Code No. 101

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I – Semester Examination, December 2017

Subject: Theory of Structures – I

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

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

PART – A (25 Marks)

1	Who developed slope defection method and moment distribution method?	2
2	What are the limitations of moment distribution method?	2
3	What is a rotation factor?	2
4	Depending on the boundary conditions, how are arches classified?	2
5	What is virtual work?	2
6	Find the horizontal thrust in a three hinged arch subjected to uniformly distributed load over its entire span.	3
7	State and describe the importance of Castigliand's theorem.	3
8	Write the equation to find displacement factor for a portal frame whose supports are not at same level.	3
9	Compute slope at A in the case of beam AB shown in Figure-1 using slope deflection method.	3

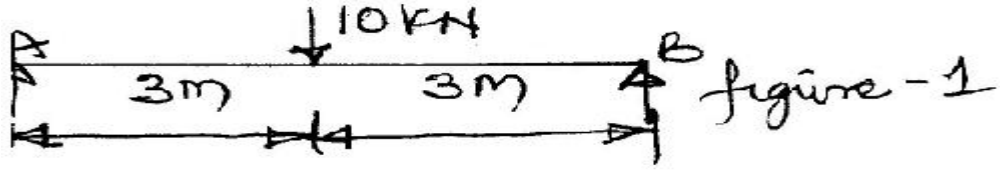


figure-1

10	Compute final moment at A in the beam AB shown in Figure-2 using moment distribution method.	3

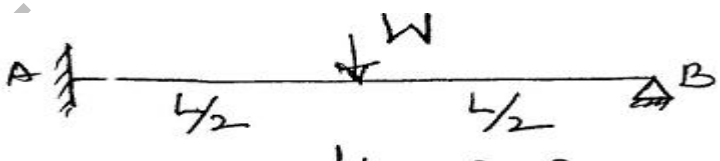
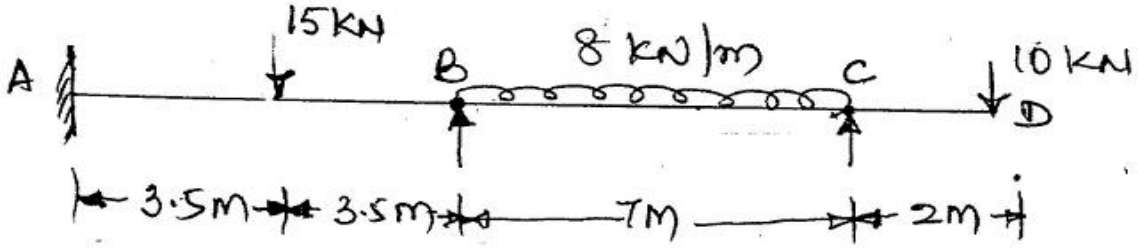


figure-2

PART – B (5x10 = 50 Marks)

11	A beam ABCD, 16m long is continuous over three spans and is loaded as shown in Figure – 3. Compute the moments and reactions at the supports using slope deflection method. Draw BMD.	10



EI Constant, figure-3.

12 Analyze the portal frame shown in Figure – 4 using moment distribution method. Draw BMD EI is constant. 10

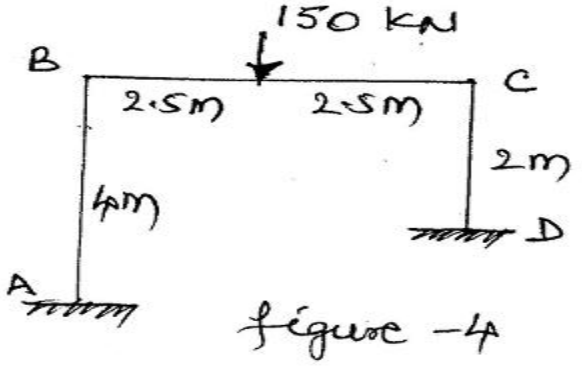


figure –4

13 Analyze the portal frame shown in Figure – 5 using Kani's method. Draw BMD. 10

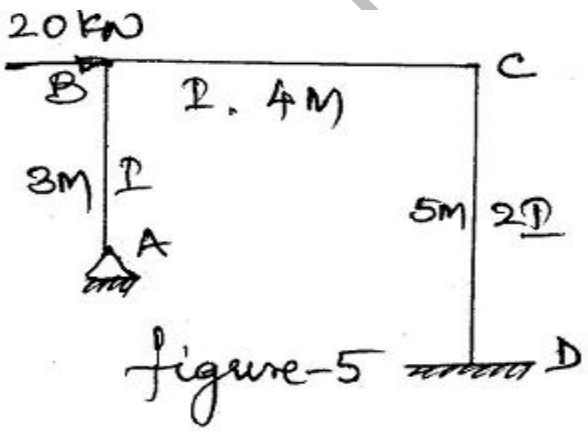


figure-5

14 A three hinged parabolic arch of 30 m span and 6 m central rise carries a point load of 24 kN at 4 m horizontally from the left hand hinge. Calculate the normal thrust and shear force at the section under the load. Also calculate the maximum positive and negative bending moment. Draw BMD. 10

15 Determine the slope and deflection at the point C in the beam AB shown in Figure – 6 using unit load method. 10

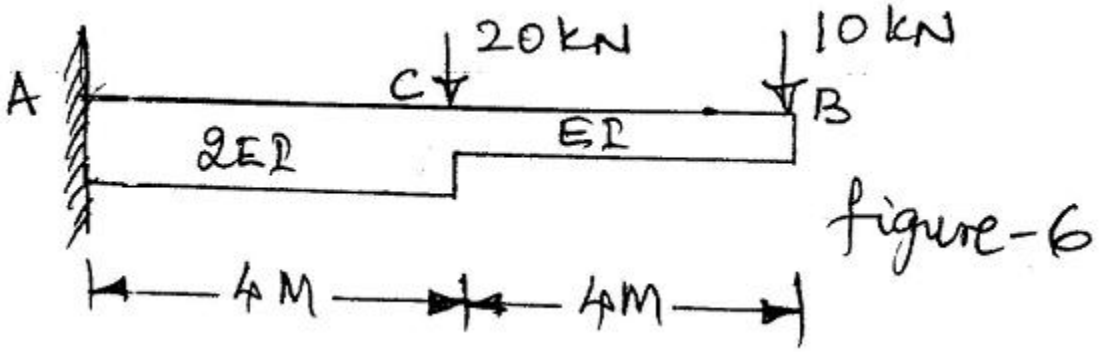


figure-6

16 Compute vertical deflection at joint F in the frame shown in figure – 7 using unit load method. 10

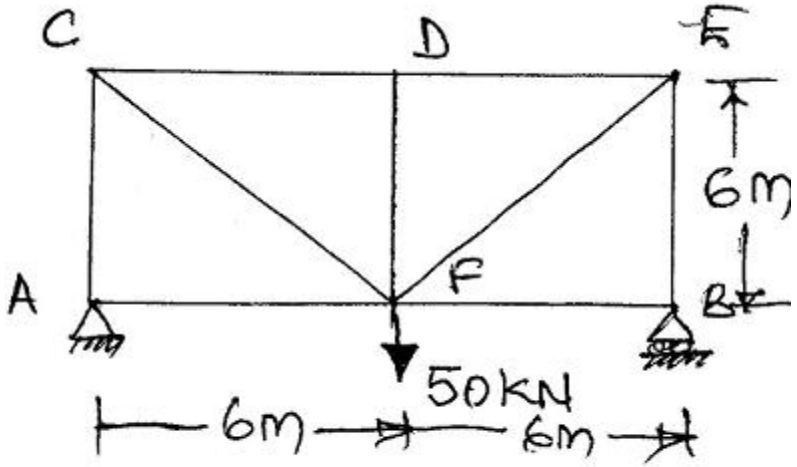
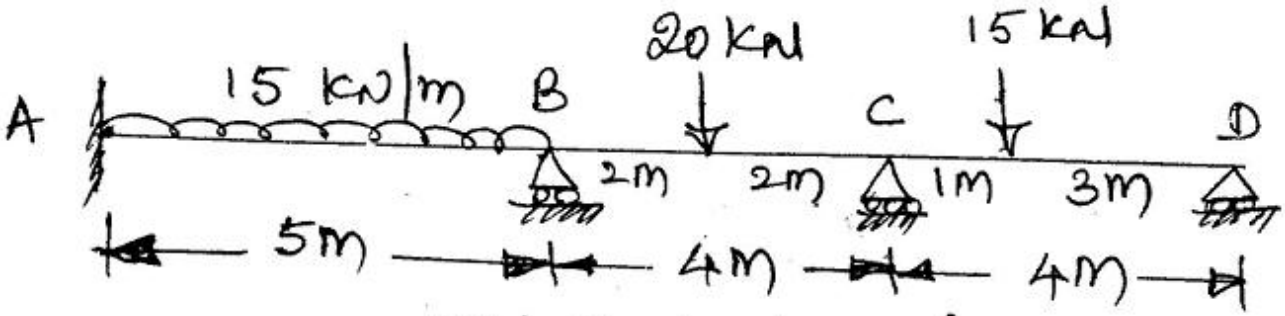


figure -7

17 Analyse the continuous beam shown in Figure – 8 using Kani's method. Draw BMD. 10



EI is Constant. figure – 8.

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Code No. 109

FACULTY OF ENGINEERING

BE 3/4 (EEE / EIE) I - Semester (Main & Backlog) Examination, December 2017
Subject: Power Electronics

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

Note : Answer all questions from Part-A & Any Five Questions from Part-B.

PART – A (25 MARKS)

1	Define latchup in IGBT		3
2	Write merits and demerits of MOSFET		2
3	Explain Turning ON and Turning OFF of BJT		3
4	Why protection circuits for SCR'S are required		2
5	What is the role of Freewheeling Diode in a 1¤ controlled converter?		2
6	Define a) Firing angle b) Extinction angle c) Overlap angle		3
7	Write the complete classification of converters		2
8	Draw the operating quadrants of class A, B, C, D and E choppers		3
9	What is the main drawback of 180^0 mode operation of three phase bridge inventor		2
10	Define external and internal control of inventers		3

PART – B (50 MARKS)

11	a)	Explain switching characteristics of IGBT with neat waveforms	5
	b)	For an SCR Gate-cathode characteristics has a straight-line slope of 130. For triggering source voltage of 15V and allowable gate power dissipation of 0.5 watts, compute the gate source resistance	5
12	a)	With neat waveforms explain RC firing circuit operation	5
	b)	Explain the gating circuit operation of 1¤ converter	5
13		With neat waveforms and circuit diagram explain the operation of half wave controlled rectifier with a freewheeling diode.	10
14	a)	Derive the output voltage of Buck Boost regulator	5
	b)	A step down D.C. chopper has a resistive load of R = 15 Ω and input voltage V_{dc} = 200V. The ON state Voltage drop of the chopper is 2.5V, chopping Frequency is 1 kHz. If duty cycle is 50% determine (i) average output voltage (ii) RMS output voltage (iii) Chopper efficiency	5

15		Explain the 180^{o} mode operation of 3¤ fridge inverter	10
16	a)	Explain the step-up operation of 1¤ cyclo converter	5
	b	Derive average load voltage, rms load voltage of 1¤ Half wave – controlled rectifier with R load.	5
17	a)	Explain over voltage protection of SCR's	5
	b)	Explain pulse width modulation	5

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Code No. 118

FACULTY OF ENGINEERING

BE. 3/4 (E.C.E) I – Semester (Main & Back Log) Examination, December 2017

Subject: Digital System Design with Verilog HDL

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

Note : Answer All Questions from part A, & Any Five Questions from part - B

PART – A (25 Marks)

1. Explain types of design methodology in verilog (3)
2. What is the difference between $ display and $ monitor? (2)
3. Write Verilog code for inverter in switch level modelling (3)
4. What is meant by logic synthesis? (3)
5. Write Verilog code for JK flip flop in behavioural modelling (2)
6. Draw state table and diagram for mealy incompletely specified circuit (2)
7. Explain hazards in combinational circuit with example (3)
8. Draw ASM chart for given FSM model shown in Table 1 (2)

PS	Inputs (x)	
	X= o	X = 1
A	C,1	D,0
B	D,0	B,1
C	B,0	C,1
D	C,0	A,0

9. Explain organization of RAM (3)
10. Draw simplified architecture of FPGA (2)

PART- B (50 MARKS)

11 a) What are the Various Data types in Verilog HDL (4)

b) Write the syntax of Tri-state gates. And write a Verilog HDL code for 4-bit binary adder using 1 – bt binary adder (6)

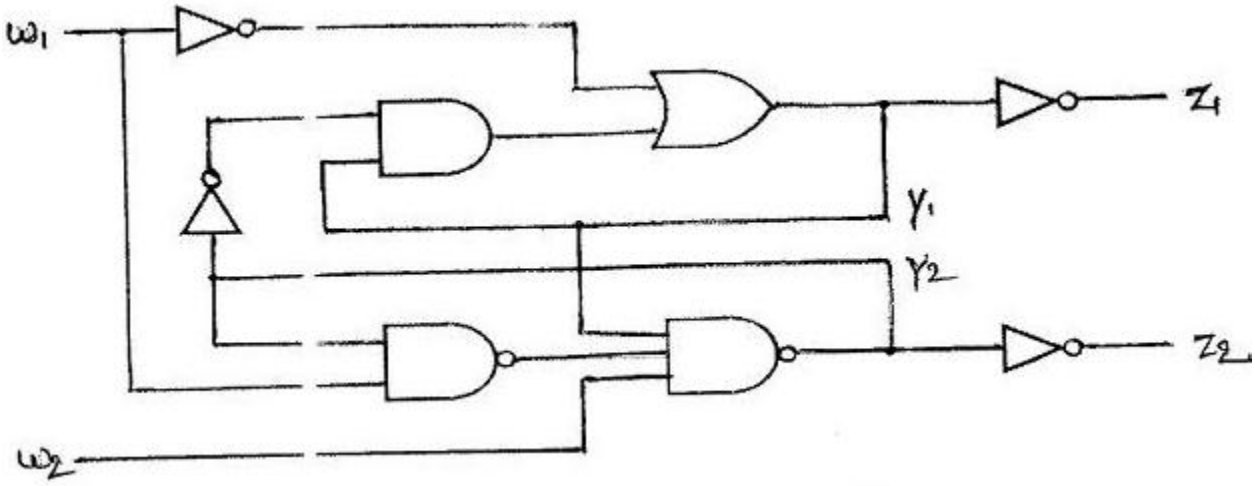
12 a) Explain Register Transfer Level code with example (5)

b) Write a Verilog HDL program in Hierarchical structural model for 3:8 decoder using 2:4 decoder and Verify with Stimulus. (5)

13 a) Design synchronous sequential model using one hot encoding method for given state table shown in Table1, Assume JK flip flop as storage element

14 a) Differentiate between ASM and ASMD chart (3)

b) Derive a Flow table that describes the behaviour of the circuit as shown (7)



15 a) Draw and Explain operation of 6T MOSRAM cell (5)

b) Realize binary to gray code converter with four – input and four – output PROM (5)

16 a) Give functioin F (A,B, C,D) = m (0,2, 7 10) + d (12, 15) realize using PLA (4)

b) Write Verilog code using a mealy machine which detect a sequence 101 and explain with timing diagram (6)

17 Write short notes on the following

a) Blocking and Non blocking assignments (4)

b) Sequential and Parallel blocks (3)

c) Lookup Tables (LUTs) (3)

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Code No. 118/O

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (Old) Examination, December 2017

Subject: Microprocessors. And Microcontrollers

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

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

PART-A (25 Marks)

1. Describe the functionalities of minimum mode pins of 8086 3
2. What are the series of actions the 8086 performs when an interrupt occurs? 3
3. Give the string manipulation instructions of 8086 2
4. Bring out the differences between Procedures and Macros 3
5. Explain the control word register format of 8255 PPI 2
6. List the DMA data transfer methods. 2
7. Explain the special functions of Port – 3 of 8051 3
8. With what instructions bit addressable memory of 8051 is accessible. 2
9. Draw the interface diagram of DAC with 8051. 3
10. What are the vector addresses of all the interrupts in 8051? 2

PART- B (50 Marks)

11. a) Explain the minimum mode configuration of 8086 with neat diagram 6
    b) Brief the evolution of x86 series microprocessor 4

12. a) Explain various addressing modes of 8086 with example for each 10

13. a) Write an assembly language program to perform ASCII multiplication of two ASCII numbers 5
    b) List out and explain the any five assembler directive. 5

14. a) Explain the modes of operation of 8255 PPI 5
    b) Describe the internal architecture of 8251 USART 5

15. a) Describe the internal and external memory organization of 8051. 5
    b) Explain the data transfer and branching instructions of 8086 with examples 5

16. a) Explain the addressing modes of 8051 with examples 5
    b) Write an assembly language program to generate square of 2 KHz frequency on P1.0 pin with help of timers 5

17. a) Write an assembly language program for 8051 to send “HELLO” serially with 9600 baud. 4

    b) Draw the interface diagram of stepper motor with 8051 and write program to rotate it in clock wise direction continuously. 6

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Code No. 121

FACULTY OF ENGINEERING

B.E. 3/4 (M/P) I – Semester (Main & Backlog) Examination, December 2017

Subject: Design of Machine Elements

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

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

PART – A (25 Marks)

1 What are the different codes and standards used in design?

2 What are the general design considerations in machine elements?

3 What are preferred numbers?

4 Define notch sensitivity.

5 What are the factors effecting the fatigue strength?

6 State the differences between rigid and flexible coupling.

7 Differentiate between shaft, axle and rod.

8 What are fluctuating stresses?

9 What are the different types of locking devices?

10 Differentiate between differential and compound screws.

PART – B (5x10 = 50 Marks)

11 A mild steel shaft of 50 mm diameter is subjected to a bending moment of 2000 N-M and a torque T. If the yield point in tension is 200 MPa, find the maximum value of this torque without causing yielding of the shaft according to maximum principle stress theory, max. shear stress theory and max. distortion strain energy theory of yielding.

12 Determine the diameter of circular rod mode of ductile material with fatigue strength σ_e = 265 MPa and a tensile yield strength of 350 MPa. The member is subjected to varying axial load from W_{min} = -300 x 10^3 N to W_{max} = 700 x 103^3 N and has a stress concentration factor of = 1.8. Use factor of safety as 2.0.

13 Design and draw a protective type cast iron flange coupling for a steel shaft transmitting 15 kW at 200 rpm, and having allowable shear stress of 40 MPa. The working stress in the both should not exceed 30 MPa. Assume that same material is used for the shaft and key and the crushing stress is twice the value of its shear stress. The maximum torque is 25% greater than the full load torque. The shear stress for cast iron is 14 MPa.

14 Design a cotter joint to connect piston rod to the cross head of a double acting st5eam engine. The diameter of the cylinder is 300 mm and the steam pressure is 1 N/mm^2. The allowable stresses for the material of the cotter and piston rod are as follows; σ_t = 50 MPa, ² = 40 MPa, and σ_c = 84 MPa.

15 A steel shaft of 1.25 m long, supported between bearings carries 1250 N pulley at its midpoint. The pulley is keyed to the shaft and receives 20 kW at 200 rpm. The belt drive is horizontal and the ratios of belt tensions is 3:1. The diameter of pulleys is 600 mm. Compute the shaft diameter.

16 A double riveted lap joint with zig – zag riveting is to be designed for 13 mm thick plates. Assume tensile stress = 80 MPa, shear stress = 60 MPa, crushing stress = 120 MPa. State how the joint will fail and find the efficiency of the joint.

17 Write short notes on the following:
   a) Bolts of uniform strength
   b) S-N diagram
   c) Design of welded joints subjected to centric loading.

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Code No. 131

FACULTY OF ENGINEERING

B.E. 3/4 (AE) I - Semester (Main & Backlog) Examination, December 2017

Subject: Design of Machine Components

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)

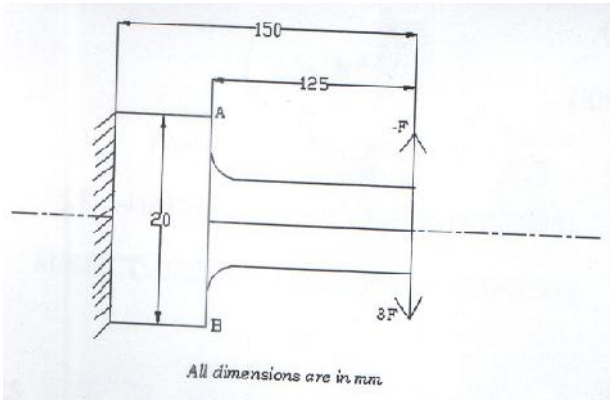
1 What do you know about factor of safety? (2)
2 What are the mechanical properties considered during design of machine components? (2)
3 Which theories of failure are applied in the design of shaft? (2)
4 Differentiate shaft, axle and spindle from the design point of view. (3)
5 How can you design a key? (2)
6 Give some examples for locking devices with suitable diagrams. (3)
7 What is turn-buckle and where is it used? (2)
8 What are the common modes of failure in a riveted join and how can they be rectified? (3)
9 How does the function of the brake differ from that of a clutch? Discuss the different types of brakes giving at least one practical application for each. (3)
10 Explain briefly the design procedure of an axially loaded unsymmetrical welded section. (3)

PART – B (50 Marks)

11 A solid steel of 50mm diameter is subjected to a bending moment of 2000N-m and a torque T. If the yield point of the steel in tension is 200 N/mm^2. Determine the maximum value of this torque without causing yielding of the shaft according to
(a) Maximum principal stress theory
(b) Maximum shear stress theory
(c) Maximum principal strain theory
(d) Maximum distortion energy theory Take factor of safety as 1

12 A circular cross section of cantilever beam made of cold drawn carbon steel is shown below. It is subjected to a load which varies from –F to 3 F. Determine the maximum load that this member can withstand for an indefinite life using a factor of safety of 2. The theoretical stress concentration factor is 1.42 and the notch sensitivity is 0.9. Assume the following values;

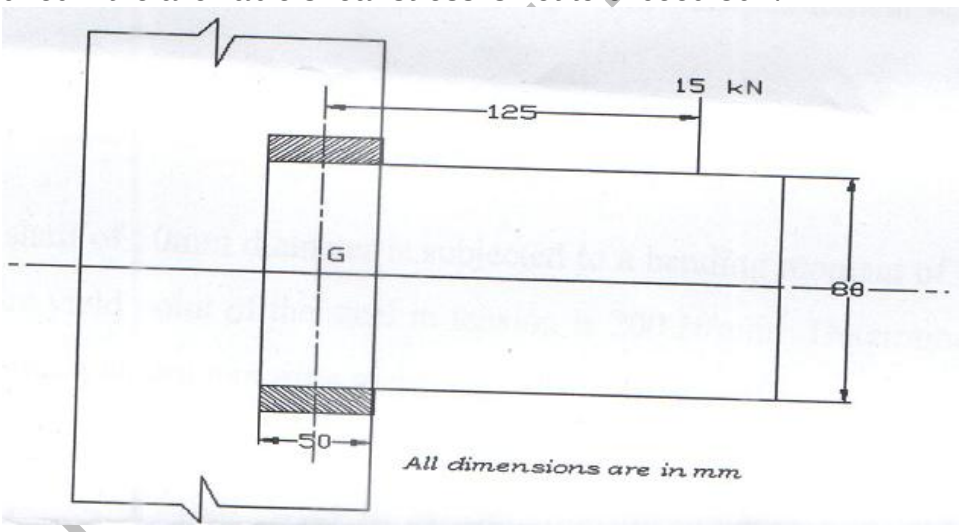
Ultimate stress = 550 Nmm^2, Yield stress = 470 N/mm^2
Endurance limit = 275 N/mm^2, Size factor = 0.85, Surface factor = 0.89



13 Design and draw a bush type of flexible flange coupling which is to transmit 3 kW power at 960 rpm with a service factor of 1.2.
Assume design stresses for shaft, bolt, key in shear = 50 N/mm^2;
For coupling in shear = 20 N/mm^2; for key in crushing = 100 N/mm^2.

14 Design a triple riveted, zigzag lap joint for connecting two plates. The thickness of the each plate is 9mm. The allowable stresses are
(i) 80 N/mm^2 for plates in tension
(ii) 60 N/mm^2 for plates in shear
(iii) 100 N/mm^2 for plates in crushing
Find also efficiency of the joint and sketch it.

15 A bracket carrying a load of 15 kN is to be welded as shown below. Find the size of weld required if the allowable shear stress is not to exceed 80N/mm^2.



16 Draw and design a knuckle joint to transmit a torque of 150 kN. The design stresses may be taken 75 N/mm^2 in tension, 60N/mm^2 in shear and 150 N/mm^2 in compression.

17 The mass and diameter of a wheel is 50 kg and 0.5m respectively. The wheel turning at 150 r.p.m. in bearings is brought to rest by pressing a brake shoe radially against the rim with a force of 100 N. If the radius of gyration of wheel is 0.2m, how many revolutions will the wheel make before coming to rest? Assume that the coefficient of friction between shoe and rim has the steady value of 0.25.

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Code No. 131/O

FACULTY OF ENGINEERING

B.E. ¾ (M/P/AE) I - Semester (Old) Examination, December 2017

Subject: Design of Machine Element

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

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

PART-A (25 Marks)

1. Define the terms(i) Ductility (ii) Malleability (iii) Hardness
2. Define factor of safety? What is its importance in design?
3. What is low and high fatigue cycle?
4. Illustrate how the stress concentration in a component can be reduced.
5. What is the function of a key? Classify various types of keys.
6. Define equivalent bending moment and equivalent twisting moment?
7. Why gaskets are provided at joints?
8. Explain the purpose of turn buckle.
9. Explain the following terms. (i) Pitch (ii) back pitch (iii) Diagonal pitch
10. Distinguish between differential and compound screw.

PART-B (50 Marks)

11. An I – section beam of depth 250 mm and M.I. of 8 x 107 mm^4 is supported 4m apart. It is loaded by a weight of 4 KN through a height of 'h' and striking the beam at mid span. Determine the height of fall if allowable stress of beam material = 120 N/mm^2 and E = 210 KN/mm^2.
12. A circular bar of 500 mm length is supported freely at its two ends. It is acted upon by a Central concentrated cyclic load having a minimum value of 20kN and a maximum value of 50 kN. Determine the diameter of bar according to Soderberg and Goodman theory, take factor of safety as 2, size effect of 0.85, surface finish factor of 0.9. The material properties of bar is given by: Ultimate Strength of 650 MPa. Yield strength of 500 MPa and endurance strength of 350MPa.
13. A bolt is subjected to an axial force of 8000N with transverse shear force of 4000N. Find the dliameter of the bolt required according to all Rankine Theory. Theory, Tresca theory, Von – Misses Stress theory. It is assumed that the permissible tensile stress at elastic limit = 100N/mm2 and Poisson's ratio = 0.29.
14. A shaft supported at the ends in ball bearings carries a straight tooth gear and its mid span and is to transmit 7.5kW at 280r.p.m. The pitch circle diameter of the gear is 150mm. The distances between the center line of bearings and gear are 100 each. If the shaft is made of steel and allowable shear stress is 40 MPa, determine the diameter of the shaft. The pressure angle of the gear may be taken as 20^o.

15. Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 m in diameter subjected to a steam pressure of 0.95 N.mm2. Assume joint efficiency as 75%, allowable tensile stress in the plate 90 MPa: compressive stress 140 MPa; and shear stress in the rivet 56 MPa.

16. a) Explain material used in machine design and their specification according to Indian standards.

    b) Explain the factors affecting fatigue strength.

17. a) Design a flange coupling to transmit 60 kW power at 350 rpm. Allowable shear stress may be taken as $30N.mm^2$.

    b) Design a cotter joint to transmit a load of 2kN. Take allowable stress values in tension and shear as 70 N/mm^2 and 30 N/mm^2 respectively.

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Code No. 134

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (Main & Backlog) Examination, December 2017

Subject: Automata Languages and Computation

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

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

PART – A (25 Marks)

1	Distinguish between NFA and DFA.	3
2	What are regular expressions?	2
3	Compare right linear grammar and left line grammar.	3
4	What do you mean by ambiguous grammar?	2
5	State the general form of transition function for NPDA.	2
6	State pumping lemma for CFG.	3
7	What is restricted turing machine?	3
8	Mention ID format for TM.	2
9	What do you mean by post correspondence problem?	3
10	State church's hypothesis.	2

PART – B (5x10 = 50 Marks)

11 a) Construct a DFA 6

	0	1
$\rightarrow$ ¥$_o$	$q_o q_1$	q_o
q_1	¤	q_2
q_2	¤	q_3
~ q_3	q_3	q_3

b) Minimize the following DFA 4

	0	1
$\rightarrow$A	B	E
B	C	F
$*$C	D	H
D	E	H
E	F	I
$*$F	G	B
G	H	B
H	I	C
$*$I	A	C

12 a) Explain algebric laws for regular expressions. 5

b) Write short note on “equivalence and minimization of automata”. 5

13 Convert the following PDA P = {{p, q}, {0,1}, {x, z_o},¢ , q, z_o} to context for grammar if ¢ is given by 10

¢ (q, 1, z_o) = (q, xz_o)

¢ (q, 1, x) = (q, xx)

¢ (q, 0, x) = (p, x)

¢ (q, ϵ, x) = (q, ϵ)

¢ (p, 1, x) = (p, ϵ)

¢ (q, 0, z_o) = (q, z_o)

14 Explain about the programming techniques of TM with example. 10

15 a) Explain post correspondence problem. 5

b) Explain about universal language. 5

16 a) Given grammar C with production 5

S $\rightarrow$ aB | bA
A $\rightarrow$ a | aS | bAA
B $\rightarrow$ b | bS | aBB for a string ‘aaabbabbba’.
Find the right most and left most derivation parse true.

b) Using pumping lemma prove L = {ww / wϵ {0,1}} is not CFL. 5

17 a) Explain the classes of P, NP and explain the terms NP – Bhard and NP – complete. 5

b) Give the regular grammar for the language L = O^n / n ≥1. 5

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Code No. 141

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I-Semester (Main & Backlog) Examination, December 2017

Subject : Design and Analysis of Algorithms

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

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

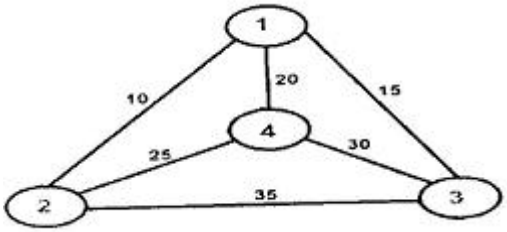
PART – A (25 Marks)

1	Explain randomized algorithms.	3
2	Define Max heap.	2
3	Define Binary search.	2
4	Define minimum cost spanning tree.	2
5	Explain reliability design.	3
6	State the 8 Queens problem.	2
7	Write the control abstraction of LC search.	3
8	State the functions of non-deterministic algorithms.	3
9	Solve the recurrence relation T(n) = 2T(n/2) +n.	3
10	Write any two applications of DFS.	2

PART – B (5 x 10 = 50 Marks)

11	a)	Write an algorithm for collapsing FIND operation.	5
	b)	Consider the array [40, 80, 35, 90, 45, 50, 70]. Derive a max heap.	5
12	a)	Sort the following elements using quick sort. 65, 70, 75, 80, 85, 60, 55, 50, 45.	7
	b)	Write the best, average and worst time complexities of quick sort.	3

13 Consider the following graph for Travelling Salesperson problem. Find the minimum cost assuming the tour starts and ends at 1 using dynamic programming approach. 10



14 Calculate an optimal solution for the following instance of 0/1 Knap Sack problem: n = 5, (P_1, P_2, P_3, P_4, P_5) = (10, 15, 6, 8, 4), (W_1, W_2, W_3, W_4, W_5) = (4, 6, 4, 2), m = 12 using LCBB. 10

15 Write about

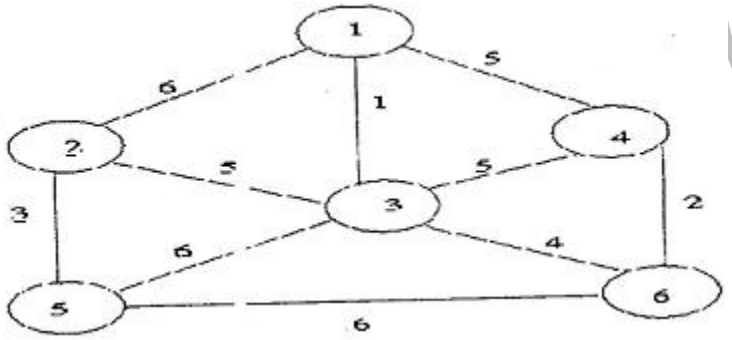
a)	Cook's theorem	3
b)	Node covering problem	3
c)	Bi-connected components	4

...2

16 a) Write an algorithm for graph coloring. 5

b) Write an algorithm to find Hamiltonian cycles. 5

17 a) Find the minimum cost spanning tree using Kruskal's algorithm for the following graph. 5



b) Write about optimal storage on tapes. 5

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Code No. 141/O

FACULTY OF INFORMATICS

B.E. 3/4 (I.T) I – Semester (Old) Examination, December 2017

Subject: Digital Signal Processing

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

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

PART- A (25 Marks)

1. Find DFT of x (n) = {1, -3, 2,6} using transformation matrix 2
2. Compare the number of multiplications required to compute the DFT of 64 – point sequence using direct computation and that of using FFT. 3
3. What are the desirable features of the window functions? 2
4. What are the different design techniques available for the FIR filters? 3
5. Draw the characteristics of Type I chebyshev filter for N = even and N = odd. 3
6. What is meant by frequency warping? What is the cause of this effect? 3
7. How many pairs of buses are there in TMSC54Xprocessor 2
8. What are the peripherals available on C54x DSP processor? 3
9. What are the applications of DSP processors? 2
10. How interrupts are handled by C54x DSP processor? 2

PART- B (25 Marks)

11. a) Compute the FFT for the sequence x [n]=n^2+1 where N=8 using DIF FFT algorithm 6
    b) Distinguish between DTFT and DFT. 4
12. a) Design a FIR low pass filter using rectangular window with cut – off frequency of 1.2 rad. / secs and N=9. 6
    b) Compare IIR and FIR filters. 4
13. a) An analog filter has the following system function. Convert this filter into a digital filter using the impulse invariant technique. Assume T = 1 sec 4

$$H(S) = \frac{1}{(S+0.1)^2+9}$$

    b) Design a digital Chebyshev filter to meet the following specifications: 6

$0.8 \le |H(e^{jw})| \le 1,\ 0 \le |\omega| \le 0.2\pi$

$|H(e^{jw})| \le 0.2,\ \ 0.6\pi \le |\omega| \le \pi$

Using impulse invariant technique. Assume T = 1 sec.

14. a) Describe the MAC unit of TMS 320 C 54 xx processor with a neat block diagram 5

    b) Identify the addressing modes of the operands in each of the following instructions and their operation. 1) ADD B ; 2) ADD #1234h ; 3) ADD 5678h : 4) ADD+* addrreg 5

15. a) Find the DFT of sequence x [n] = { 1, -1, -1, -1, 1,1,1,-1} using DIT FFT 5

    b) Write the magnitude & phase function of FIR filters when impulse response is anti – symmetric & N is even. 5

16. a) Obtain H (Z) for H (s) when T = 1 sec. and $H(s) = S^3/(S+1)(s^2 + s+1)$ 4

    b) Explain the concept of pipelining and how pipeline depth is measured? 6

17. Write short notes on

    a) DSP based Bio – telemetry system 5

    b) Encoding and Decoding using TMS320C54 xx processor. 5

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