Code No. 3121 / O

FACULTY OF ENGINEERING

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

Subject : Theory of Structures-I

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 principle axes. 2

2 Define castigliano's theorem-II. 2

3 What are the limitations of Kani's method? 2

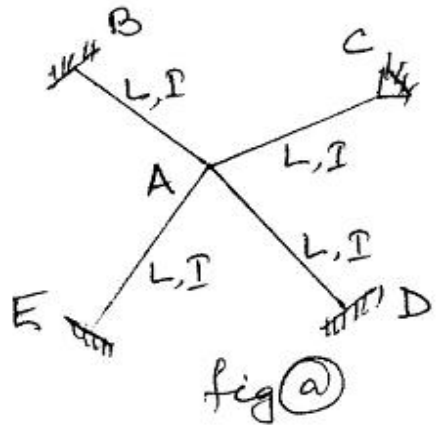
4 a) The carry over factor in a prismatic member whose far end is hinged is ____ . 1

b) Which of the following methods of structural analysis is a displacement method. 1

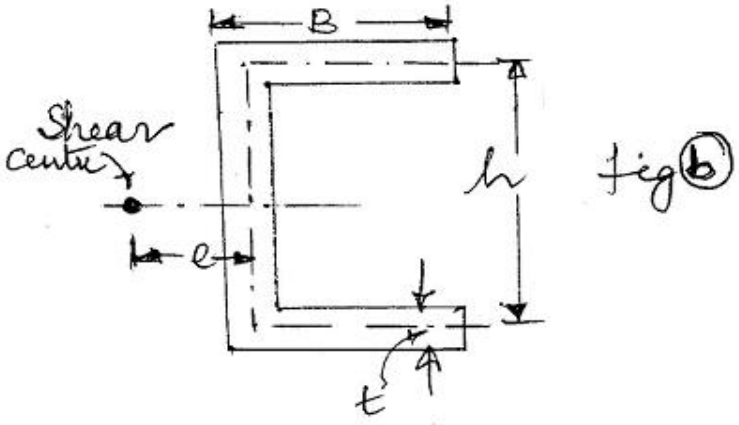
i) Moment distribution method ii) Slope deflection method

iii) Three moment theorem method iv) None of the above

5 For the structure shown in fig.a, the ratio of relative stiffness for AB and AC is how much? 2



6 Determine the distance of shear centre 'e' for the c/s shown in fig.b. 3



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7 Determine the rotation of the joint B of the frame ABC shown in fig.c 3

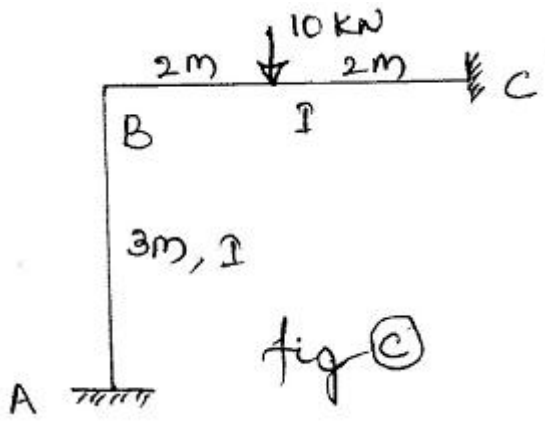
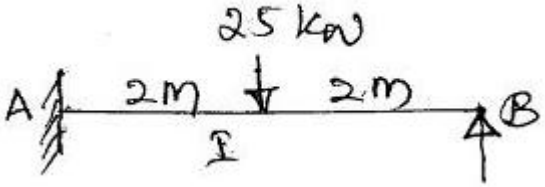


fig ©

8 Using moment distribution method. Compute BM at 'A' in the propped cantilever shown in figure below. 3



9 Derive the expression for displacement factor used in Kani's method of structural analysis. 3

10 For the rigid frame shown in the fig.d, determine the force required for moving the girder AB through a horizontal displacement Δ. 3

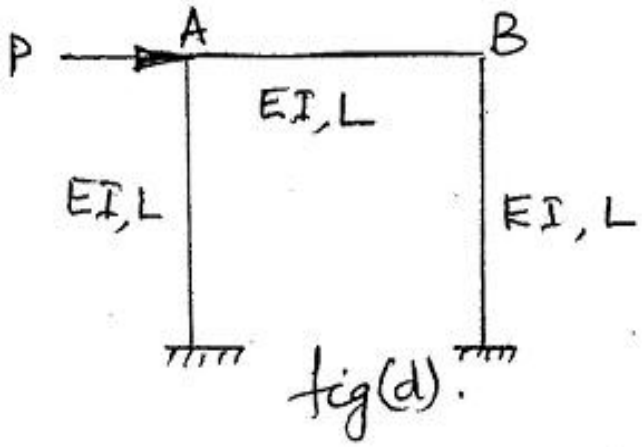


fig (d).

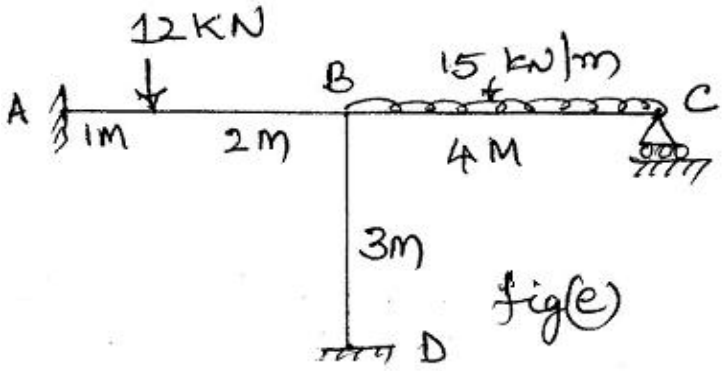
..3

PART – B (50 Marks)

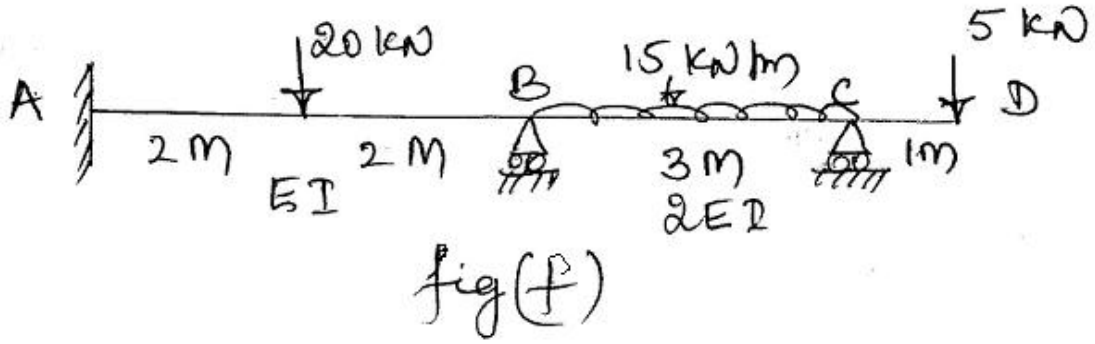
11 a) Explain the concept of shear centre and unsymmetrical bending using neat diagrams. 6

b) Explain the concept of static indeterminacy and kinematic indeterminacy of rigid jointed and pin jointed plane frames using neat sketches and necessary formulae. Also give examples. 4

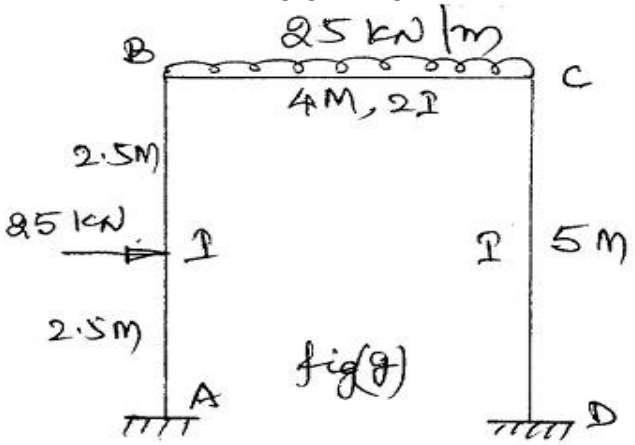
12 Analyse the frame shown in fig.e using slope-deflection method. Draw BMD and SFD. 6+2+2



13 Analyse the continuous beam shown in fig.f using moment distribution method and draw BMD. 7+3



14 Analyse the portal frame showin in fig.g using Kani's method and draw BMD. 7+3



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15 Find the forces in the members of the truss shown in fig.h. All members are of the same material. The cross sectional areas of the members in mm^2 are indicated in brackets. 10

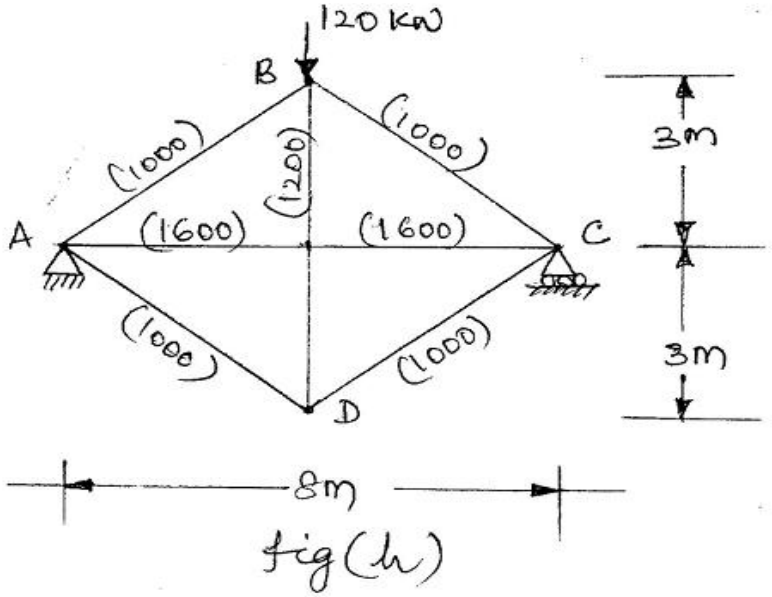
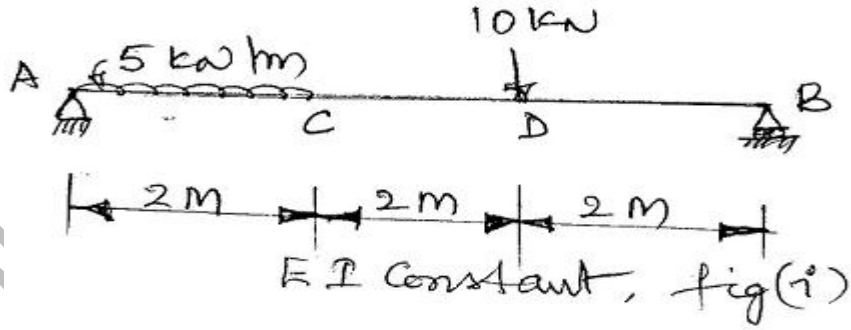


fig (h)

16 a) Simply supported beam of span ℓ carries a concentrated load P at distances a and b from the two ends. Find the strain energy stored in the beam. 4

b) Compute slope at C and deflection at D of the beam shown in fig.i, using unit load method. 6



EI Constant, fig (i)

17 Analyse the portal frame shown in fig.j using moment distribution method. Draw BMD and SFD. 6+2+2

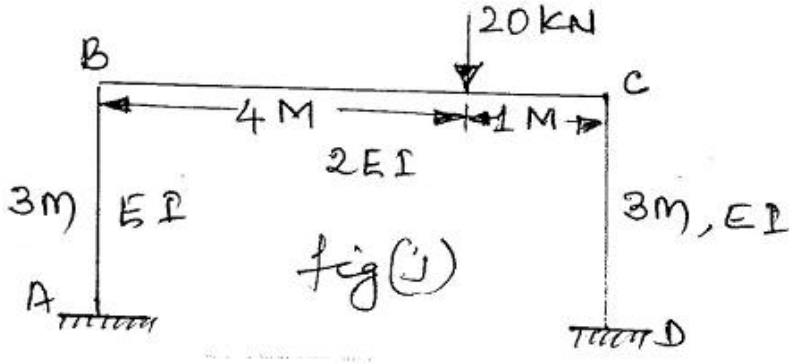


fig (j)

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Code No. 3400 / N

FACULTY OF ENGINEERING

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

Subject : Theory of Structures – I

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 a) Castigliano's first theorem is applicable. 1
   i) for statically determinate structures only
   ii) when the system behaves elastically
   iii) only when principle of superposition is valid
   iv) none of the above

   b) The principles of virtual work can be applied to elastic system by considering the virtual work of 1
   i) internal forces only
   ii) external forces only
   iii) internal as well as external forces
   iv) none of the above

2 The moment required to rotate the near end of a prismatic beam through a unit angle without translation the far end being simply supported, is given by _____ 2

3 For the structure shown in fig (a) the ratio of relative stiffners for AB and AC is _____ 2

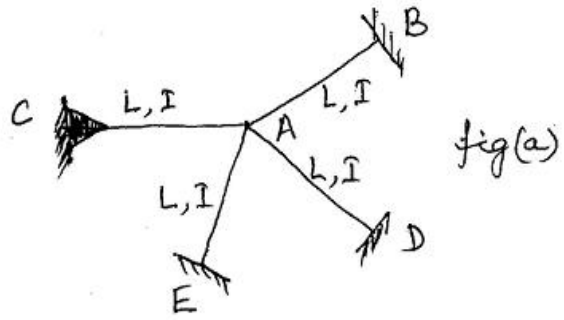


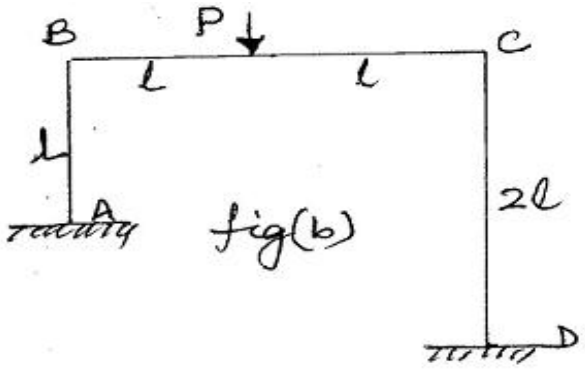
fig (a)

4 i) A linear arch has 1
   a) normal thrust only
   b) shear force only
   c) bending moment only
   d) normal thrust and shear force

   ii) A three hinged arch is carrying udl over the entire span the arch is free from shear force and bending moment if its shape is 1
   a) circular b) parabolic c) elliptical d) none of the above

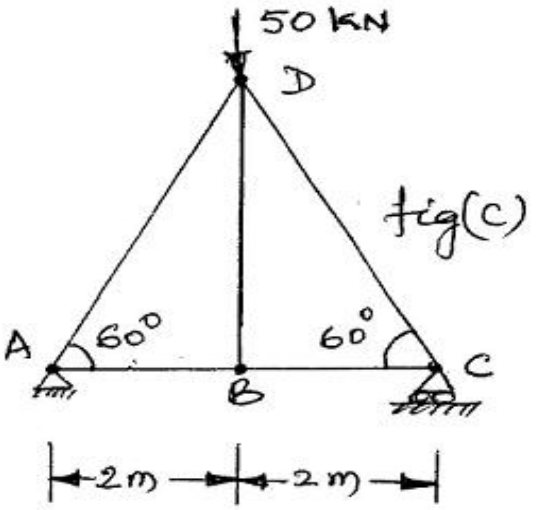
..2

5 The rigid jointed plane frame shown in below figure (b) will 2
a) sway to right
b) sway to left
c) no sway at all
d) none of the above



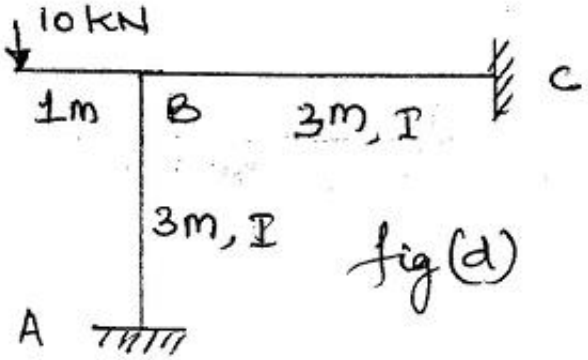
fig(b)

6 In the pin-jointed plane frame shown in fig.(c), compute the force in the member BD. 3



fig(c)

7 Compute the slope at B in the frame shown in figure (d). 3

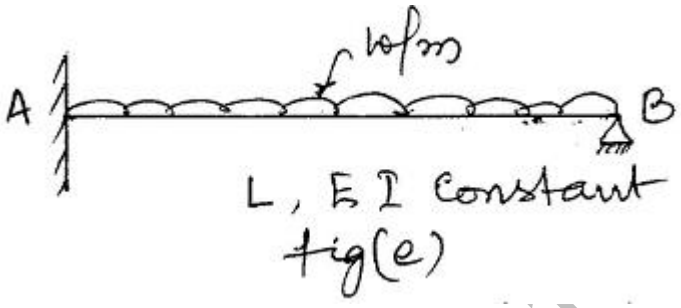


fig(d)

..3

8 Show that the three hinged parabolic arch acted upon by a uniformly distributed load throughout is not subjected to bending moment any where in the span. 3

9 Compute the end moment at A of the propped cantilever shown in fig (e) and draw BMD. Use moment distribution method. 3

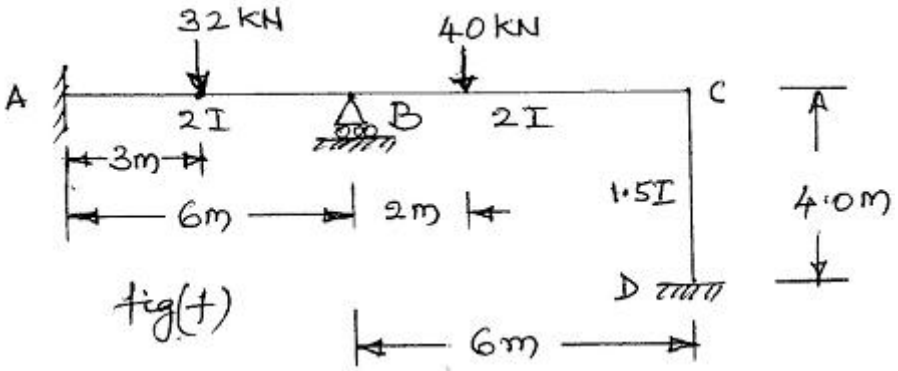


fig(e)

10 Derive the general expression for displacement factor used in the analysis of rigid frame. 3

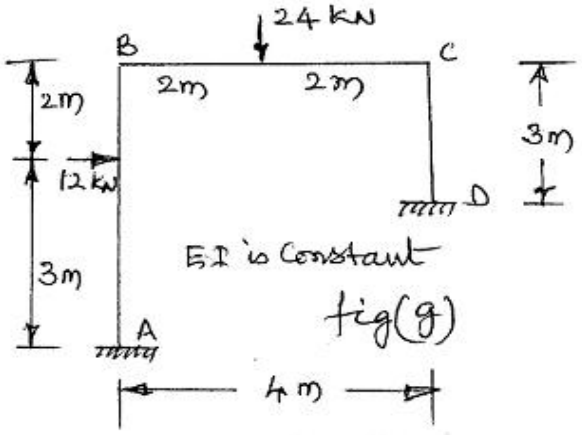
PART – B (10 x 5 = 50 Marks)

11 Analyse the beam shown in the following figure (f) by slope-deflection method. Sketch the bending moment diagram for the same, marking therein all the salient values.



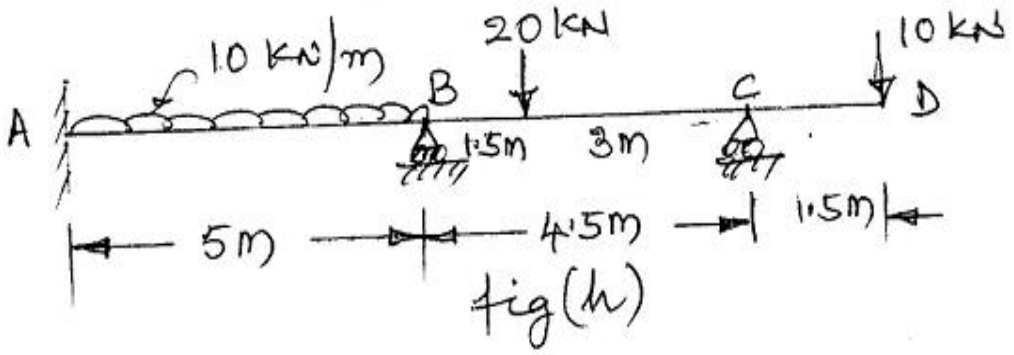
fig(f)

12 Analyse the rigid frame shown in the figure(g) by the moment distribution method. Draw the shear and moment diagram.



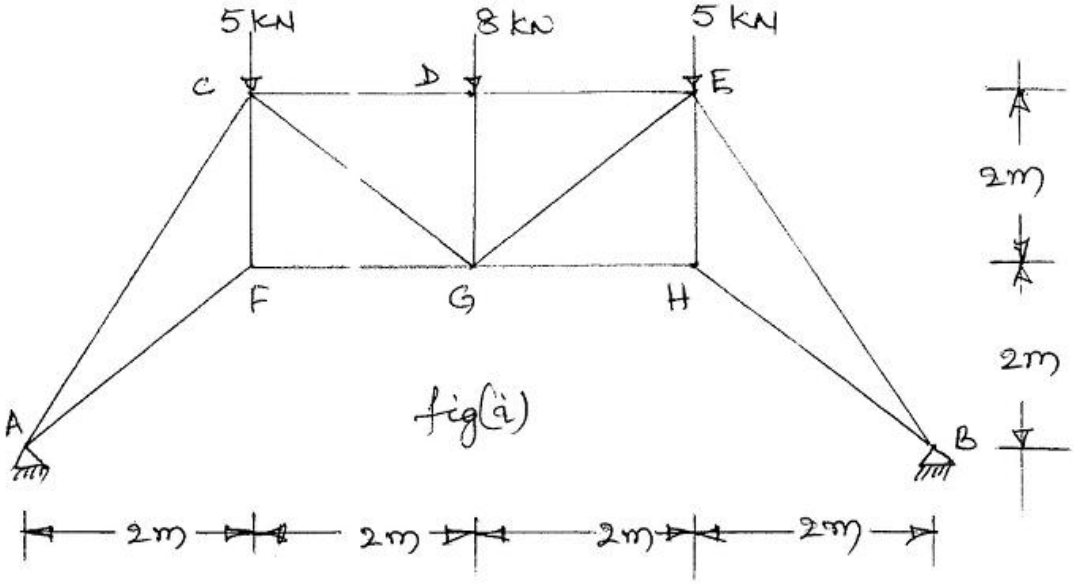
fig(g)

13 Analyse the continuous beam shown in fig(h) using Kani's method and draw bending moment diagram indicating salient values. EI is constant. 10



fig(h)

14 Analyse the redundant pinjointed frame shown in figure (i). The cross sectional area of each member is 100 mm^2. E is constant. Compute forces in all members. 10

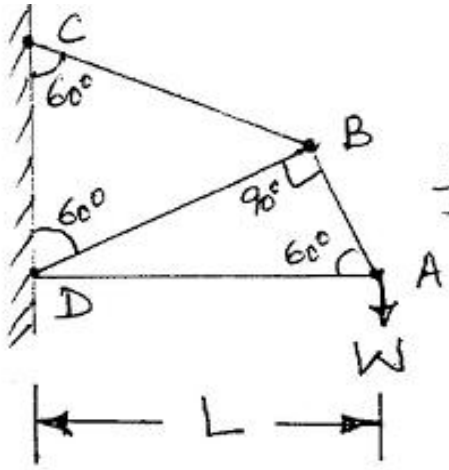


fig(i)

15 An arch in the form of a parabola with axis vertical has hinges at the abutments and the vertex. The abutments are at different levels, the horizontal span being 80m and the heights of the vertex above the abutments being 16m. Compute i) the horizontal thrust ii) maximum negative B.M, and iii) the normal thrust and radial shear at 10m from left support due to a udl of 25kN/m run over the entire span. 10

16 a) A two hinged semi circular arch of uniform flexural stiffners EI carries central vertical load W. Show that the horizontal thrust at support is $\frac{W}{®}$. 5

b) Figure (j) shows a pin jointed plane frame hinged to a rigid wall at C and D and carrying a vertical load W at A. The area of each tension member is 'a' and that of compression member is '2a'. The length AD is L and all members have modulus of elasticity E. Compute vertical displacement of joint A. 5



17 Write short notes on the following questions :

a) What are the advantages of Kani's method over other methods? Also write the limitations of Kani's method. 4

b) Explain unbalanced moment and carry over moment with diagrams. 3

c) What is fundamental distinction between simply supported beam and continuous bean? 3

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Code No. 3127 / O

FACULTY OF ENGINEERING

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

Subject : Power Electronics

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	Show the symbol and structure of IGBT.	2
2	Compare IGBT with BJT.	3
3	Define latching and holding current of SLR.	2
4	Define natural and forced commutation list out forced commutation circuits.	3
5	Discuss the effect of source inductance on 1-ϕ converters.	3
6	Draw the output wave forms of 1-ϕ full converter with RL load, assume α = 60.	3
7	Define AC voltage controller mention this applications.	2
8	What are the control strategies of chopper? Mention the applications of chopper.	3
9	Give complete classification of inverters.	2
10	What are the voltage control methods of inverter? Explain any one of them.	3

PART – B (50 Marks)

11 a)	Explain working of IGBT with neat structure.	5
b)	Explain turn on and turn off mechanism in a power BJT.	5
12 a)	Explain working of UJT firing circuit with neat diagram.	5
b)	Explain resistance firing circuit of SLR.	5
13 a)	Derive average load voltage and load current of 1-ϕ full wave rectifier with RL-load.	5
b)	Calculate load current in a 1-ϕ fully controlled converter supplying RLE load. Supply RMS voltage = 220V, load resistance = 10Ω, α =30^0, E = 150V.	
14	Discuss in detail operation of buck-boost converter with output wave forms. Also obtained the expression for output voltage.	10
15	Explain the operation of a 3-ϕ voltage source inverter with output wave forms. Assume 120^0 conduction mode.	10
16	A four quadrant chopper is driving a separately excited DC motor load. The parameters are R = 0.1Ω, L = 10 MH. The supply voltage is 230V DC. If the rated current of the motor is 12A and if the motor is driving a rated torque. Determine i) Duty cycle "α" if chopper E_b = 150V ii) Duty cycle "α" if E_b = -110V.	10
17 a)	Explain V-I characteristics of SLR	5
b)	Explain driver circuit for power BJT	5

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Code No. 3406 / N

FACULTY OF ENGINEERING

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

Subject : Power Electronics

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

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

PART – A

1	How a power diode differs from signal diode?	2
2	Applications of MOSFET's	3
3	Difference between forced and natural communication.	2
4	Distinguish between voltage commutation and current commutation in thyristor circuits.	3
5	A single phase halfwave rectifier is supplying a 10Ω load from 230V, 50Hz, A.C. supply at 30^0 firing angle. Calculate average load voltage and load current.	3
6	Write the disadvantages of circulating current mode of dual converter.	2
7	Write the application of choppers.	2
8	Draw output voltage and output current wave forms of two quadrant choppers.	3
9	Explain sinusoidal pulse width modulation.	3
10	What are the drawbacks of current source inverters?	2

PART – B (50 Marks)

11	Draw and explain the switching characteristics of IGBT.	10
12 a)	Explain RC triggering circuit.	5
b)	Explain Gating circuit for single phase thyristor bridge rectifier.	5
13	An inductive load supplied from a 230V, 50 Hz single phase supply by a fully-controlled fridge a) What is the average load voltage provided by the fridge at 30^0 b) Distortion factor c) Displacement factor d) Power factor e) THD	
14	Explain the operation of single phase bridge type cycloconverter.	10
15	Explain the bridge inverter operation in 180^0 mode of operation.	10
16 a)	With neat circuit diagram explain cuk regulator operation.	5
b)	Draw V-I characteristics of N-type MOSFET.	5
17 a)	Describe turn on and turn off times of a thyristor with switching characteristics.	5
b)	How source inductance effects the operation of single phase fully controlled converter?	5

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Code No. 3137 / O

FACULTY OF ENGINEERING

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

Subject: Microprocessors & Microcontrollers

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 need of memory segmentation in 8086 microprocessor?	2
2	Explain the flag register of 8086.	3
3	Why AD_0-AD_7 lines are multiplexed in 8086.	2
4	Explain the following 8086 instructions i) LDS ii) LAHF iii) IMUL	3
5	What are the functions of SI and DI registers?	2
6	What is meant by assembly language program?	2
7	Write control word format of 8255 PPI.	3
8	What is microcontroller? How it is different from microprocessor?	2
9	Define the following 8051 instructions i) CJNE ii) SWAPA iii) JNB	3
10	Give the format of TCON register.	3

PART – B (50 Marks)

11	a) Discuss interrupt mechanism of 8086.	5
	b) Explain the addressing modes of 8086.	5
12	a) Write an ALP in 8086 to convert packed BCD to unpacked BCD.	5
	b) Explain about Debugging tools.	5
13	a) Interface the following memory IC's with 8086 i) Two chips of 16 K X8 EPROM, select starting address suitably. ii) Two chips of 32K X8 RAM. It must start at 00000H.	5
	b) How 8257 DMA controller is interfaced with 8086.	5
14	What is the difference between serial and parallel data transmission? Explain 8251 communication interface.	10
15	a) Describe memory organization of 8051.	5
	b) Write an ALP in 8051 to transfer 'A' serially at 4800 baud rate continuously.	5
16	Interface 8051 with seven segment display controller.	10
17	Write short notes on any two: i) Analog to digital converter ii) Stepper motor interface iii) Procedures and macros of 8086.	10

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Code No. 3416 / N

FACULTY OF ENGINEERING

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

Subject: Computer Organization and Architecture (New)

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 Represent a condition evaluation of a typical expression using RTL with two examples. [2]

2 Specify a sequence of micro-operations that will perform the operation:
   a) IR ← M [PC]
   b) AC ← AC + TR
   c) DR ← DR + AC [3]

3 Show the hardware for implementing Booth's algorithm. [3]

4 Why do we use dividend alignment while performing division operation of binary numbers? [2]

5 Compare Hardwired and Micro programmed control unit. [3]

6 Write the differences between 2 and 3 address instructions. [2]

7 Why does DMA have priority over the CPU when both request a memory a memory transfer? [2]

8 Explain the terms Tag, Index and Block in relation to cache memory. [3]

9 How many 128 × 8 RAM chips are needed to provide a memory capacity of 2048 × 16 words? [2]

10 Distinguish between Superscalar and VLIW processors. [3]

PART – B [50 Marks]

11 a) Explain various phases of an instruction cycle in detail. [5]
   b) List the control functions and micro-operations needed for the execution of the following instructions and explain.
      i) ADD
      ii) BSA [5]

12 a) Explain the process of floating point number multiplication with flow chart. [5]
   b) Show the hardware for a 2 bit-by-2 bit array multiplier and explain its working. [5]

.

13 a) Write the need for addressing modes. Explain various addressing mode supported by a general purpose CPU. [6]
   b) Show how a 9-bit micro-operation field in a microinstruction can be divided into subfields to specify 46 micro-operations. How many micro-operations can be specified in one microinstruction? [4]

14 a) Design a parallel priority interrupt hardware for a system with four interrupt sources. [5]
   b) A two-way set associative cache memory uses blocks of four words. The cache can accommodate a total of 2048 words from main memory. The main memory size is 128 × 32.
      i) Formulate all pertinent information required to construct the cache memory
      ii) What is the size of the cache memory? [5]

..2

15 a) What is Flynn's classification of computers? Explain. [5]
b) List and briefly describe types of Superscalar instruction issue policies. [5]

16 a) Differentiate between Restoring and Non-Restoring division algorithms. [4]
b) Explain instruction pipeline conflicts and their remedies. [6]

17 Write any Two of the following [5 x 2= 10]
a) Isolated Vs Memory mapped I/O.
b) Common bus system.
c) Instruction level parallelism

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Code No. 3140 / O

FACULTY OF ENGINEERING

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

Subject : Design of Machine Elements

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 the important mechanical properties of materials used in design?
2 State the different types of loads and stresses acting on machine elements.
3 Explain about S-N curve.
4 What is Notch sensitivity?
5 What are the factors effecting the fatigue strength?
6 Give the differences between rigid and flexible couplings.
7 What are the applications of cotter and knuckle joints?
8 What are the different types of locking devices?
9 State the factors to be considered in the design of gasket joints.
10 Classify the types of riveted joints and mention their application.

PART – B (10 x 5 = 50 Marks)

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

12 Determine the diameter of circular rod made of ductile material with fatigue strength σ_e = 265 MPa and tensile yield strength of 350 MPa. The member is subjected to a varying axial load from Wmin = -300 x 10^3 N to Wmax = 700 x 10^3 N-and a stress concentration factor = 1.8. Use factor of safety = 2.

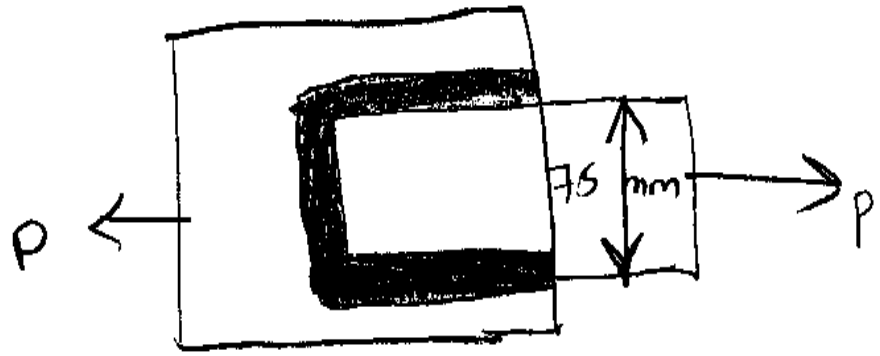
13 Design and draw a protective type of cast iron flange coupling for a steel shaft transmitting 15 KW at 200 rpm and having an allowable shear stress of 400 MPa. The working stress in the bolts should not exceed 30 MPa. Assume the same materials is used for the shaft and the key and that the crushing stress is twice the value of its shear stress. The max torque is 25% greater than the full load torque. The shear stress for CI is 14 MPa.

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

..2

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

16 A palate of 75 mm wide and 12.5mm thick is joined with another plate by a single transverse weld and a double parallel fillet weld as shown in fig ; the maximum tensile and shear stress are 70 MPa and 56 MPa respectively. Find the length of each parallel fillet weld, if the joint is subjected to both static and fatigue loading.



17 Write short notes on the following :
a) Manufacturing consideration in design
b) Goodman's criteria
c) Caukling and Fullering in riveted joints

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Code No. 3420 / N

FACULTY OF ENGINEERING

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

Subject : Design of Machine Elements

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 various types of loads that machine elements are subjected to and the specify the factor of safety used in each case. [3]
2 Show different types of fluctuating stresses with sketches. [3]
3 Name 2 flexible couplings. What are its advantages over rigid couplings. [3]
4 Sketch a bolt of uniform strength in two different ways and explain. [3]
5. The life of a bearing is (a) 20,000 cycles at 50 Mpa and(b) 15000 cycles at 60 Mpa . What is the cumulative damage if the bearing is subjected to 100 cycles under each load condition. [3]
6. What type of threads are preferred for (a) Differential screws and (b) Compound screws and mention the reasons for the same. [2]
7. Suggest suitable material for the following
a) Machine bed b) automobile body [2]
8. Among a solid shaft and a hollow shaft of same outer diameter and same material , which shaft is preferred under torsion and why? [2]
9. What is the principle in cotter joints which keeps the cotter in locked condition. [2]
10. What methods are used in riveted joints to make them leak proof joints? [2]

PART- B (50 Marks)

11. A mild steel shaft of 50mm diameter is subjected to a bending moment of 2000 N-m and a torque T. If the yield point of the steel in tension is 200Mpa, find the maximum value of this torque without causing yielding of the shaft according to (a) Max Principal stress theory (b) Max shear stress theory.

12. A forged steel bar, ¤ 50 mm in diameter, is subjected to a reversed bending stress of 250MPa. The bar is made of steel 40C8 (Sut = 600MPa). Calculate the life of the bar for a reliability of 90%.
Given $K_a = 0.43$, $K_b = 0.85$, $K_c = 0.897$, $K_d = 1.0$

13. Design a C.I. flange coupling (protective type) to connect two shafts 100 mm diameter running at 300 rpm for transmitting 5000 N-m torque. Assume permissible shear stress for shaft, bolt and key is 50 MPa, crushing stress for the bolt and key is 150 MPa and shear stress for flange is 8 MPa.

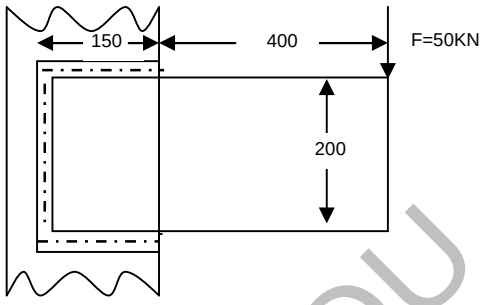
14. A horizontal shaft of 1.2 m long is supported on bearings at its end and transmits 2 kW at 1440 rpm. The critical section of the shaft, which is at the mid span, is subjected to a vertical load of 500 N, a horizontal load of 400 N. Determine the diameter of the shaft for an allowable shear of 50 MPa.

..2

15. Design a knuckle joint to connect two tension rods subjected to an axial load of 15 KN. Consider σ_t = 65 MPa, τ = 50 MPa and σ_c = 80 MPa.

16. In a hand vice, the screw has a double start square thread of 26mm diameter. If the lever is of length 0.25m and the maximum force that can be applied at the end of the lever is 300N, determine the force with which the job is held between the jaws of the vice. Take the coefficient of friction as 0.14.

17. Fig. shows an eccentrically loaded welded joint. Determine the weld size if shear stress in the same is not to exceed 80MPa



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Code No. 3430 / N

FACULTY OF ENGINEERING

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

Subject : Design of Machine Components

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

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

PART – A (10 x 2.5 = 25 Marks)

1 What are preferred numbers? Explain their importance in design.
2 Why normal stress theory is not suitable for ductile materials?
3 What are low and high fatigue cycle?
4 What are the methods used to improve fatigue strength?
5 What is the difference between shaft, axle and spindle?
6 What is Kennedy key? What is its application?
7 Why gaskets are provided at joints?
8 What do you mean by single start and double start threads?
9 Explain the following terms i) pitch ii) back pitch iii) diagonal pitch in case of rivets.
10 Distinguish between differential and compound screw.

PART – B (50 Marks)

11 A mild steel shaft of 50mm diameter is subjected to a bending moment of 2000 N-m and a torque 'T'. If the yield point of the steel in tension is 200MPa. Find the maximum value of 'T' without causing yielding of the shaft according to

i) maximum principal stress theory
ii) maximum shear stress theory
iii) maximum distortion energy theory of yielding

12 A mass of 500kg falls through a distance 'h' at the middle of the beam of span. The end connection of the beam may be considered as simply supported. Determine the value of 'h', such that the maximum stress induced in the beam doesnot exceed 150MPa. The modulus of the section may be taken as 200cm^3 and second moment of area as 1000cm^4.

13 A shaft is subjected to a bending moment that varies from +400 N-m to -200 N-m and a twisting moment at critical section varies from 300 N-m clockwise to 100 N-m counter clockwise. Determine the diameter of the shaft by taking FOS = 2 ; ultimate tensile strength = 560MPa, yield stress = 230MPa, endurance stress = 280MPa, $K_{\lambda z}$ = 0.85, $K_{\lambda r}$ = 0.85 , K_t = 1.4.

..2

14 Compare the weight, strength and stiffness of a hollow shaft of same material with same external diameter that of solid shaft. The inside diameter of hollow shaft is being 0.6 times the external diameter. Both shaft have same length.

15 Design a cast iron protective flange coupling to connect two shafts in order to transmit 10kW at 500rpm. Permissible shear stress for shaft, bolt, and key material = 33MPa, permissible crushing strength for bolt and key material = 60 MPa. Permissible shear stress for cast iron = 15MPa.

16 Design a cotter joint of socket and spigot type, which may be subjected to a pull of 30kN. All the parts are made of same material with permissible stresses, 55MPa in tension, 70MPa in compression and 40MPa in shear.

17 Determine the size of the weld required for the joint as shown in figure. Allowable stress for the weld materials is 80MPa.

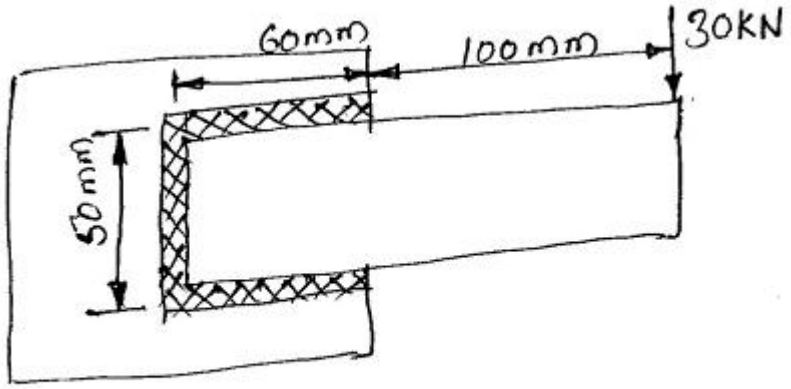

figure : weldjoint

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Code No. 3152 / O

FACULTY OF ENGINEERING

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

Subject : Automata Languages and Computation

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 deterministic finite automata. 2

2 Determine an NFA accepting all strings over {0, 1} which end in 1, but do not contain the substring 00. 3

3 Write any three decision properties of regular languages. 3

4 Draw parse tree of an example string of a grammar. 2

5 Define push down automata. 2

6 Define left recursion. 2

7 Eliminate unit productions from the grammar

$S \to A0|B$, $B \to A|11$, $A \to 0|12|B$. 3

8 Write about GNF. 3

9 Distinguish between classes P and NP. 3

10 Define PCP. 2

PART – B (50 Marks)

11 a) Write about informal picture of finite automata. 5

b) Obtain a DFA to accept strings of a's and b's having even number of a's and b's. 5

12 a) State and prove pumping lemma for regular languages. 5

b) Show that $L= \{a^n b^n | n \geq 0\}$ is not regular. 5

13 Obtain a PDA to accept the language $L(M) = \{WCW^R | W \in (a+b)^*\}$ where W^R is reverse of W by a final state. 10

14 a) Write in detail about programming techniques for T/M. 5

b) Explain briefly about lD's of TM. 5

15 Prove that for every nondeterministic TM (NTM) there exists a determine TM (DTM) such that L(NTM) = L(DTM). 10

16 a) Write about CNF and GNF. 4

b) Convert the following grammar into GNF. 6

$S \to AA \mid 0$

$A \to SS \mid 1$

17 a) Explain a restricted satisfiability problem. 5

b) Explain the terms NP-complete and NP-hard. 5

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Code No. 3433 / N

FACULTY OF ENGINEERING

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

Subject : Automata Languages and Computation

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 strings, alphabets, and languages.	3
2	Write any two applications of finite automata.	2
3	Write a regular expression which accepts set of all strings whose Σ=(0, 1).	2
4	Define pumping lemma for regular languages.	2
5	What do you mean by equivalence states?	3
6	Define Ambiguous grammar.	2
7	Write about Chomsky normal form.	3
8	Define 'δ' of turing machine with an example.	3
9	Write about classes P and NP.	3
10	Define undecidability.	2

PART – B (50 Marks)

11 a) Construct DFA for {W | W is any string except 11 and 111} where Σ={0, 1}. 5

b) Construct DFA equivalent to the NFA's ({p, q, r, s}, {0, 1}, δ, p, {s}). Where δ is defined as follows : 5

δ	0	1
p	{p, q}	p
q	r	r
r	s	-
s	s	s

12 Minimize the given below DFA. Draw the minimized resultant FA. 10

Q\Σ	a	b
→A	B	E
B	C	D
*C	H	I
*D	I	H
E	F	G
*F	H	I
*G	H	I
H	H	H
I	I	I

..2

13 a) Use Pumping lemma theorem to prove whether the following languages is CFG or not. L= $\{0^n1^n0^n1^n \mid n \geq 0\}$. 5

b) Construct PDA that recognize the language L = $\{WW^R / W \in \{0, 1\}^*\}$. 5

14 Design a TM for the language. 10

B = $\{WW / W \in \{0, 1\}^*\}$.

15 a) What is the difference between PCP and MPCP? 5

b) Given the following list A and B of words. Is it having a solution? If so, give the sequence 5

	List A	List B
i	W_i	X_i
1	1	111
2	10111	10
3	10	0

16 a) Convert CFG which is given below into CNF form. 5

S---> bA/aB
A---> bAA/as/a
B---> aBB/bs/b

b) Write the FA for the regular expression a.(a+b)*b.b 5

17 a) What is Halting problem and its significance in automata languages? 5

b) Explain the Chomsky's hierarchy of language. 5

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Code No. 3156 / O

FACULTY OF INFORMATICS

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

Subject : Digital Signal Processing

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 Determine the whether the following signal is energy or power signal
$x[n] = (0.5)^n u[n]$ (3)

2 State any two properties of DFT. (2)

3 What are the advantages of FIR filters? (3)

4 Why windows are used in designing FIR filters? (2)

5 Write the advantages of digital filters? (3)

6 Write any two techniques for digitizing the transfer function of an analog filter. (2)

7 What are the advantages of DSP processors? (3)

8 Write about Harvard architecture. (2)

9 What is pulse position modulation? (3)

10 Define auto correlation. (2)

PART – B (50 Marks)

11 (a) Find the linearity, stability, shift invariance and causality for the following systems. (5)
(i) $y[n] = 2x[n+1]+[x(n-1)]^2$
(ii) $y[n]+y[n-1]=x[n]+x[n-2]$

(b) Check whether the following system are static or dynamic (5)
(i) $y[n]=x[n]x[n-2]$
(ii) $y[n]=\log_{10}|X[n]|$
(iii) $y[n]=a^n u[n]$
(iv) $y[n]=x^2[n]+\frac{1}{x^2[n-1]}$

12 (a) An 8-point sequence is given by x[n]={2, 2, 2, 2, 1, 1, 1,1}. Compute 8-point DFT of x[n] by Radix – 2 DIF FFT algorithm. (7)

(b) Explain the difference between DTFT and DFT. (3)

13 (a) Design a filter with (7)

$$H_d(e^{j\omega})=\begin{cases} e^{-j3\mu}, & \frac{-®}{4} \le \mu \le \frac{®}{4} \\ 0, & \frac{®}{4} < \mu < ® \end{cases}$$

Determine the transfer function of filter for N=7, the window function is

$$w(n)=\begin{cases} 0.54-0.46ccs\frac{2®n}{N-1}, & 0 \le n \le N-1 \\ 0, & otherwise \end{cases}$$

(b) Draw the direct form structure for the FIR system described by the transfer function

$$H(z)= H(z) = 1-\frac{1}{5}z^{-1}+\frac{3}{4}z^{-2}+\frac{1}{3}z^{-3}+\frac{1}{7}z^{-4}+\frac{1}{6}z^{-5}$$ (3)

14 (a) Realize the following systems with minimum number of multipliers (7)

(i) $H(z)=\left(1+\frac{1}{2}z^{-1}+z^{-2}\right)\left(1+\frac{1}{4}z^{-1}+z^{-2}\right)$

(ii) $H(z) = 1 + 3z^{-1} + 2z^{-2} + 5z^{-3} + 2z^{-4} + 3z^{-5} + z^{-6}$

(iii) $H(z) = 0.2 + 0.6z^{-1} + 0.7z^{-2} + 0.8z^{-3} + 0.8z^{-5} + 0.7^{-5} + 0.6z^{-8} + 0.2z^{-7}$

(b) What are linear phase FIR systems? Write the advantages of them. (3)

15 (a) Design a digital butterworth filter satisfying the following constraints (8)

$0.8 \le H(w) \le 1 : 0 \le w \le 0.2\pi$

$H(w) \le 0.2 : 0.32\pi \le w \le \pi$

Apply impulse invariant transformation if T = 1s.

(b) Write about butterworth filters. (2)

16 (a) Explain architectural features of TMS320C54XX. (7)

(b) Write about on-chip memory organization. (3)

17 (a) Explain DSP based biotelemetry receiver implementation. (7)

(b) Write about JPEG encoding. (3)

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Code No. 3436 / N

FACULTY OF INFORMATICS

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

Subject : Design and Analysis of Algorithm

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 space and Time complexity. Give example. (3)

2 What is a Heap? Write down the Time complexity of Heap sort. (2)

3 What is a minimum spanning tree and write prims algorithm used to find it. (3)

4 Write the control abstraction of Divide and conquer. (2)

5 Define principle of optimality. Give an example. (3)

6 How Bi-connected components are useful? (2)

7 Differentiate implicit and explicit constraints in Back tracking. (2)

8 Write the control abstraction for LC branch of sound. (3)

9 State Cook's theorem. (3)

10 Define NP-hard and NP- complete problems. (2)

PART – B (50 Marks)

11 (a) Describe Asymptotic Notation forms with the help of a graph. (5)
(b) What is a Randomized Algorithm? Give an example to illustrate it. (5)

12 (a) Explain Knapsack problem by using Greedy approach. (5)
(b) Analyze the complexity of quick sort. (5)

13 Explain Travelling salesman problem solved using Dynamic programming for the given matrix. (10)

Assume node 1 as home city $\begin{bmatrix} 0 & 10 & 15 & 30 \\ 4 & 0 & 9 & 11 \\ 5 & 13 & 0 & 10 \\ 7 & 7 & 8 & 0 \end{bmatrix}$

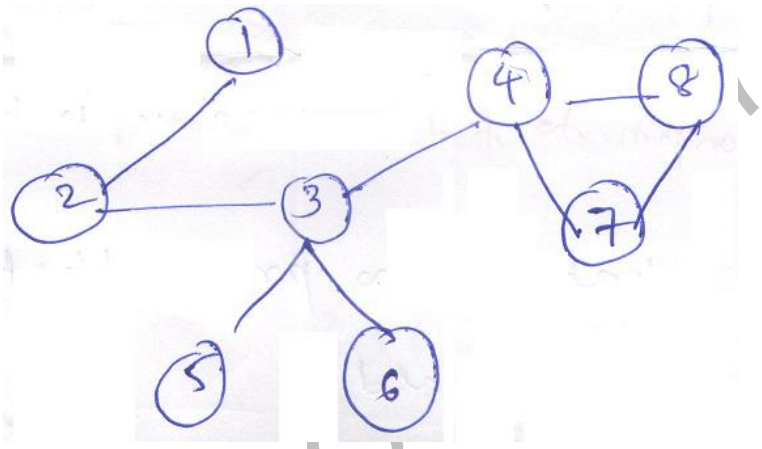
14 (a) How Back tracking works on 8-Queen's problem with suitable example? (5)
(b) Design the algorithm to find next colour in graph coloring problem. (5)

15 Explain the strategy to prove that
(a) a problem in NP-Hard (5)
(b) Explain non-deterministic sorting problem. (5)

..2

16 (a) Write a greedy algorithm to the job sequencing with deadlines problems. (5)
(b) Explain the algorithm used to improve UNION and FIND operations on sets. (5)

17 Write short notes on any **two** of the following:
(a) For the following graph identify and explain the algorithm to find articulation points and draw the bio-connected components.



(b) Solve Knapsack problem using back tracking
(c) Node covering problem

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