare gas turbines and steam turbines. 5

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Code No. 5201 / S

FACULTY OF INFORMATICS

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

Subject : Object Oriented Systems Development

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 unified process.	2
2	What are the 'Four P's in unified software development process?	3
3	What is meant by defect?	2
4	Why we go for modeling? State the reasons.	3
5	Define the following things. a) Grouping things b) Annotational things	3
6	Differentiate class and object.	2
7	Define event and signal in state machines.	2
8	Write the difference between structural diagrams and behavioural diagrams.	3
9	Define forking and joining in activity diagrams.	3
10	Define stereotypes with example.	2

PART – B (50 Marks)

11	a) Explain the life cycle of unified process.	7
	b) What are the different factors that influence the architecture of a system?	3
12	a) Explain core work flow of 'Requirements capture'.	5
	b) Explain requirements capturing as use cases.	5
13	a) Explain different things in the UML.	5
	b) Explain different diagrams present in the UML.	5
14	a) Define class and explain class diagram with an example.	5
	b) Write steps to implement reverse engineering.	5
15	Draw the state machine for the life time of an object and explain history states and concurrent states in state machines with an example.	10
16	Define the following with example. a) Process and threads b) Time and spaces c) Isomorphism	10
17	a) Define artifact diagrams with an example.	5
	b) Define a node and explain deployment diagram with an example	5

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