Code No. 5120

FACULTY OF ENGINEERING

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

Subject : Reinforced Cement Concrete

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

Note: Answer all questions from Part - A and answer any five questions from Part-B. Assume suitable data if required.

PART – A (25 Marks)

1 Draw the stress-strain curve for mild steel and standard grade concrete. (3)
2 Differentiate between Working Stress method and Limit State method. (3)
3 Define under, over and balanced sections. (3)
4 Define Partial safety factors. (2)
5 How do you provide curtailment of reinforcement in beams? (3)
6 Explain anchorage and development length. (3)
7 How do you check for deflection and cracking in case of limit state of serviceability? (2)
8 Define one way and two way slabs. (2)
9 Explain Yield line theory. (2)
10 Differentiate between Uniaxial and Biaxial Bending. (2)

PART – B (50 Marks)

11 A rectangular, singly reinforced beam, 300 mm wide and 500 mm effective depth is used as a simply supported beam over an effective span of 6m. The reinforcement consists of 4 bars of 20 mm diameter. If the beam carries a load of 12 kN/m, inclusive of the self weight, determine the stresses developed in concrete and steel. Take m = 19. Use Working Stress method. (10)

12 Design a doubly reinforced section for a rectangular beam at mid span having an effective span of 5m. The superimposed load is 50 kN/m and size of the beam is limited to 260 mm x 420 mm overall. Assume suitable data if required. Take M20 grade concrete and fe415. (10)

13 Determine the shear stress in a 250 mm x 500 mm rectangular section, if the shear force is 20 kN and torsional moment is 10 kNm at service loads. Assumed M30 grade concrete and fe500. Also assume 0.75 % torsion reinforcement at an effective cover of 50mm. (10)

14 Design a roof slab for a room 5.40 m x 6.60m clear in size to support a super imposed service load of 6 kN/m^2, if two of its adjacent edges are continuous and the other two are discontinuous. Use M20 and fe415. (10)

15 (a) Write the procedure for the design of yield lien theory. (5)
(b) Explain how one ways and two way slabs are designed using Yield Line theory. (5)

16 Design a circular column to carry an axial load of 1600 kN, using lateral ties, helical reinforcement. (10)

17 Design a footing for a rectangular column 300 mm X 450 mm carrying an axial service load of 1000 kN. The net bearing capacity of the soil is 120 kN/m^2. Use M20 grade concrete and fe415 steel. (10)

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Code No. 5126

FACULTY OF ENGINEERING

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

Subject: Power Systems – II

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 Ferranti effect on a line. 3

2 Explain about tuned power lines. 3

3 Write the comparison between series capacitor and shunt capacitor type of voltage control methods. 3

4 When MVA base is changed from ($MVA_{B,old}$) to ($MVA_{B,new}$) and KV base is changed from $KV_{B,old}$ to ($KV_{B,new}$). Write the new per unit impedance ($Z_{pu,new}$) equation. 3

5 Explain the basic working principle of thyristor switched capacitor. 3

6 Write the boundary condition for L-L and L-L-G fault when fault occurs at the terminals of the alternator. 3

7 Explain the velocity of propagation of a traveling wave over the overhead transmission line along with its necessary equation. 3

8 Write the empirical formula to calculate the power loss due to corona and explain the parameters in it. 2

9 Write the relation between phase current in terms of sequence component of the currents, taking Phase-A as reference. 2

PART – B (5x10 = 50 Marks)

10 a) Determine the efficiency and regulation of 3 phase, 200 km, 50 Hz transmission line delivering 20 MW at power factor of 0.8 lagging and 66 kV to a balance load. The conductors are of copper, each having resistance 0.1 ohm per km, 1.5 cm outside diameter, spaced equilaterally 2 meters between centres. Neglect leakage and use nominal-® method. 7

b) Explain the methods of reducing the corona loss. 3

11 a) Explain the operation of a basic thyristor controlled reactor with necessary diagram, equations and waveforms. 5

b) Explain about series capacitor type of voltage control method with necessary phasor diagram. 5

12 a) Derive the expression for (i) Base current I_B (ii) Base impedance Z_B (iii) per unit impedance Z(pu) for a given base mega volt-amperes MVA_B, base kilovolts kV_B. 4

b) Explain about per unit representation of transformer and draw its per unit equivalent circuit with necessary equations. Prove that the per unit impedance of transformer is same when computed from primary side or secondary side. 6

…2.

13 a) Derive the expression for average three phase power in terms of symmetrical components. 4

b) A 25 MVA, 13.2 kV alternator with solidly grounded neutral has a sub-transient reactance of 0.25 p.u. The negative and zero sequence reactance's are 0.35 p.u. and 0.1 p.u. respectively. A line-to-line fault occurs at the terminals of an un-loaded alternator. Determine the (a) Fault current, (b) Line-to-line voltages. Assume base quantities as 25 MVA and 13.2 kV. 6

14 a) Explain about traveling wave phenomenon over long transmission line (loss less), considering the line with receiving end is open-circuited. Draw the necessary various current and voltage waves over the line. 6

b) For a line terminated through a resistance 'R' the surge impedance is 'Z'. Derive the expression for the coefficient of refraction for (a) current waves, b) voltage waves. 4

15 a) Explain about concept of short circuit capacity of a bus. 4

b) Consider a three phase system with earthed neutral. For a single line-to-ground fault on line phase-A of three phase system, derive the expression for (i) sequence currents of faulted phase – A (ii) sequence voltages at faulted phase – A, in-terms of sequence impedances Z_o, Z_1 and Z_2. 6

16 a) Derive the expression for critical disruptive voltage. 5

b) When a three phase short circuit occurs at the terminals of an alternator, draw the equivalent circuit of an alternator under (a) sub-transient (b) transient (c) steady state conditions, and explain it. 5

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Code No. 5132

FACULTY OF ENGINEERING

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

Subject: Instrumentation 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 AC Tachogenerator.	2
2	Explain the principle of strain guage.	3
3	Explain the working principle of piezo-electric tranducers.	3
4	What are the basic methods of force measurement?	2
5	What are metal alloys used for thermocouple?	3
6	What are radiation thermometer?	2
7	Give the classification of flow meters?	3
8	Explain the ultrasonic Method.	2
9	Distinguish between relative humidity and absolute humidity.	2
10	Give the classification of various microphones.	3

PART – B (5x10 = 50 Marks)

11 a) Explain the working of a stroboscope.
   b) Explain the working of piezo electric accelerometer.

12 a) Discuss the merits & demerits of the cooling techniques of thermocouples.
   b) Give the principle of strain gauge torque meter.

13 Give the construction and working of hot wire anemometer with neat diagram.

14 Derive the flow rate of variable head meter with neat diagram.

15 a) A gas (density=0.8 kg/m^3) flows through a 20 cms diameter pipe at the rate of 1000 m^3 / hr. The flow is measured by a pitot tube located centrally in the pipe and connected to an inclined manometer (inclination 12 in 1). It contains oil of specific gravity 0.55 as manometric liquid . I the average velocity of gas is 0.8 of the aximum velocity. Determine the manometric reading for this flow.
   b) Give the importance of P^H measurement in a chemical process.

16 Discuss the various types of liquid level meters.

17 a) Give the definition of Sound pressure level and sound power level.
   b) Write about Piezo-electric microphone.

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Code No. 5134

FACULTY OF ENGINEERING

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

Subject : Linear Integrated Circuits and Applications

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 terms balanced output and unbalanced output. 2

2 Discuss the three factors that affect the electrical parameters of an Op-Amp. 3

3 Draw an Op-Amp circuit whose output is $V_1+V_2-V_3-V_4$. 2

4 Indicate how two analog voltages are multiplied using log-antilog amplifiers. 3

5 How would you recognize that positive feedback is being used in Op-Amp circuit? 2

6 What is filter? Explain how filters are classified. 3

7 Draw the pin diagram of 555 timer and explain function of control voltage pin. 3

8 Explain the block diagram of PLL. 2

9 What are the limitations of three terminal regulators? 2

10 Calculate the values of LSB, MSB and full-scale output for an 8-bit D/A converter for the 0 to 10 volts range. 3

PART – B (50 Marks)

11 a) Prove that a different amplifier amplifies the difference between two input signals. 5

b) List and explain all DC characteristics of Op-Amp. 5

12 a) Explain the operation of voltage-to-current converter with grounded load? Is there any limitation on the size of the load when grounded. 5

b) Draw the circuit of full wave rectifier and explain how it gives the average value. 5

13 a) Explain Schmitt trigger without reference voltage. 5

b) Draw the second order high-pass Butterworth filter and derive the expression for its gain. 5

14 a) What is a monostable multivibrator? Derive the expression for time delay of a monostable multivibrator. 6

b) In an astable multivibrator, $R_A = 2.2k\Omega$, $R_B= 6.8k\Omega$ and $C = 0.01\ \mu F$. Calculate Free Running Frequency and Duty Cycle. 4

15 a) Explain the operation of Weighted Resistor D/A converter. 5

b) Explain the operation of successive approximation register A/D converter. 5

16 a) Explain a low voltage regulator using current fold back. 5

b) Draw the circuit of PLL FM demodulator and explain its operations. 5

17 Write short notes on :

a) Op-Amp based differentiator 5

b) Triangular Wave form generator 5

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Code No. 5139

FACULTY OF ENGINEERING

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

Subject : Applied Thermodynamics

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

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

PART – A (2.5 x 10 = 25 Marks)

1 What is the advantage of fitting an after cooler in a reciprocating air compressor.
2 Plot on TS coordinates, ideal cycle of a two stage reciprocating air compressor with intercooler and aftercooler.
3 How is scavenging period determined from valve timing diagram?
4 Define brake specific fuel consumption for an IC engine.
5 Why is period of controlled combustion called so in CI engines?
6 List some demerits of anti knocking additives.
7 What is the utility of economizer used in power plant?
8 What is the working principle of super critical boilers?
9 What is the relation for exit velocity in a nozzle flow in terms of inlet properties?
10 How does reheating improve the performance of Rankine cycle?

PART – B (5 x 10 = 50 Marks)

11 A two stage, single acting, reciprocating air compressor takes in air at 1 bar and 300^0 K. The delivery pressure is 10 bar. The law of compression is $PV^{1.3}$ = constant. The rate of discharge is 0.1 kg/s. Calculate (a) power required to drive the compressor (b) saving in work in comparison with single stage compression (c) isothermal efficiency and (d) heat transfer to intercooler. Take R_{air}=287 J/kg ^{0}K.

12 A four cylinder, two stroke petrol engine develops 30 kW at 2500 rpm. The mean effective pressure on each piston is 8 bar and mechanical efficiency is 80%. Calculate the diameter and stroke of each cylinder, if the stroke to bore ratio is 1.5. Also calculate the fuel consumption of the engine, if the brake thermal efficiency is 28%. The calorific value of the fuel is 43900 kJ/kg.

13 Discuss how knocking takes place in SI and CI engines. What are the geometrical design considerations to prevent knocking in SI engines?

14 a) Explain the working principle of a cooling tower.
b) Discuss about the classification of steam condensers.

15 Steam enters a convergent – divergent nozzle at 15 bar and 300^0C and leaves at a pressure of 2 bar. The inlet velocity to the nozzle is 150 m/s. Find the required throat and exit areas for a mass flow rate of 1 kg/s. The nozzle efficiency is 90% and C_p = 2.4 kJ/kg ^{0}K.

16 A steam power plant operates on an ideal Rankine cycle between a boiler pressure of 40 bar, 300^0C and a condenser pressure of 0.035 bar. Calculate cycle efficiency, Work ratio, and specific steam consumption for
i) Ideal Rankine cycle
ii) Rankine cycle when expansion process has an isentropic efficiency of 80%.

17 a) Differentiate between Air and Water cooling systems used in IC engines.
b) Discuss briefly about the types of combustion chambers used in SI engines.

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Code No. 5144

FACULTY OF ENGINEERING

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

Subject: Applied Thermodynamics and Heat Transfer

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 uses of compressed air?	2
2	What is the effect of variable specific heats in IC engines?	2
3	Derive relation for SFC, brake thermal efficiency and calorific value.	3
4	How is rich mixture compensation done at high speeds in carburetor?	3
5	What is the effect of knocking in IC engines?	3
6	What are anti-freeze solutions used in IC engines?	2
7	Define Stefan's Boltzman law.	2
8	Distinguish between black body, white body and gray body.	3
9	State Buckingham's π-theorem.	3
10	What is critical radius of insulation?	2

PART – B (5 x 10 = 50 Marks)

11 Drive expression for work done in reciprocating air compression with clearance volume. Show that work done, with and without clearance for reciprocating air compressor per kg is same?

12 During the trial on a four stroke cycle gas engine , the following data is recorded.
   a) Area of indicator diagram = 565.8 mm^2
   b) Length of indicator diagram = 74.8 mm
   c) Spring index = 0.9 bar / mm
   d) Cylinder diameter = 220 mm
   e) Stroke length = 430 mm
   f) No. of explosions / Min = 100
   Determine IMep, indicator power.

13 What are types of lubrication system used in multi cylinder engines? Discuss in brief.

14 Explain with neat sketch the phenomenon of knocking in diesel engines. Sketch on p-θ diagram.

15 A rectangular slab of thickness 10 cm and area has both of its faces maintained at 300^0C and 50^0C respectively. The thermal conductivity of the material varies as K = 50 [1 + 0.002T], where T is in ^{0}C. Determine the temperature at a distance of 8 cm from 300^0C surface and rate of heat transfer?

16 Using Buckingham's π-theorem, derive expression for heat transfer coefficient in internal flow and forced convection.

17 a) Derive expression for LMTD of parallel flow heat exchanger 7
   b) Explain briefly about Stefan's Boltzman law. 3

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Code No. 5147

FACULTY OF ENGINEERING

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

Subject : Automotive Diesel Engines

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 importance of diesel engine? Briefly mention its applications.	2
2	Differentiate between fuel-air and actual cycles.	2
3	What are the important properties of diesel fuel?	2
4	Give list of equipment to measure brake power, indicated power and friction power of an engine.	3
5	What are the various types of fuel injectors?	2
6	Classify combustion chambers of diesel engine. Draw sketch of any one type of combustion chamber.	3
7	Explain briefly the importance of air motion in diesel engine.	3
8	Differentiate between super charging and turbocharging.	3
9	What are the harmful emissions from diesel engine exhaust? List out various emission standards.	3
10	Describe the importance of performance maps.	2

PART – B (5 x 10 = 50 Marks)

11	a)	Differentiate between 2-stroke cycle and 4-stroke cycle engines.	4
	b)	Derive an expression for air standard efficiency of diesel cycle.	6
12	a)	What is common rail fuel injection? Explain its working with a sketch.	5
	b)	Explain the effect of injection timing on the performance of diesel engine.	5
13	a)	Explain the importance of swirl and squish on the combustion of diesel engine.	5
	b)	Describe the diesel engine combustion stages with the help of p-θ diagram.	5
14	a)	What are the factors affecting the knock in CI engine?	5
	b)	What are the advantages of super charging the diesel engine?	5
15	a)	Explain the method of determining friction power of multi cylinder diesel engine.	4
	b)	Explain the effect of i) engine size ii) speed and iii) valve timing on the performance of diesel engine.	6
16	a)	Explain the method of formation of hydrocarbons and oxides of nitrogen in diesel engines.	5
	b)	Explain the method of control of carbon monoxide and oxides of nitrogen from diesel engines.	5

17 A single cylinder, 4-stroke cycle CI engine with 12.9 cm bore and 18.0 cm stroke, operating at 800 rpm, uses 0.113 kg of fuel in 4 minutes while developing a torque of 76 N.m calculate : 10

a) Brake specific fuel consumption
b) Brake mean effective pressure
c) Brake power
d) Specific power
e) Output per displacement

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Code No. 5151

FACULTY OF ENGINEERING

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

Subject: Database Management 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 are three levels of data abstraction?	2
2	What is different mapping cardinalities in a binary relationship?	3
3	What are fundamental operator of relational algebra?	2
4	What is the difference between where and having clauses in SDL?	3
5	Define minimal cover.	2
6	What is dynamic SQL?	3
7	What are ordered indices?	2
8	State advantages of extendible hashing.	3
9	What is 'Thoma's write rule?	3
10	What are the different recovery algorithms?	2

PART – B (50 Marks)

11	a)	What are the advantages of database systems over file processing system.	6
	b)	Explain the concept of aggregation with an example.	4
12	a)	How do you represent-n-ry relationship using a set of binary relationships in ER diagram?	4
	b)	Explain the concept of stored procedures with example.	6
13	a)	Define normalization. Explain INF, 2NF, 3NF with examples.	6
	b)	What is loss-less join decomposition.	4
14	a)	What are the differences between B tress and B+ tress?	5
	b)	Explain static hashing with example.	5
15	a)	Discuss about immediate database modification.	4
	b)	Write short notes on log based recovery.	6
16	a)	Describe about time-stamp based protocol.	5
	b)	What is meant by Fuzzy check point?	5
17	Write short notes on :		
	a)	Aries	4
	b)	Conflict serializability	3
	c)	Views	3

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Code No. 5156

FACULTY OF INFORMATICS

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

Subject : Software 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	Differentiate between functional and non-functional requirements with an example.	2
2	List any three Practitioner's Myths.	3
3	Write short notes on Architecture design.	3
4	Define Design Process.	2
5	What is meant by Software Availability?	2
6	Explain about testing and debugging with an example.	2
7	What is white-box testing? Explain in brief?	3
8	Explain Refactoring?	3
9	Differentiate between Risk Projection and Risk Refinement?	3
10	Explain briefly about CMMI.	2

Part-B (50 Marks)

11	(a) Discuss the advantages and limitations of Evolutionary Process Models.	5
	(b) Discuss the concept of Team Software Process (TSP) proposed by Watts Humphrey	5
12	Write short notes on Art of Debugging.	10
13	(a) Discuss some problems that occur when requirements must be elicited from three or four different customers.	3
	(b) List and explain the three types of requirements identified in quality function deployment (QTD) technique.	7
14	Discuss the concept of constructive cost model (COCOMO) in detail.	10
15	(a) Discuss the importance of data abstraction in the software design Process.	5
	(b) Apply a "stepwise refinement approach" to develop three different levels of procedural abstraction for developing a simple task-scheduling algorithm for an operating system	5
16	Write short notes on Metrics for the design model.	10
17	(a) List and briefly explain three golden rules related to user interface design	5
	(b) Discuss the concept of Extreme Programming (XP) process model.	5

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