Code No. 3119 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (Old) Examination, Nov. / Dec. 2016

Subject : Reinforced Cement Concrete

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 test to find the compressive strength of concrete.

2 List the objectives of structural design.

3 Define collapse limit state and serviceability limit state.

4 Calculate the modular ratio if permissible stress in concrete in bending compression is 7 MPa.

5 Define the 'effective flange width'.

6 Calculate the anchorage length in tension for Fe415 steel rebars in concrete of grade M20.

7 Discuss in brief the 'short term' and 'long term' deflections of RC beams.

8 What are the I.S code requirements for controlling the crack width?

9 In a dog-legged stain case, landings are supported on two edges perpendicular to the risers. How do you calculate the effective span.

10 What is a criterion for minimum eccentricity in column design?

PART – B (50 Marks)

11 A rectangular beam section 300mm width and 500mm effective depth is reinforced with 4-16mm diameter tension bars. Determine the stresses induced in the top compression fibre of concrete an in tension steel when it is subjected to a moment of 70 KNm. Consider concrete of grade M20. Use working stress method.

12 Design a singly reinforced rectangular section for an applied factored moment of 200 KNm. Take the width of the section as 300mm. Use M25 concrete and Fe415 steel. Sketch the reinforcement details.

13 Design a rectangular beam section 300mm width and 500mm effective depth subjected to ultimate moment of 175kNm, ultimate shear force of 25 kN and ultimate torsional moment of 10 kNm. Use M25 concrete and Fe415 steel. Sketch the reinforcement details.

14 A hall has clear dimensions of 2.5m x 8m with wall thickness 230mm. The superimposed load on the slab is 3 kN/m^2 and finishing load is 1 kN/m^2. Design the slab. Adopt M20 concrete and Fe415 steel. Sketch the reinforcement details.

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15 A square slab simply supported on all sides is isotropically reinforced. Find ultimate resisting moment 'm' per unit length of yield line to sustain a uniformly distributed load w/m^2.

16 Design the longitudinal reinforcement and ties required in a short column of size 230mm x 450mm subjected to an axial factored load of 1200 kN and a factored moment of 30 kNm about the shorter axis. Assume M20 concrete and Fe415 steel.

17 Design a rectangular footing for a column of 300mm x 750mm carrying an axial factored load of 1800 kN. Safe bearing capacity of soil may be assumed as 400 kN/m^2. Adopt M20 concrete and Fe415 steel. Sketch the reinforcement details.

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Code No. 3398 / N

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

Subject : Reinforced Cement Concrete

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 working stress method.	3
2	Define characteristic load and partial safety factors.	3
3	Differentiate between singly and doubly reinforced beams.	2
4	Define development length.	2
5	Give the IS specifications for design of shear and torsion.	2
6	How do you check deflection limitations?	3
7	What is the importance of yield line theory?	3
8	What do you understand from one way and two way slab?	3
9	Give any two assumptions made in design of columns.	2
10	How do you design circular footing?	2

PART – B (50 Marks)

11	a) Explain the different tests on concrete and steel.	5
	b) Explain stress block parameters and obtain the expressions for concrete member according to limit state method.	5
12	A beam 250mm x 550mm overall is reinforced with from 25mm ϕbars on tension side, and three 22mm ϕbars on compressive side. The bars are at 50mm and 30mm centres respectively from bottom and top edges of the beam. Calculate the moment of resistance of the beam if σ_{cbc} = 5N/mm^2, σ_{st} = 140N/mm^2 and m = 19, σ_{sc} = 130N/mm^2 (use working stress method).	10
13	A simply supported beam is 250mm x 500mm and has 2-20mm dia tor bars going in to the support. If the shear force at the centre of support is 110kN at working loads, determine the anchorage length. Assume M20 grade concrete and fe415 grade steel (use limit state method).	10
14	Design a section of a ring beam 450mm wide and 650mm deep subjected to a bending moment of 130kNm, twisting moment of 10 kNm and a shear force of 130kN at ultimate. Use M20 grade concrete fe415 grade steel. Use limit state method.	10
15	A simply supported slab panel is 4m x 6m and carries a uniformly distributed load of 5kN/m^2 at collapse. Determine its moment of resistance if it is same in the two directions.	10
16	A Short column 400mm square in cross-section is reinforced with 4-22mm bars longitudinally which are bound together with lateral ties. Determine the safe axial load on the column.	10
17	Design a footing for a rectangular column 300mm x 450mm carrying an axial service load of 1000kN. The net bearing capacity of soil is 120 kN/m^2. Use M20 grade concrete and SAIL – MA MA = M350mm grade steel.	10

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Code No. 3125 / O

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I-Semester (Old) Examination, Nov. / Dec. 2016

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 Brief about the methods of reducing corona effect. 3
2 Explain the influence of power factor on the performance of a transmission line. 2
3 Explain the working principle of thyristor switched capacitors. 3
4 What are the drawbacks in voltage control using generator excitation? 2
5 Why it is preferable to express the reactances of various elements in percentage values for short circuit calculations? 2
6 How will you determine the synchronous, transient and subtransient reactances from the oscillogram of the short circuit current? 3
7 Distinguish between symmetrical and unsymmetrical faults. 2
8 Draw a diagram showing interconnection of sequence network for a double line to ground fault. 3
9 How can Bewley Lattice be drawn? Discuss its use. 3
10 Discuss the behaviour of a traveling wave when it reaches the end of a short circuited transmission line. 2

PART – B (50 Marks)

11 A three phase transmission line has the following constants :
$A = D = 0.945 \angle 1^{\circ}01'$; $B = 82.3 \angle 72^{\circ}02'$ and $C = 0.001376 \angle 90^{\circ}23'$ S

Construct a universal power circle diagram for the line and find the sending end voltage, current and power factor when the line is supplying a load of 15 MW at 0.8 pf lagging, the receiving end voltage being 66 kV. Choose the base voltage as 60 kV. 10

12 a) Two substations A and B are interconnected by a line having an impedance of 0.03 + j 0.12 p.u. the substation voltages are $33 \angle 2$ and $33 \angle 0^{\circ}$ respectively. In phase and quadrature boosters are installed at A. Determine their output voltage ratings and MVA ratings in order to supply 5 MVA at 0.8 p.f. lagging at substation B. 5
b) With neat necessary diagrams explain the operation of induction regulators. 5

13 a) A three phase, 30 MVA, 33 kV alternator has 4% reactance (internal) and negligible resistance. Find the (external) reactance per phase to be connected in series with the alternator so that the steady state current on the short circuit does not exceed 10 times the full load current. 5
b) The p.u. impedances of 100 MV, 11/32 kV step-up transformer is 0.3 ohms on its own base. Determine i) actual impedances of the transformer referred to HV as well as LV side ii) base impedance referred to both sides. 5

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14 a) Show that positive and negative sequence currents are equal in magnitude but out of phase by 180 degrees in a line to line fault. Draw the interconnection diagram of sequence network. 4

b) A 25,000 kVA, 6.9 kV generator, star connected has positive, negative and zero sequence reactances of 0.25, 0.25 and 0.08 p.u. respectively. A reactor of 0.06 p.u. reactance on the generator rating is placed in the line from neutral to ground. A double line to ground fault occurs at the terminals of the generator when it is operating at its rated voltage and unloaded. Find the initial r.m.s. line and ground wire current for a solidly grounded fault, and also the ground of the un-faulted line. 6

15 a) A reactangular surge voltage E travels along a conductor of surge impedance Z_c towards a transition point P. Show that the voltage V_0 and current i_0 at point P satisfy the relation $V_0 = 2E-Z_e\ i_0$. 5

b) Two lines having surge impedances Z_1 and Z_2 meet at a junction. A fault leading to fault current I occur at the junction. Examine the voltage and current surges in the two lines due to clearance of fault. Find the magnitude of voltages and currents if I = 5 kA, Z_t = 300 ohms, and Z_2 = 60 ohms. Show the voltage and current surges on a diagram. 5

16 a) Derive an expression for finding the transient current in an RL series excited by an ac source. 5

b) Discuss about static Var compnesator. 5

17 a) What is shunt compensation? How it is different from series compensation? 4

b) A three phase 220 kV, 50 Hz transmission line consists of 1.5 cm radius conductor spaced 2 meters apart in equilateral triangular formation. If the temperature is 40 degrees and atmospheric pressure is 76cm, calculate the corona loss per km of the line. Take $m_0 = 0.85$. 6

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Code No. 3404 / N

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I - Semester (Main) Examination, November / December 2016

Subject : Power Systems - II

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 do you understand about tuned power lines? (2)

2 Obtain the exact condition for zero regulation for a short transmission lines. (3)

3 What is a booster transformer? (2)

4 Show that the load voltage V_2 is not affected much due to the component of the load. (3)

5 What are the quantities whose base values are required to represent the power system by reactance diagram? (2)

6 A transformer is rated at 11 kV/0.4 kV, 500 kVA, 5% reactance. Determine the short circuit MVA of the transformer when connected to an infinite bus. (3)

7 Draw the connections of sequence networks for line to line to ground fault through an impedance Z_r. (3)

8 What are the uses of symmetrical components in power systems? (2)

9 What is a travelling wave? Draw the characteristics of it. (2)

10 Explain why a travelling wave suffers reflection when it reaches a discontinuity? (3)

PART – B (50 Marks)

11 (a) From fundaments derive the A,B,C and D constants of medium lines. (5)

(b) A 3-phase, 50 Hz, 132 kV transmission line consists of conductors of 1.17 cm dia and spaced equilaterally at a distance of 3 metres. The line conductors have smooth surface with value for m = 0.96. The barometric pressure is 72 cm of Hg and temperature of 20°C. Determine the fair and foul weather corona loss per km per phase. (5)

12 (a) A 3-phase induction motor delivers 500 HP at an efficiency of 90% when the operating p.f. is 0.8 lag. A loaded synchronous motor with a power consumption of 120 kW is connected in parallel with the induction motor. Calculate the necessary kVA and the operating p.f. of the synchronous motor if the overall p.f. is to be unity. (6)

(b) With necessary diagrams explain in detail about Induction regulator. (4)

13 A 3-bus system shown in below Fig.(1). The ratings of the various components are listed below:
Generator 1 = 50 MVA, 13.8 kV, X″ = 0.15 p.u.
Generator 2 = 40 MVA, 13.2 kV, X″ = 0.20
Generator 3 = 30 MVA, 11 kV, X″ = 0.25
Transformer 1 = 45 MVA, 11 kV, Δ/110 kV Y, X = 0.1 p.u.
Transformer 2 = 25 MVA, 12.5 kV, Δ/115 kV Y, X = 0.15 p.u.
Transformer 3 = 40 MVA, 12.5 kV, Δ/115 kV Y, X = 0.1 p.u.

The line impedances are shown in Fig. P1.3. Determine the reactance diagram based on 50 MVA and 13.8 kV as base quantities in Generator 1.

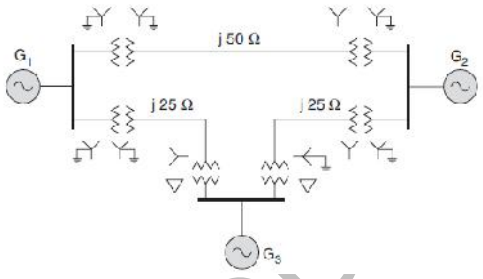

Fig.(1) (10)

14 A 50 Hz, 80 MVA, 11 kV generator has positive, negative and zero sequence impedances of j0.4, j0.3 and j0.1 p.u. respectively. The generator is connected to a busbar A through a transformer having X1 = X2 = X0 = j0.4 p.u. on 100 MVA base and rated voltage. Determine the ohmic resistance and rating of the earthing resistor such that for a L-G fault on busbar B the fault current of the generator does not exceed full load current. A reactor of reactance 0.08 p.u. on 100 MVA base is connected between busbars A and B. (10)

15 (a) A rectangular surge of 2 μ sec duration and magnitude 100 kV travels along a line of Surge impedance 500 ohms. The latter is connected to another line of equal impedance through an inductor of 500 μH. Calculate the maximum value of surge transmitted to the second line. (5)
(b) Define the surge impedance with reference to transmission line and deduce from the first principles an expression for its value. (5)

16 (a) From fundamentals explain in details about all the aspects to draw the receiving end Circle diagram. (5)
(b) From fundamentals obtain the expression for visual critical voltages. (5)

17 (a) Derive equivalent parameters of two transmission lines when they are connected in tandem. (5)
(b) Write short notes on static var compensator. (5)

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Code No. 3131 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I-Semester (Supplementary) Examination, Nov. / Dec. 2016

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	State working principle of Electrical tacho-generator.	3
2	How much degrees the strain gauges should be mounted along the shaft axis?	2
3	Mention the law of Thermocouple.	2
4	Explain measurement of stress in hollow shaft with diagram.	3
5	An accelerometer has a seismic mass of 0.05 kg and a spring constant of $3x10^3$ N/m, maximum mass displacement is $\pm$0.02 m. Calculate a) maximum measurable acceleration and b) natural frequency.	3
6	Draw the diagram of Electromagnetic flow meter.	2
7	Explain basic principle of measurement of flow.	3
8	Define absolute humidity and relative humidity.	2
9	What are the significant characteristics of Piezo-electric microphone?	3
10	Explain the working of carbon microphone.	2

PART – B (5 x 10 = 50 Marks)

11	a)	Explain the working of a AC tacho-generator with suitable diagram.	5
	b)	Write short notes on stroboscopic methods.	5
12	a)	Explain the Magneto-strictive transducer used for Torque measurement using suitable diagram.	5
	b)	A bimetallic strip element has one end fixed and other free with length of cantilever being 40mm. The thickness of each metal is 1mm and element is initially straight at 20C. Calculate the movement in free end in perpendicular direction from the initial line when the temperature is 180C.	5
13		Explain various kinds of Head-type flow meter depending on the physical principle of operation and other characteristics with suitable diagrams and equations.	10
14	a)	Explain the measurement of liquid level with variable permeability method.	5
	b)	Explain with suitable diagram the working of pH meter.	5
15		Explain the various microphones in detail.	10

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16 a) A piezo-electric accelerometer has a transfer function of 61mV/g and a natural frequency of 4500Hz. In a vibration test at 110Hz, a reading of 3.6V peak is obtained. Find the vibration peak displacement. 5

b) A load cell consist of a solid cylinder of steel 40mm in diameter with four strain gauges bonded to it and connected into four arms of voltage sensitive bridge. The gauges are mounted to have Poisson arrangement. If G_f = 2.1, the bridge excitation voltage 6V, determine the sensitivity of the cell in V/kN. E = 200 GN/m^2 v = 0.29. 5

17 a) A venture meter is to be fitted in the horizontal section at a 0.15m pipeline. Calculate the cylindrical throat diameter, if the maximum differential pressure obtained is 0.5 cm for a maximum flow rate of 5.0 Kg/s for water of 20^{0}C. Assume discharge coefficient of 0.99. 5

b) Write short notes on capacitive Hygrometer. 5

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Code No. 3410 / N

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I - Semester (Main) Examination, November / December 2016

Subject : Instrumentation Systems

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 With the help of a sketch, explain the principle of eddy current tachometer? (2)
2 Explain the principle of Deflection type accelerometer? (3)
3 What are the basic methods of force measurement? (2)
4 Explain the Laws of Thermocouples. (3)
5 State and explain Bernouli's theorem. (3)
6 Explain the function of orifice plate in the measurement of Flow. (2)
7 "Gamma rays can be used for measurement of liquid level", justify. (2)
8 Give the principle of null balance P^H meters. (3)
9 Explain sound pressure level and sound power level with equations. (3)
10 Mention the different types of microphones. (2)

PART – B (50 Marks)

11 (a) Explain the working of a stroboscope with relevant diagram. (5)
(b) Explain the working of a Piezoelectric Accelerometer with neat diagram. (5)

12 (a) Give the various thermocouple circuits with diagram. (5)
(b) Explain the working of a strain gauge torque meter with neat diagram. (5)

13 With the help of a neat sketch explain the constructional details of orifice plate. What are its applications and limitations? (10)

14. (a) With the help of a neat sketch explain the various capacitive methods for measurement of liquid level. (5)
(b) Give the importance of P^H measurement in a chemical process. (5)

15 (a) With the help of a neat sketch explain the construction of piezoelectric microphone and give its characteristics. (5)
(b) What are the different types of secondary transducers used for the sound pressure measurements? Explain anyone in with a diagram. (5)

16 With the help of a neat sketch explain the construction of a rotameter and derive its mathematical equation for flow rate. (10)

17 Write short notes on:
(a) Ultrasonic method of liquid level measurement (5)
(b) Radiation thermometers (5)

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Code No. 3133 / O

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I-Semester (Old) Examination, Nov. / Dec. 2016

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 List the Op-Amp parameters that are important for AC and DC applications. 3

2 The 741 Op-Amp is used as an inverting amplifier with a gain of 50. What would be the maximum i/p signal amplitude applied to it if its voltage gain is flat upto 10 KHz? 3

3 Draw the circuit diagram of inverting halfwave precision rectifier. 2

4 Draw the circuit diagram of current controlled voltage source using Op-Amp. 2

5 Draw the circuit diagram of 2^{nd} order wide band reject filter using Op-Amp. 3

6 What is the importance of control pin and reset pin in 555 times? 2

7 Draw the pin diagram of IC8038. 2

8 Calculate the frequency of oscillation with no input voltage to an IC 566 VCO for external components R_T = 5kΩ, C_T= 470PF. 2

9 Write the difference between successive approximation type and dual slope ADCS? 3

10 Using the 7812 voltage regulator, design a current source that will deliver a 0.5A current to a 25Ω load. 3

PART – B (50 Marks)

11 a) Explain the AC analysis of dual input, balanced output differential amplifier. 5

b) Define the following terms 5

i) Input offset current
ii) Input bias current
iii) PSRR
iv) CMRR
v) Total O/P offset voltage

12 a) Draw the circuit diagram of voltage to current converter with floating load and derive the transfer gain. 5

b) Design a differential amplifier using single Op-Amp such that $V_0 = -2V_1 – 4V_2 + 5V_3$ 5

13 a) Draw the circuit of a second order narrow band pass filter and derive an expression for its function. 6

b) Design a narrow band pass filter to meet the following specifications : f_c = 2KHz, Q = 20 and A_F = 10. 4

..2

14 a) Explain the operation of Monostable multivibrator using 555 timer. 5
b) Draw the internal functional diagram of IC555 and explain the functions of each pin. 5

15 a) Draw the circuit diagram of dual slope ADC and explain its operation. 6
b) For 8-bit dual slope ADC, R = 10kΩ, C = 0.1μF, clock frequency is 100KHz, V_{rcf} = -5V and Vin = 3V. Determine the output count after the conversion is completed. 4

16 a) Draw the circuit diagram of IC723 voltage regulator for 9V at 200MA. 6
b) Explain about current foldback and current boosting techniques of IC723. 4

17 a) Draw the functional diagram of IC566 waveform generator and explain the function of each block. 5
b) Explain any two applications of PLL. 5

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Code No. 3412/N

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester (New)(Main) Examination, November / December 2016

Subject : Linear Integrated Circuits and Applications

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 Define slew rate. Explain its significance and give its typical value for 741 IC. (2)
2 Define input bias current, input offset voltage and write the expression for output voltage of OP AMP due to these parameters. (3)
3 What are the desirable characteristics of Instrumentation Amplifier? (3)
4 Explain OP AMP subtractor circuit and derive the expression for its output voltage. (3)
5 What are the advantages of higher order filters over first order filters? (2)
6 Explain the operation of Astable multivibrator using OP AMP. (3)
7 Define Lock range and capture range of PLL. (2)
8 Draw the functional diagram of NE 555 and represent all pins. (2)
9 What do you understand by current fold back in IC 723 Regulators? (3)
10 Define the terms Resolution and conversion time of A/D converters. (2)

PART – B (50 Marks)

11 (a) Obtain the expressions for differential voltage gain, common mode gain, input impedance and output impedance of dual input unbalanced output differential amplifier. (6)
(b) What is the need for frequency compensation in an OP AMP? Explain about any one frequency compensation technique. (4)

12 (a) Design a practical differentiator which operates between 150 Hz to 1500 Hz. (5)
(b) Explain the operation of sample and hold circuit with neat diagram and waveforms. (5)

13 (a) Draw the circuit diagram of narrow band pass filter and derive the expressions for its voltage gain, band width and quality factor. (6)
(b) Explain the operation of peak detector circuit. (4)

14 (a) Draw the circuit diagram of monostable multivibrator using 555 timer and explain its operation. Also derive the expression for pulse width. (6)
(b) Explain the operation of Schmitt Trigger using OP AMP. (4)

15 (a) Explain the operation of IC 723 as high voltage Regulator. (4)
(b) Explain the operation of successive approximation ADC with an example. (6)

16 (a) Explain the operation of practical logarithmic Amplifier. (5)
(b) What are the different ways to improve CMRR of OP AMP? Explain any one method. (5)

17 Write short notes on the following:
(a) All pass filters (5)
(b) Voltage controlled oscillators (5)

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Code No. 3138 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) I-Semester (Old) Examination, Nov. / Dec. 2016

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 (10 x 2.5 = 25 Marks)

1 How does clearance volume help in the working of a reciprocating compressor?
2 What are the relative advantages of multi stage compressors over single stage compressor?
3 Define i) Brake thermal efficiency ii) indicated thermal efficiency
4 Define Carburation. What are the factors affecting the carburation?
5 Explain ignition delay in C.I. engine.
6 Explain the importance of indirect injection in C.I. engine briefly.
7 Write short notes on water tube boiler.
8 Define equivalent evaporation of boiler.
9 Define Nozzle efficiency.
10 Define Heat rate in Rankine cycle.

PART – B (50 Marks)

11 a) Mention important differences between i) single acting and ii) double acting reciprocating air compressors. 3

b) A double acting, single stage reciprocating air compressor delivers 0.25m^3/s of air measured at 1.013 bar (abs) and 27^{0}c, delivers at 7 bar (abs). The conditions at the end of induction stroke are pressure of 0.98 bar (abs) and temperature of 40^{0}C. The clearance volume is 5% of stroke volume and the L/D is 1.3 : 1, while the compressor runs at 300rpm. Calculate i) the volumetric efficiency ii) cylinder dimensions iii) indicated power and iv) isothermal efficiency of this machine. Take index of compression and expansion to be 1.3. 7

12 a) Define i) Relative efficiency ii) Volumetric efficiency 4

b) A six cylinder gasoline engine operates in the four stroke cycle. The bore of each cylinder is 80mm and the stroke 100mm. The clearance volume per cylinder is 70cc. At a speed of 4000 r.p.m. the fuel consumption is 20kg/hr and the torque developed is 150Nm. Calculate i) Brake power ii) Brake mean effective pressure iii) Brake thermal efficiency, If the calorific value of the fuel is 43000Kj/kg and iv) Relative efficiency on a brake power basis assuming the engine works on the cycle constant volume cycle γ = 1.4 for air. 6

13 a) Explain the Swirl type combustion chamber and pre combustion chamber in detail. 5

b) Explain the phenomenon of knock in C.I. engine in detail. 5

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14 a) Explain Benson boiler with a sketch. 6
b) Explain in detail natural draught and mechanical draught. 4

15 Explain the methods to improve Rankine cycle. 10

16 A regenerative system is added to a 5-MW steam power plant that operates on a simple ideal Rankine cycle. Steam enters into the inlet of the turbine at 5MPa and 673K and subsequently gets cooled to a saturated liquid at 5kPa in the condenser. A suitable portion of the steam is withdrawn from the turbine at 3MPa, and the remaining steam is expanded to the condenser pressure level. Then, the pressure of this steam is raised to 3MPa to get mixed with extracted steam from the turbine in an open feed water heater. Determine a) quality of steam at the exit of turbine b) net work output per unit mass, and c) thermal efficiency. 10

17 Write short notes on the following : 10
a) Inter coolers in reciprocating air compressor
b) Mist Lubrication system
c) Combustion phenomena in S.I. engine

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Code No. 3418 / N

FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

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 (25 Marks)

1 Explain the difference between double acting and double stage reciprocating air compressor.
2 Write the importance of inter cooler in the air compressor.
3 Define brake thermal efficiency and indicated thermal efficiency of an I.C. engine.
4 Explain the variation of air fuel ratio in best power condition and best economy condition.
5 Define cetane number of a fuel.
6 What is antiknock agent and its importance in a gasoline fuel?
7 Write few words on economizer in a stem boiler.
8 What is equivalent evaporation 'from and at 100^0C'?
9 Define Nozzle efficiency.
10 Define heat rate in Rankine cycle.

PART – B (5 x 10 = 50 Marks)

11 a) Derive an expression for volumetric efficiency of a reciprocating air compressor.
b) A single acting water cooled air compressor was originally installed to deliver air at an absolute pressure of 6bar having 4% clearance volume. It is proposed to increase the delivery pressure to 8bar keeping the speed of the machine unchanged. The compressor is capable of working under the new conditions but the driving motor is already loaded to its maximum rated capacity and can accept on increase in load. Calculate the percentage increase in the compressor clearance volume. Which at the new delivery pressure, will ensure that driving power remains unchanged. How will be the mass of air delivered be affected? Assume the mechanical efficiency of the compressor is independent of the load and the law of compression in both cases $pv^{1.3}$ = c the suction pressure is 1 bar.

12 a) Define i) relative efficiency b) brake thermal efficiency c) indicated thermal efficiency
b) A 42.5 kW engine has a mechanical efficiency of 85%. Find the indicated power and frictional power. If the frictional power is assumed to be constant with load, what will be the mechanical efficiency at 60% of the load.

13 a) Explain the combustion phenomenon in C.I. engine.
b) Explain abnormal combustion in C.I. engine.

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14 a) Define draught in the boilers.
   b) Write down the differences water tube boiler and fire tube boiler.

15 Explain the reheat cycle in Rankine cycle with a neat sketch and derive its efficiency.

16 a) Explain the types of nozzles and derive the velocity of steam through the nozzle.
   b) Dry saturated steam at 5 bar with negligible velocity expand isentropic ally in a convergent nozzle to 1 bar and dryness fraction 0.94. Determine the velocity of steam leaving the nozzle.

17 Write short notes on the following :
   a) Mist type lubrication
   b) Thermosiphon cooling system
   c) Flame front propagation

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Code No. 3143 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) I-Semester (Old) Examination, Nov./ Dec. 2016

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	Why multi stage compressors are required?	3
2	Is there any effect of clearance volume on work done and efficiency?	2
3	How do you classify I.C engines?	3
4	Define Brake thermal efficiency.	3
5	How does combustion in C.I. engines take place?	3
6	What are the main functions of carburetors?	3
7	Name the laws of heat transfer.	2
8	Define critical Radius of Insulation.	2
9	What is forced and free convection?	2
10	Classify heat exchangers.	2

PART – B (50 Marks)

11 a) Bring out the salient advantages and disadvantages between single stage piston type and rotary compressors.

b) A single cylinder, single acting reciprocating compressor takes in air 6 m^3 / min at 1 bar and 15^0c and compresses air to a delivery pressure of 5 bar gauge. The possible compression processes are :

A) Isentropic compression, n = 1.4

B) Polytropic compression, n = 1.25

Find in each case, neglecting clearance,

i) Temperature at the end of compression

ii) Work done during suction by air

12 a) Explain briefly the effects of cooling during the multistage compression.

b) Explain briefly the effects of clearance on the volumetric efficiency.

13 a) Explain the difference between two stroke and four stroke I.C. engines – which is more efficient and why.

b) Explain the effects of engine variables on ignition delay in S.I. engines.

14 a) What are the effects of octane and cetane ratings on the engine fuels and why?

b) Explain with a neat sketch the valve timing diagram of a 4-stroke single cylinder Diesel engine.

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15 The following observations were taken during the testing of single cylinder four stroke oil engine.

Brake wheel diameter = 65 cm,
Rope dia = 3cm,
Speed = 450 rpm,
Load on band = 270N,
Spring balance reading = 40N,
Area of indicator diagram = 6.5cm,
Spring stiffness = 12bar/cm,
Bore = 11cm,
Specific fuel consumption = 0.3129kg/kwh,
CV of fuel = 41868 kj/kg
Estimate the bp, ip, mechanical efficiency, ith efficiency, bth efficiency.

16 a) What are the different modes of heat transfer – explain briefly.
b) Give the uses of compressed air.
c) Define Wein's law.

17 a) Explain the procedure of dimentinoal analysis using Buckingham theorem.
b) Differentiate between parallel and counter flow heat exchange.

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Code No. 3423 / N

FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

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	Enumerate the applications of compressed air.	2
2	What are the advantages of multistage reciprocating air compressor?	3
3	What are the uses of air-standard cycle analysis?	2
4	What is mean piston speed, explain its importance?	3
5	Explain the phenomenon of knock in CI engine.	2
6	Compare 4-stroke and 2-stroke cycle engine.	3
7	What is Fourier law of conduction?	2
8	Define critical radius of insulation.	3
9	State Planck's law.	2
10	What is the difference between natural and forced convection?	3

PART – B (50 Marks)

11 a) Compare the differences in valve mechanism of internal combustion engine and reciprocating air compressor.

b) A single stage double acting air compressor is required to deliver $14m^3$ of air per minute measured at 1.013 bar and 15^0C. Delivery pressure is 7 bar and speed 300 rpm. Take the clearance volume as 5% of the swept volume with compression and expansion and expansion index of n as 1.3. Calculate i) Swept volume of the cylinder, ii) The delivery temperature iii) Indicated power.

12 a) Explain the method of preparation of heat balance sheet for IC engines.

b) The following observations were recorded during a test on single cylinder oil engine. Bore = 300mm, Stroke = 450 mm, Speed = 300 rpm, imep = 6 bar, net brake load = 1.5 kN, brake rope diameter = 2cm, Brake drum diameter = 1.8 meters. Calculate i) Indicated power ii) Brake Power and iii) Mechanical Efficiency.

13 a) What are the types of combustion chambers in SI engines?

b) Explain the working principle of simple carburetor.

14 a) Explain about the stages of combustion in SI engine, elaborating the flame front propagation.

b) Derive the expression for the rate of heat transfer through composite cylinder.

..2

15 A furnace wall consists of 200mm layer of refractory bricks, 6mm layer of steel plate and a 100mm layer of insulation bricks. The maximum temperature of the wall is 1150^0C on the furnace side and the minimum temperature is 40^0C on the outermost side of the wall. An accurate energy balance over the furnace shows that the heat loss from the wall is 400 W/m^2. It is known that there is a thin layer of air between the layers of refractory bricks and steel plate. Thermal conductivities for the three layers are 1.52, 45 and 0.138 W/m^0C. respectively. Find i) The thickness of air between the layers of refractory brick and steel plate ii) What is the temperature of outer surface.

16 The flow rates of hot and cold water streams running through a parallel flow heat exchanger are 0.2 kg/s and 0.5 kg/s respectively. The inlet temperatures on the hot and cold sides are 75^0C and 20^0C respectively. The exit temperature of hot water is 45^0C. If the individual heat transfer coefficients on both sides are 650 W/m^2 ^{0}C, calculate the area of heat exchanger.

17 Write short notes on the following :

a) LMTD 3

b) Detonation 4

c) Absorptivity, Reflectivity and Transmissivity 3

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Code No. 3146 / O

FACULTY OF ENGINEERING

B.E. 3/4 (AE) I-Semester (Old) Examination, Nov. / Dec. 2016

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	List the major differences between the actual cycle and air standard cycle.	3
2	What do you understand by the term "ignition quality" of diesel fuel.	2
3	What are the basic requirements of a fuel injection system of a diesel engine?	3
4	Describe the crank-case scavenging.	2
5	Explain the importance of air-motion during the combustion process.	3
6	What is the purpose of injection pump governor?	2
7	Explain the effect of load on engine performance characteristics.	3
8	What are the limitations of mechanical governors?	2
9	Briefly explain about the "exhaust emissions" from a diesel engine.	3
10	What are the advantages of "Turbo charging" in a diesel engine?	2

PART – B (50 Marks)

11	a)	With the help of a labeled sketch, explain the construction and operation of a diesel engine.	5
	b)	Explain the working of Jerk type injection pump with a neat sketch.	5
12	a)	Write a detailed note on the "Knocking" in diesel engines.	5
	b)	Explain how Cetane member is determined in the laboratory.	5
13	a)	Explain the different stages of combustion in diesel engines.	5
	b)	Explain the factors affecting the "delay period" in diesel engines.	5
14	a)	Describe the process of "Exhaust gas recirculation" and its effects on the performance characteristics of a diesel engine.	5
	b)	Explain how "Supercharging" mechanism is matched with an engine.	5
15	a)	Derive an expression for the mean effective pressure of diesel engine.	5
	b)	Explain the phenomenon of spray formation in diesel engines.	5
16	a)	Compare the diesel and dual cycles, taking important variables into consideration.	5
	b)	What are the requirements and design objectives of combustion chamber in diesel engines?	5

17 Write notes on the following with neat labeled sketches
   a) Indirect injection combustion chambers
   b) Turbocharger used in a diesel engine

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Code No. 3426 / N

FACULTY OF ENGINEERING

B.E. 3/4 (AE) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

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 Explain the procedure of measuring the brake power output of a diesel engine.
2 What is meant by distributor fuel injection system?
3 What is meant by swirl motion?
4 What is the necessity of turbocharging on engine and what are its limitations?
5 What are the emissions that come out of diesel engine exhaust? How it can be controlled?
6 What are the advantages of two stroke cycle engine over four stroke cycle engine?
7 What is meant by atomization of fuel?
8 What is the effect of air motion in CI engine?
9 What is scavenging? Explain its procedure briefly.
10 What is the significance of volumetric efficiency in a diesel engine?

PART – B (50 Marks)

11 a) Explain the significance of fuel air cycle.
b) What is a difference between air standard cycle and fuel air cycle analysis?

12 a) What are the basic requirements of a fuel injection system in diesel engine?
b) Explain two major types of governors used in CI engine.

13 a) What is delay period and what are the factors that effect it?
b) What are homogenous and heterogeneous mixtures? In which engines these mixtures are used.

14 a) Briefly explain the various methods of supercharging an engine and its effect on engine performance.
b) What is meant by EGR? Explain its procedure briefly.

15 a) Schematically explain the use of study of heat balance sheet of an engine.
b) Discuss about the various efficiency terms associated with an engine.

16 A diesel engine has a compression ratio of 20 and cut off takes place at 5% of the stroke. Find the air-standard efficiency. Assume $\gamma = 1.4$.

17 Write short notes on the following :
a) Engine cooling methods used in diesel engine
b) Performance maps
c) Cetane number

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Code No. 3150 / O

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I - Semester (Old) Examination, November / December 2016

Subject : Database Management Systems

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 responsibilities of a DBA?	(2)
2	Explain distinctions among the terms primary key, candidate key, super key.	(3)
3	Express left outer join interms of basic relational algebraic primitives.	(2)
4	Describe about Domain constraints.	(3)
5	Write short notes on views.	(3)
6	Define functional dependency.	(2)
7	What are the features of dense Index?	(3)
8	Draw and explain state diagram of Transaction.	(2)
9	Explain about stable storage.	(2)
10	What is fuzzy check point? Explain.	(3)

PART – B (50 Marks)

11 (a) What are the main differences between a FPS and DBMS? (6)
(b) Explain how to reduce E-R diagrams to tables. (4)

12 (a) What is the functionality of following operations in Relational Algebra (6)
Rename
Division
Cartesian product
(b) Explain the concept of Nested sub queries with examples. (4)

13 (a) Explain the different steps involved in query processing. (5)
(b) What is Normal form? Explain 1NF, 2NF and 3NF. (5)

14 Construct B+ tree for the following key values : (10)
2, 3, 5, 7, 11, 17, 19, 23, 29, 31.
Show the form of tree and do the following operations
(i) Insert 9 (ii) Insert 10 (iii) Delete 23 (iv) Delete 17

15 (a) List and explain the properties of Transactions with example. (6)
(b) Explain specialization and generalization with example. (4)

16 (a) What are the steps that are in 'Time stamp – ordering protocol'? Explain. (6)
(b) Describe about two-phase 'locking protocol'. (4)

17 Write short notes on the following: (10)
(a) Remote backup systems
(b) Failure classification
(c) Recursive Queries

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Code No. 3431 / N

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (Main) Examination, November / December 2016

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	Describe the three levels of data abstraction.	2
2	Define data definition language, Data control language (DCL) and Data manipulation language (DML).	3
3	List several types of aggregate with examples.	3
4	Differentiate strong and weak entity sets with example.	3
5	What is the importance of normalization?	2
6	Define Dynamic SQL.	2
7	What are ACID properties of a transaction?	2
8	Define serializability.	3
9	Write the features of ARIES recovery system.	3
10	What is stable storage/	2

PART – B (5x10 = 50 Marks)

11	a)	Draw and explain the Database Management system architecture.	5
	b)	Draw the E-R diagram which models an online bookstore.	5
12	a)	Explain the steps in reduction to relational schema.	4
	b)	Write SQL queries for the given schemas Employee: (Emp id, Ename, Designation, Salary, Address) Department: (Dept id, Dname, Dmanager) i) Retrieve the details of the employee who gets the maximum salary ii) List names of all employees who earn more than Rs. 10,000 iii) Retrieve the total amount spending towards employee salaries	6
13	a)	Explain the fundamental extended algebra operations.	5
	b)	What is a join expression? Explain various types of join expressions.	5
14	a)	Define normalization and explain the use of normalization.	5
	b)	Write about embedded SQL.	5
15	a)	Compare B tree and B+tree index file structures with example.	5
	b)	Discuss in detail on testing for serializability.	5
16	a)	Explain log based recovery in transactions.	5
	b)	Explain Deadlock handling in concurrency control.	5
17	Write a short note on the following:		
	a)	Aggregation	4
	b)	Null values	3
	c)	Two phase locking	3

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Code No. 3155 / O

FACULTY OF INFORMATION

B.E. 3/4 (IT) I - Semester (Old) Examination, November / December 2016

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 List activities involved in a Generic process model of software engineering. (2)
2 Briefly explain about unified process. (3)
3 What is Liskov substitution principle (LCP)? (2)
4 List the Garvin's Quality Dimensions. (4)
5 What is Debugging ? Differentiate it from testing. (3)
6 What is software configuration management? (2)
7 Define Measures. Metrics and indictors. (3)
8 What is Software Maturity Index? (2)
9 What is Alpha test and Beta Test? (2)
10 Define coupling and Cohesion. (2)

PART – B (50 Marks)

11 (a) Explain about Requirements Elicitation in detail. (5)
(b) Develop a use case for making a withdrawal at an ATM machine. (5)

12 Explain about different Architectural styles in detail. (10)

13 (a) Explain about Integration Testing strategies for conventional S/Ws. (6)
(b) What is Software Reliability ? Discuss about different measures of Reliability and Availability. (4)

14 What is White Box Testing? Illustrate Basis–Path Testing with suitable examples. (2+8)

15 (a) Write about Elements of SQA. (5)
(b) What is an SCM Repository? Explain about its contents. (5)

16 Explain about function-based Metrics for Requirements model using a suitable example. (10)

17 Write about any **two** of the following: (5+5)
(a) RMMM
(b) Software scope and Feasibility
(c) Loop Testing
(d) Waterfall model

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Code No. 3437 / N

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I – Semester (New) (Main) Examination, November / December 2016

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	What is requirements engineering? List its activities.	3
2	What are different types of quality attributes given by Hewlett-Packard?	2
3	Define coupling and cohesion. List different coupling strategies.	4
4	Differentiate between reactive and proactive risks.	2
5	Write McCall's quality factors.	3
6	What is software maturity index? Give its formula.	2
7	Differentiate between validation and verification.	2
8	Define unit testing.	2
9	What is SCM?	2
10	What is meant by component qualification, adaptation and composition?	3

PART – B (5x10 = 50 Marks)

11	Discuss concept, advantages, limitations of following process models: Waterfall, spiral model.	10
12	Write steps required for conducting component level design for an object oriented system.	10
13	Explain about system testing strategies in detail.	10
14	a) Write about following design concepts: separation of concerns, modularity and functional independence.	6
	b) Define software reliability. Give formula for software reliability and availability.	4
15	Explain function based metrics for requirements model and compute function – points assuming sample data.	10
16	a) What is debugging? Illustrate debugging process with help of a neat diagram.	6
	b) Explain how changes to software system are managed by SCM process.	4
17	Write short notes on:	
	a) SQA tasks	5
	b) RMMM plan	5

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