Code No: 11084

FACULTY OF ENGINEERING & TECHNOLOGY

B.E 3/4 (CIVIL) I-Semester (Backlog) Examination, November / December 2018

Subject: Theory of Structures-I

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

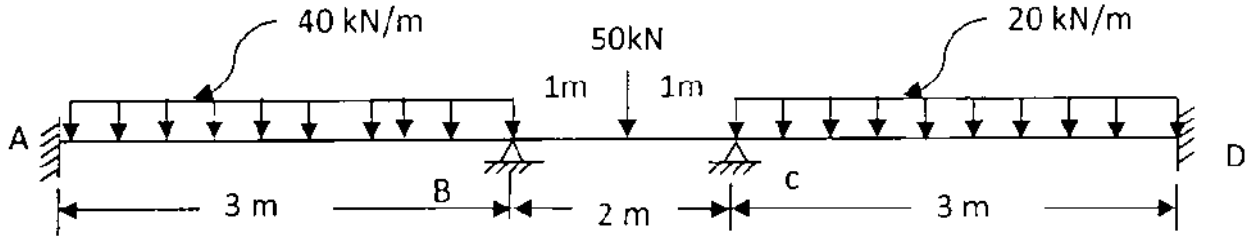
Note: Answer All Questions From Part-A, & Any Five Questions From Part-B.

Part-A (25Marks)

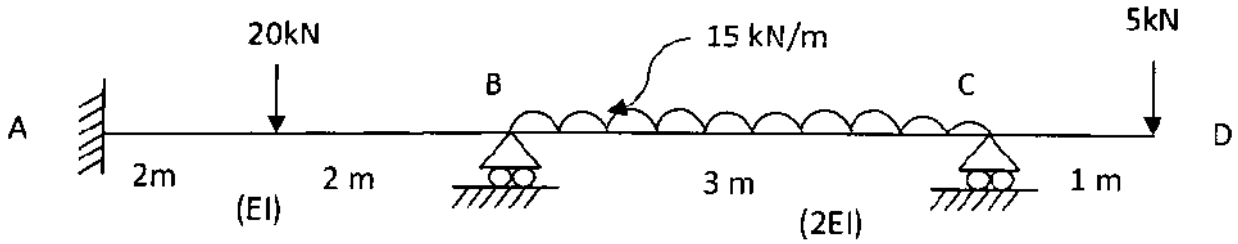
1. The number of simultaneous equations to be solved in slope deflection method is equal to (2)
   a) The degree of statical indeterminacy.
   b) The degree of kinematic indeterminacy.
   c) The number of joints in the structure.
   d) None of the above.
2. A single bay single storey portal frame with hinges at the base is to be analysed using slope-deflection method. Write the equilibrium equations that you use. (3)
3. Derive stiffness factor for a beam with far end fixed. (3)
4. List the disadvantages of moment distribution method. (2)
5. Define rotation factor and displacement factor. (3)
6. Mention the causes of sway in single bay single storey portal frames with sketches. (2)
7. Using strain energy method, determine the maximum deflection in a simply supported beam subjected to a central concentrated load. (3)
8. Explain lack of fit in trusses. (2)
9. State the Eddy's theorem of arches. (2)
10. What is the effect caused due to temperature rise on a two hinged arch? (3)

Part-B (50 Marks)

11. Analyse the continuous beam shown in fig using slope deflection method and draw B.M.D. Support B sinks by 2.5mm, I=3.5 x 10^7 mm^4 and E=200KN/mm^2. (10)



12. Analyse the continuous beam shown in fig using moment distribution method and draw BMD. (10)



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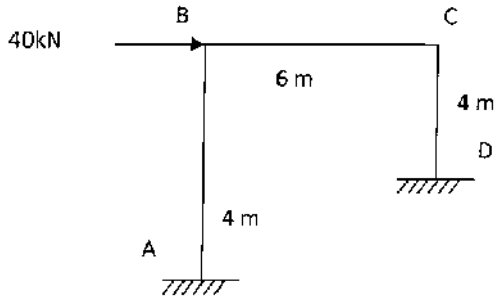
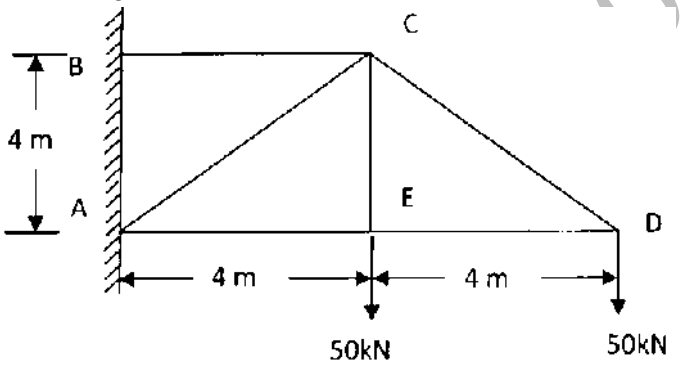
13. Analyse the given portal frame by using Kani's method. Take EI as constant. (10)

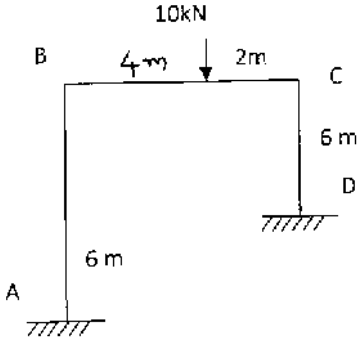


14. For the pin-jointed plane truss shown in fig below, find the vertical displacement of the joint D. Assume AE = 2X 10^6N. (10)

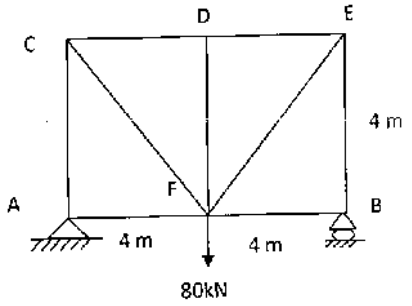


15. A three hinged parabolic arch of span 40 m and rise 5 m carries a uniformly distributed load of intensity 20KN/m over left half of the span and a point load of 50kN at 10m from the right support. Find the bending moment, normal thrust and radial shear at left quarter span point. Also draw the B.M.D. (10)

16. Draw the BMD and show all important features of the diagram using slope deflection method for the given portal frame. Take EI as constant. (10)



17. Determine the vertical deflection at joint F of the truss shown in fig below. A= 2200mm^2 and E=200GPa. (10)



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CodeNo.11090

FACULTY OF ENGINEERING

B.E ¾ (EEE/Inst) I-Semester (Backlog) Examination, November / December 2018

Subject : Power Electronics

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

Note : Answer all questions from Part-A & Any five question from Part-B

Part – A (25 Marks)

1. Draw V-I Characteristics of Ideal Diode 2
2. Match the following 3
   1. Short key Diode (a) Turn off is due to recombination
   2. Fast recovery Diode (b) Applicable for electric traction
   3. General purpose Diode (c) Have metal to semiconductor junction
3. Define natural commutation and forced commutation 2
4. Draw the schematic diagram of Firing circuit for an SCR 3
5. Define (a) Displacement Factor (b) Harmonic Factor and 3
   (c) Power Factor
6. Draw the output voltage and voltage across thyristor wave forms for a Halfwave controlled rectifier with resistive load 2
7. Write the complete classification of D.C choppers 3
8. Write the applications of cycloconvertors 2
9. What are the disadvantages of Multilevel Inverters 2
10. What are the drawbacks of sinusoidal pulse width modulation 3

Part –B (50 Marks)

11. a) With neat output characteristics of PMOSFET, explain what is load line and how MOSFET operates as a switch 5
    b) Explain the principle of operation of thyristor by two transistor analogy 5

12. a) The UJT Oscillator has ¦ =0.72, Ip=0.4mA, V_p=16V V_v=1.0V, Iv=2.5mA, R_{BB}=5kΩ. Normal leakage current with emitter open = 4.2mA. If the firing frequency is 2K Hz then find R, R_1 & R_2 for C = 0.04 µF 5
    b) Explain Gate control protection of SCR's 5

13. With neat wave forms and circuit diagram explain the operation of fully controlled 1ϕ bridge rectifier with RL load 10

14. a) Explain the operation of 1ϕ A.C voltage controller with R load 5
    b) Explain the operation of 1 ϕ cycloconvertor discontinuous mode of operation 5

15.	a)	Differentiate between voltage source Inverter and current source Inverter	5
	b)	Explain Multiple Pulse width modulation	5
16.	a)	Derive average capacitor voltage and average Inductor current of cuk regulator	5
	b)	Explain the circulating current free mode Dual converter operation	5
17.	a)	How SCR is triggered by UJT oscillator	5
	b)	Write short notes on multi – level Inverter	5

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Code No. 11101

FACULTY OF ENGINEERING

BE. 3/4 (E.C.E) I–Semester (Backlog) Examination, November / December 2018

Subject: Digital System Design with Verilog HDL

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

PART – A (25 Marks)

1. Explain Nets and Variables in Verilog (3)
2. Write Verilog code of full adder in behavioural modelling (2)
3. Write Dataflow description of a 1:4 Demultiplexer using conditional operators (3)
4. Explain difference between Task and Function (2)
5. Explain Logic synthesis flow with diagram (2)
6. What are the steps involve in partitioning minimization procedure (3)
7. Write a Verilog model for D Flip flop (2)
8. Draw ASM chart for given Moore model shown (3)

PS	Inputs (x)		Z
	0	1	
00	00	01	0
01	00	10	0
10	10	01	0
11	10	01	1

9. Explain Hazards with example (3)
10. Draw simplified architecture of FPGA and CPLD (2)

PART-B (50MARKS)

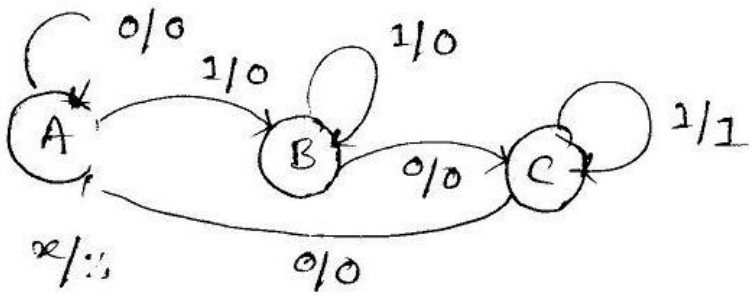
11 a) Design Timing and Delays in Verilog (4)

b) Write a Verilog HDL program in Hierarchical structural model for 3 : 8 Decoder realization through 2:4 decoder and Verify with Stimulus (6)

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

b) Design and write Verilog code for a BCD – to – 7 – segment decoder (5)

13 a) Design synchronous sequential model and compare in terms of hardware using sequential state assignment and one hot encoding method for given state diagram use D flip Flop as memory element. (10)



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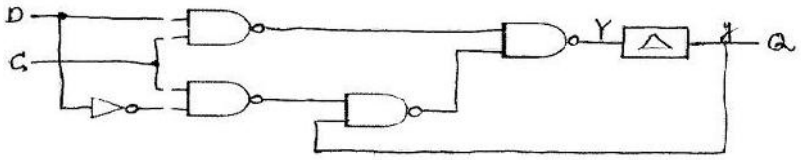
14 Explain FSM as Arbiter and Implement its Verilog code and define stimulus model for above program. Show sample outputs.

15 a) Given function F (A, B, C, D) = Σ m (0, 2, 7, 10) + d (12, 15) realize using PAL. (4)
b) Write Verilog code using a mealy machine which detect a sequence 1011 and also draw ASM chart for above mealy machine (6)

16 a) Explain Races in digital circuits with example (3)
b) Analyze given asynchronous sequential circuit and obtain its state table and timing diagram (7)



17 Write short notes on the following
a) Full custom and Semi custom ASICs (4)
b) Lookup Tables (LUTs) (3)
c) RAM BJT Cell (3)

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Code No.11104

FACULTY OF ENGINEERING

B.E 3/4 (M/P/AE) I-Semester (Backlog) Examination, November / December 2018

Subject : DESIGN OF MACHINE ELEMENTS

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

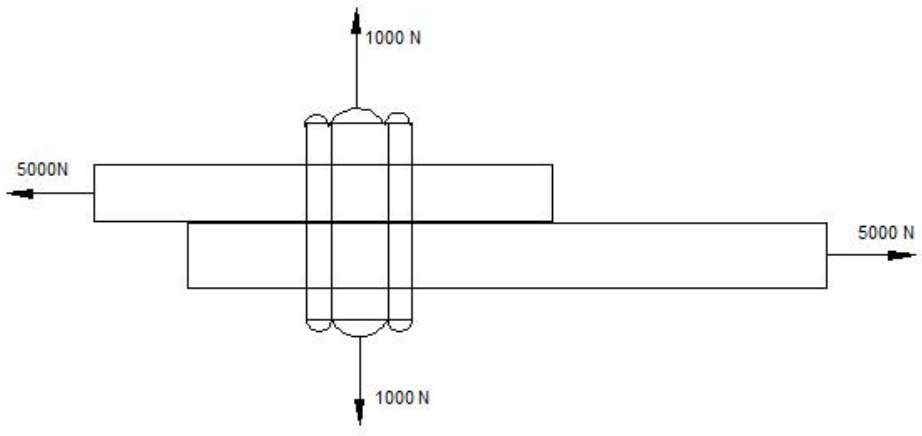
Note: Answer all questions from Part -A and any five questions from Part –B.

Part-A (10x2.5=25 Marks)

1. What are the factors to be considered in the selection of materials for the machine members?
2. What is meant by Cumulative fatigue damage?
3. Enumerate the type of stresses induced in shafts.
4. What are the standard dimensions of Sunk key with respect to the shaft diameter?
5. Define the following terms for the screw threads write a sketch
   i) Nominal diameter ii) Root diameter iii) pitch
6. What factors should be considered when designing chain drives?
7. What is the difference between chain riveting and zigzag riveting?
8. Draw and explain the differential and compound screw.
9. Why are flexible coupling preferred when compare with rigid coupling?
10. How is welding classified and what are the types of welded joints?

Part-B (5x10=50 Marks)

11. A bolt is subjected to an axial force of 10000 N with a transverse shear force of 5000N as shown in figure. Find the diameter of the bolt required according to i) Maximum principal stress theory ii) Maximum shear stress theory iii) Maximum principal strain theory iv) Maximum strain energy theory v) Maximum distortion energy theory. It is assumed that the permissible tensile stress at elastic limit = 100 N/mm^2 and $\mu = 0.3$



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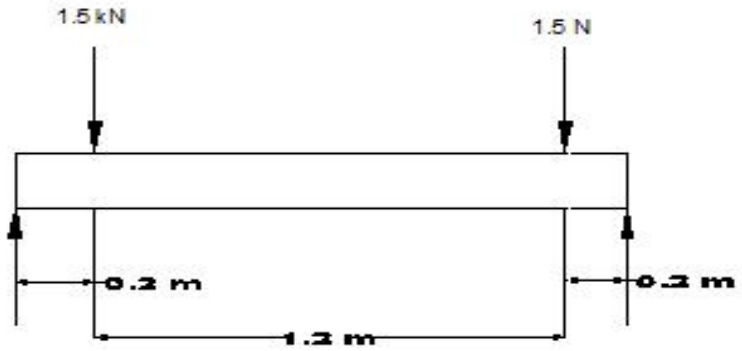
12 A pair of wheels of a cycle rickshaw carries a load of 3 kN. The distance between the wheels is 1.6 m and load is acting at a distance of 200 mm from each end. Find the diameter of the shaft. Assume allowable bending stress as 90 N/mm^2



13. Design a knuckle joint for transmitting an axial load of 60kN. The following stresses Are In Tension 60 MPa, In Compression 75 MPA, In shear 40 MPA

14. A lever loaded safety valve has a diameter of 100 mm and the blow off pressure is 1.6 N/mm^2. The fulcrum of the lever is screwed into the cast iron body of the cover. Find the diameter of the threaded part of the fulcrum if the permissible tensile stress is limited to 50 MPa and the leverage ratio is 8.

15. A plate of width 240mm is welded to a vertical plate by placing it on the vertical plate to form a cantilever with a projecting length of 480mm and overlap between the plates as 120mm. Fillet welding is done between the plates on all the three sides. a vertical load of 35kN is applied on the cantilever at its free end parallel to the width. If the allowable stress of the weld is 94 MN/m^2, determine the size of the weld.

16. A triple riveted butt joint with unequal cover plates is used to connect two 16mm plates of a boiler. Design the joint completely, if allowable stresses are 50, 40 and 80 N/mm^2 in tension, shear and crushing respectively for the plate and rivet material. Find also the efficiency of the joint.

17. Write short notes on
    a) Methods to reduce stress concentration with suitable diagrams.
    b) Bushed pin type of flexible coupling with neat sketch.
    c) Soderberg's method for combination of stresses
    d) Gasket joints.

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Code No.11114

FACULTY OF ENGINEERING

B.E.3/4 (AE) I-Semester (Backlog) Examination, Nov / Dec 2018

Subject : DESIGN OF MACHINE COMPONENTS

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

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

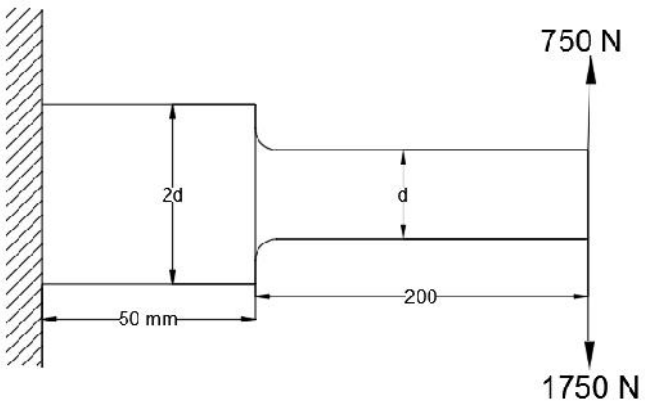
Part-A (10x2.5=25 Marks)

1. List the factors affecting the machine design process.
2. Define variable load and give four applications.
3. Briefly explain about torsional stiffness of the shaft.
4. In what way Splines superior to other keys? Give four reasons
5. In what way Coarse thread is differed from Fine thread?
6. In what way the clutches are differed from brakes?
7. What kinds of failures occur in a riveted joint? State four features state four items.
8. Why are square threads preferable to V-threads for power transmission?
9. Give some examples for permanent and temporary joints.
10. What is meant by throat- thickness in Welded joints?

Part-B (5x10=50 Marks)

11. A solid circular shaft is to transmit 112 Kw at 500rpm with provision for a 20% overload. The angle of twist must not exceed 1 degree in a length of fifteen diameters. For practical reasons, the diameter must not be more than 85 mm. Design the shaft. Adopt mild steel with a working shear stress of 60N/mm^2

12. A circular cross section of a cantilever beam is as shown in figure. It carries a transverse load at free end which varies from 750N upwards and 1750N down wards. Calculate the diameters assuming yield stress 45000 N/mm^2, endurance limit 35000N/mm^2 ,size factor 0.8,surface finish factor 0.85 and notch sensitivity factor 0.9



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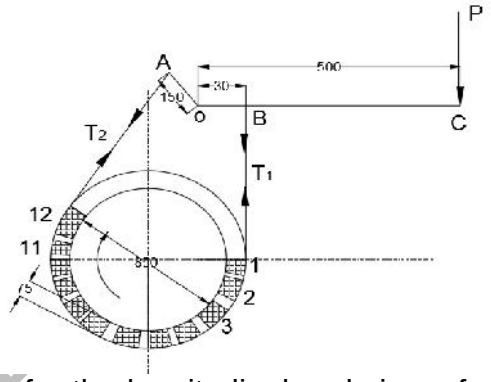
13. Design and draw a sleeve and cotter joint subjected to a load of 30kN. For the steel used, take the permissible stresses are In tension 55 N/mm^2, In crushing 70N/mm^2, In shear 35 N/mm^2

14. A multiple disc clutch has five plates having four pairs of active friction surfaces. If the intensity of pressure is not to exceed 0.127 N/mm^2, find the power transmitted at 500 r.p.m. The outer and inner radii of friction surfaces are 125 mm and 75 mm respectively. Assume uniform wear and take coefficient of friction = 0.3.

15. In the band and block brake shown in Figure, the band is lined with 12 blocks each of which subtends an angle of 15° at the centre of the rotating drum. The thickness of the blocks is 75 mm and the diameter of the drum is 850 mm. If, when the brake is inaction, the greatest and least tensions in the brake strap are T_1 and T_2, show that $=\frac{\tan 7\,1/2^{\circ})}{\tan 7\,1/2^{\circ})}^{12}$ where μ is the coefficient of friction for the blocks. With the lever arrangement as shown in Figure. Find the least force required at C for the blocks to absorb 225 kW at 240 r.p.m. The coefficient of friction between the band and blocks is 0 .4.



16. Design the riveted joints for the longitudinal and circumferential seams of a boiler for the following requirements. Internal diameter of the shell = 1.5m, Maximum steam pressure = 1 N/mm^2 Ultimate tensile strength of the boiler plate = 300N/mm^2 Factor of safety = 4, shear stress for the rivets = 60 N/mm^2 crushing stress for the rivets = 120 N/mm^2, Sketch the intersection of the above two rivets.

17. Write short notes on
    a) Preferred numbers
    b) forces acting on a sunk key.
    c) split muff coupling with neat sketch.
    d) types of the brakes

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Code No: 11117

FACULTY OF ENGINEERING

BE 3/4 (CSE) I-Semester (Backlog) Examination, November / December 2018

SUBJECT : Automata Languages and Computation

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

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

PART-A (25 Marks)

1. Give R.E. for the set of all strings where length is at least 2, given Σ= {0,1}. 3
2. Mention closure properties of Regular languages. 2
3. What do you mean by inherently ambiguous Grammas?. 2
4. What are the normal forms of CFG's?. 2
5. How will you convert CFG to NPDA?. 3
6. State Church's hypothesis. 2
7. How is a TM used as a computer of non negative integer functions?. 3
8. What do you mean by Undecidability?. 3
9. Explain Universal Turing Machine. 3
10. State RICE theorem. 2

PART-B (50 Marks)

11. a) Give $\in$– NFA to accept $\{0^n 1^n 2^n \mid n \geq 0\}$ and give the $\in$– closures of all states . 5
    a) Differentiate between NFA and DFA. 5

12. a) State and prove pumping lemma for CFLs. 5
    b) Compare right linear and left linear grammars. Give examples. 5

13. How can a PDA be converted to a CFG? Explain the methodology with the help of an example. 10

14. a) Design a TM which recognizes palindromes. 5
    b) Explain Halting problem of TM. 5

15. Consider the CFG: $S \to A_1 A_2 \mid A_2 A_3, A_1 \to A_2 A_1 \mid 0, A_2 \to A_3 A_3 \mid 1, A_3 \to A_1 A_2 \mid 0$ Test if 10010 is member or not using CYK algorithm. 10

16. a) Prove that for every NDFA exists a DFA. 5
    b) State and explain the properties of Recursively Enumerable languages. 5

17. a) Explain Chomsky Hierarchy of languages. 5
    b) Explain Post Correspondence problem with an example. 5

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Code No. 11611

FACULTY OF INFORMATICS

BE 3/4 (IT) I-Semester (Old) Examinations, November / December 2018

Subject: Digital Signal Processing

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

Note: 1. Answer All questions from Part-A & Any Five questions From Part-B
2. Assume suitable missing data of any

Part-A

1. Compare DFT and FFT. [3]
2. Show how FFT of a N-point sequence can be computed using two N/2 point DFT's. [2]
3. Explain warping effect. [2]
4. Define limit cycle oscillations. [3]
5. What is the condition for FIR filters to have both constant phase delay and group delay. [2]
6. Distinguish between IIR & FIR filters [3]
7. What are the DSP Computational Building Blocks? Explain. [3]
8. What is vocoder? Why it is needed? [2]
9. Write the applications of programmable DSP devices. [2]
10. Explain about DSP-based biotelemetry receiver system. [3]

Part-B

11.a) A System is described by the difference equation Y(n) = 3y(n-1) + 2y (n-2) + x(n). [6]
(i) Find the impulse response of the system (ii) Is it stable.

b) Compute the DFT of x(n) = [1 0 1 1] [4]

12. a) Show that FIR filters have linear phase characteristics. [5]

b) Design a FIR band pass filter of length 11 to approximate the ideal characteristics with pass band cut off frequencies at 500 Hz and 600 Hz using Hamming window. [5]

13. a) Compare FIR and IIR filters [4]

b) Convert the analog filter Ha(s) to a digital filter using impulse invariant method when [6]

$$H(S) = \frac{S+2}{S^2+3S+6}$$

14.a) Draw the functional diagram of the central processing unit of TMS320C54XXprocessor and explain the same. [6]

b) Distinguish between Harvard architecture and Von-Neumann architecture for processors. [4]

15. Draw the block diagrams of JPEG encoder and decoder. Explain about encoding and decoding of JPEG using TMS320C54XX. [10]

contd…2

16. Find the linear convolution of the following sequences [10]
    x(n) = {1, -1, 2, 1, -1, 2, 1, -1, 2} and h(n) = {2, 3, -1} using
    i) overlap add method
    ii) overlap save method.
17. Write short notes on the following: [10]
    (a) Design of optimum equiripple linear phase FIR filters
    (b) Addressing modes of programmable DSPS
    (c) Gibb's Phenomenon

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Code No.11120

FACULTY OF ENGINEERING

B.E.3/4 (IT) I-Semester (Backlog) Examination, November / December 2018

Subject : Design and Analysis of Algorithms

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 Big Oh, Omega and Theta Notation. 3
2. What is Heap? Write down time complexity of Heap Sort 2
3. Define Binary Search. 2
4. Write the control abstraction of greedy strategy. 3
5. What is multistage graph? 2
6. Explain about Depth First Search? 3
7. State Graph coloring problem and chromatic number. 3
8. Differentiate between explicit and implicit constraints. 2
9. Define NP-Hard and NP-Complete problems 2
10. State Cook's theorem. 3

PART – B (5x10=10 Marks)

11. a) Define Graph. What are its characteristics. 4

    b) Explain the representation of graph with example. 6
12. a) Write a Greedy algorithm for sequencing unit time jobs with deadlines and profits. 5

    b) Write Kruskal's algorithm and explain with an example to find Minimum Spanning tree. 5
13. Generate the sets Si, 0<=i<=4, when (w1, w2, w3, w4)=(10,15,6,9) and (P1,P2,P3,P4) = (2,5,8,1) and m=25. 10
14. a) Explain how Backtracking works on 8-Queen's problem with suitable example. 5

    b) Explain Reliability design problem with an example. 5
15. a) Explain briefly Flow Shop Scheduling problem with example. 5

    b) Explain about Non-Deterministic Algorithm. 5
16. Describe merge sort algorithm and explain with an example. 10
17. Following cost matrix is defined for a travelling sales-person problem. Obtain reduced cost matrix and state space tree generated by LCBB method. Label each node with cost estimate. 10

∞	20	30	1	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

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Code No. 11470

FACULTY OF ENGINEERING

BE V Semester (Civil) (CBCS) (Main) Examination, November/December 2018

Subject : Concrete Technology

Time: 3 Hrs **Max. Marks. 70**

Note: Answer all questions Part – A & any five questions from Part – B

Part – A (20 Marks)

1) Explain Gel space ratio.
2) Define bleeding of the concrete.
3) Give relationships between mechanical properties of concrete
4) What do you understand from micro cracking of concrete?.
5) Give any two important parameters to maintain quality in concrete.
6) Obtain target strength for M30 grade concrete?
7) Define fly ash concrete?
8) Explain need for admixtures in concrete
9) What is light weight concrete?
10) What is mechanism of fibers in concrete?

PART B(5 x10 = 50 Marks)

11 Discuss in detail tests on cements, fine and coarse aggregates. 10M

12. Explain in detail mechanical properties of concrete and their testing procedures 10M

13. Explain the temperature effects on high strength and low strength concrete 10M

14. Discuss the durability and permeability aspects of the high strength concrete. 10 M

15. Design a concrete mixture using IS method of mix design. Following design. 10M
Specifications and material properties are given.
i) Characteristic compressive strength = 40 MPa
ii) Maximum size of aggregate = 20 mm (angular)
iii) Degree of workability = 0.95 CF
iv) Degree of Q.C. = Fair
v) Type of exposure = Moderate
vi) SP gravity (a) Cement – 3.15, (b) CA – 2.62
(c) FA – 2.63
vii) Water absorption (a) CA – 0.9%
(b) FA - 0.85%
viii) Free surface moisture (a) CA – Nil
(b) FA – 1%
ix) Sieve analysis
(a) Sand – Conforming to Zone II of IS -383
(b) CA – Conforming to IS – 383 provisions. Assume any other data suitability

16. Differentiate between chemical and mineral admixtures and give their advantages.10M

17. Differentiate between high strength and high performance concrete and also their Practical applications. 10M

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Code No: 11481/CBCS

FACULTY OF ENGINEERING

B.E (EEE/Inst.) V-Semester (Main) Examination November/December 2018

Subject: Electrical Measurements and Instrumentation

Time: 3 hours **Max. Marks: 70**

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

PART-A (2x10=20 Marks)

1 A moving coil instrument gives full scale deflection with 15mA and has a resistance of 5Ω. Calculate the resistance to be connected:
   i) In parallel to enable the instrument to read upto 1A.
   ii) In series to enable it to read upto 100V.

2 The current coil of a 200 V, 5 A, electrodynamometer type LPF wattmeter carries a current of $\sqrt{2}\cos(100® t)$. The voltage across the pressure coil is $200\sqrt{2}\sin(100 ® t)V$. Determine the power measured by the wattmeter.

3 Give the reason why gravity controlled instruments are not used in horizontal position.

4 The name plate of a meter reads "1 kWh=15000 revolutions". In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in circuit.

5 Why control torque is not required in power factor meters? Give the reason.

6 The ammeter-voltmeter method is used to measure a resistance. With the voltmeter connected across the resistance the readings on the ammeter and voltmeter are 0.3A and 2.4V respectively. The resistance of the voltmeter is 450Ω. Calculate the percentage error in the value of resistance, if the voltmeter current is ignored.

7 List the detectors and sources used in a.c. bridges.

8 List the types of test used in magnetic measurements.

9 Define the following:
   (a) Transformation ratio
   (b) Turns ratio for a current transformer.

10 The following readings were obtained during the measurement of power by a polar potentiometer:
   Voltage across 0.2Ω standard resistance in series with the load ='$1.52 \angle 35^o$
   Voltage across 200:1 potential divider across the line=' $1.43 \angle 53^o$. Determine the power consumed by the load.

PART- B (5x10=50 Marks)

11 (a) Show that the error due to pressure coil inductance in wattmeter is $\left(\frac{\sin}{\cot\Phi + \sin}\right) X$ Actual Reading.

   (b) The relationship between inductance of a moving iron ammeter, the current and the position of the pointer is as follows:

Reading(A)	0.8	1.0	1.2	1.4	1.6	1.8	2.0
Deflection(degree)	16.5	26	36	46.5	57	70	90
Inductance(μH)	527.8	573.9	575	576.2	577.3	578.35	579.45

Calculate the deflecting torque when the current is 1.5A and 2.1 A. 5+5

..2

12 (a) A moving coil voltmeter with a resistance of 20Ω gives a full scale deflection of 120^{o} when a potential difference of 100mV is applied across it. The moving coil has dimensions 30mm x 25mm and is wound with 100 turns. The control spring constant is 0.378μNm/degree. Find the flux density in the gap. Find also the diameter of the copper wire of coil winding if 30 percent of instrument resistance is due to coil winding. The specific resistance for copper=1.7 x 10^{-8}Ωm.

(b) Explain how following adjustments are made in 1-Φ induction type energy meter

(i) Lag Adjustment

(ii) Overload Compensation

(iii) Temperature Compensation 5+5

13 (a) Describe the construction and working of Weston type synchroscope.

(b) A 230V, single phase, watthour meter has a constant load of 4A passing through it for 6 hours at unity power factor. If the meter disc makes 2208 revolutions during this period, what is the meter constant in revolutions per kWh? Calculate the power factor of the load if the number of revolutions made by the meter are 1472 when operating at 230Vand 5A for 4 hours. 5+5

14 (a) Explain how a cable resistance is measured with loss of charge method.

(b) A balanced 1kHz bridge has the following configuration:
Arm ab: R1=1000Ω in parallel with C1=0.053μF;
Arm bc: R2=1500Ω in series with C2=0.53μF;
Arm cd: the unknown value
Arm da: pure capacitance C4=0.265μF.
Determine Rand L or C constants of the unknown. Draw the phasor diagram of the bridge at above frequency. 5+5

15 (a) Describe the method for determination of B-H curve of a magnetic material using step by-step method.

(b) A current transformer has a bar primary, 100 secondary winding turns and 100/1 nominal ratio. It is operating on an external burden of 1.6Ω non inductive, the secondary winding resistance being 0.2Ω. The primary winding current is 1.9A, lagging 40.6^{o} to the secondary voltage reversed. With 1A current flowing in the secondary winding, calculate:
i) The actual ratio of primary winding current to secondary winding current.
ii) The phase angle between these currents. 5+5

16 (a) With a neat circuit explain the working of a coordinate type potentiometer.

(b) A basic slide wire potentiometer has a working battery voltage of 3.0V with negligible internal resistance. The resistance of slide wire is 400Ω and its length is 200 cm. A200 cm scale is placed along the slide wire. The slide wire has 1 mm scale divisions and it is possible to read up to 1/5 of a division. The instrument is standardized with 1.018 V standard cell with sliding contacts at the 101.8 cm mark on scale. Calculate
a) Working current b) Resistance of series rheostat c) Measurement range 6+4

17 Explain any two from the following
a) Hall effect transducer b) Lissajous Figures.
c) 3-∅ Reactive power measurement using 1-∅ wattmeter. 5+5

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Code No.11495 / CBCS

FACULTY OF ENGINEERING

B.E. (ECE) V – Semester (CBCS) (Main) Examination, Nov. / Dec. 2018

Subject: Digital Signal Processing

Time: 3 Hours **Max.Marks: 70**

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

PART – A (10x2 = 20 Marks)

1 Compute DTFT of $(0.2)^n U(n)$

2 List out the similarities and differences between DIT-FFT and DIF-FFT.

3 Mention the advantages & disadvantages of bilinear transformation technique

4 List the characteristics of FIR filters designed using windows.

5 Derive the relation between analog pole and a digital pole for Impulse Invariant technique.

6 What are the requirements for a digital filter to be stable and causal?

7 Discuss the computationally efficient implementation of decimator in an FIR filter.

8 What is anti-aliasing and anti-imaging filters and where are they used?

9 How fast data access is achieved in Digital signal processors?

10 What is the total memory space in TMS320c54x processors and how it is divided between program, data and IO?

PART – B (5x10 = 50 Marks)

11 a) Perform Linear convolution of the following sequences by Overlap –Save method X(n)={1,-1,2,1,-1,2,1,-1,2}; h(n)={2,3,-1}

b) Perform circular convolution of the two sequences using concentric circles method X1(n)={1,2,-1,1}; x2(n)={ 2,4,6,8}

12 a) Compute DFT of the sequence x(n)= {1,3,3,3} ,sketch the magnitude and phase spectrum.

b) Compute 8-point DFT of the discrete time signal x(n)={1,2,1,2,1,3,1,3} using DIT-FFT algorithm

13 Design a Butterworth digital IIR low pass filter using Bilinear transformation technique by taking T=0.2 sec,to satisfy the following specifications. Draw direct-form II structure.

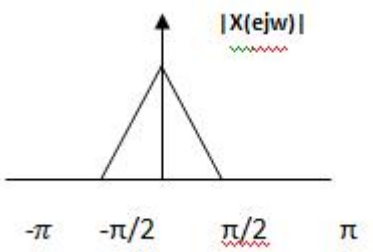
$0.8 \leq |H(e^{jw})| \leq 1.0$,for $0 \leq w \leq 0.4\pi$

$|H(e^{jw})| \leq 0.3$,$0.7\pi \leq w \leq \pi$.

14 Design a Band-pass filter for the following specifications for N=5 ,lower cut-off frequency=0.4π rad/sample ,Upper cut-off frequency =0.6 π rad/sample using hanning window. Realize the filter structure.

15 a) Discuss the sampling rate conversion by a rational factor I/D.

b) Draw the spectrum of the down sampled signal for the sampling rate factor D=2 and D=3.



16 Draw the simplified architecture of TMS320C5x processor and explain each block in detail.

17 a) Obtain H(Z) from H(s)=4/(S+2)(S+4) using Bi-linear transformation technique when T=1 sec

b) Write short notes on Finite word length effects

c) Sub-band coding of Speech signals.

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Code No.11502 / CBCS

FACULTY OF ENGINEERING

B.E. (M / AE) V – Semester (CBCS) (Main) Examination, Nov. / Dec. 2018

Subject: Heat Transfer

Time: 3 Hours **Max.Marks: 70**

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

PART – A (10x2 = 20 Marks)

1 What is thermal diffusivity? Explain its importance in heat conduction problems.

2 Write a note on electrical analogy for conduction problems.

3 Define fin efficiency and fin effectiveness? Can fin effectiveness be less than 1?

4 Define Biot number and Fourier number and explain its physical significance.

5 What is the Dittus-Boelter equation? Where and when does it apply?

6 Define Grashof number and explain its significance.

7 What is a black body? How does it differ from a gray body?

8 State and prove Kirchhoff's law of radiation.

9 What do you mean by 'fouling' in heat exchangers?

10 Differentiate mechanism of filmwise and dropwise condensation.

PART – B (5x10 = 50 Marks)

11 a) Derive general heat conduction equation in Cartesian coordinate system. 4

b) An insulated steel pipe carrying a hot liquid, Inner diameter of the pipe is 25 cm, wall thickness is 2 cm, thickness of insulation is 5 cm, temperature of hot liquid is 120^0C, temperature of surrounding is 25^0C, inside heat transfer co-efficient is 730 w/m^2k and outside heat transfer co-efficient is 15 w/m^2k. Calculate the heat loss per metre length of the pipe. Take k_{steel} =55 w/mK, $k_{insulating\ material}$=0.22 w/mK 6

12 a) What is lumped capacity? Derive expression for temperature distribution of the lumped system. 4

b) A long rod 5 cm diameter its base is connected to a furnace wall at 150^0C, while the end is projecting into the room at 20^0C. The temperature of the rod at distance of 20 cm apart from its base is 60^0C. The conductivity of the material is 200 W/m K. Determine convective heat transfer coefficient. 6

13 a) What is the mechanism of heat transfer by natural convection across a gap between two horizontal concentric cylinders? 4

b) Air at 30^0C and at atmospheric pressure flows at a velocity of 2.2 m/s over a plate maintained at 90^0C.The length and the width of the plate are 900 mm and 450 mm respectively. Using exact solution, calculate the heat transfer rate from, (i) first half of the plate, (ii) full plate and (iii) next half of the plate. 6

14 a) The filament of a 75 W light bulb may be considered a black body radiating into a black enclosure at 70^0C. The filament diameter is 0.10 mm and length is 50 mm. considering the radiation, determine the filament temperature. 4

b) A dead black cylinder of emissivity 0.95 is kept at 95^0C in a large enclosure at 10^0C . Find the radiation heat loss per square metre of its surface. What would be the radiation loss become if the cylinder were surrounded by a concentric cylinder with its inner surface having a brightly polished metal of emissivity 0.1. 6

15 a) Explain the physical mechanism of boiling and condensation. 4

b) In an oil cooler for a lubrication system, oil is cooled from 70^0C to 40^0C by using a cooling water flow at 25^0C. The mass flow rate of oil is 900 kg/hr and the mass flow rate of water is 700 kg/hr. Give your choice for a parallel flow or counter flow heat exchanger, with reasons. If the overall heat transfer co-efficient is 20 W/m^2k, find the area of the heat exchanger. Cp of oil = 2 KJ/Kg^{0}C 6

16 a) A reactor's wall, 320 mm thick, is made up of an inner layer of fire brick (K = 0.84 w/m^{0}C) covered with a layer of insulation (K = 0.16 w/m^{0}C). The reactor operates at a temperature of 1325^oC and the ambient temperature Is 25^oC. (i) Determine the thickness of fire brick and insulation which gives minimum heat loss; (ii) Calculate the heat loss presuming that the insulating material has a maximum temperature of 1200^0C. 5

b) An egg with mean diameter of 40 mm and initially at 20^0C is placed in a boiling water pan for 4 minutes and found to be boiled to the consumer's taste. For how long should a similar egg for same consumer be boiled when taken from a refrigerator at 5^0C . Following properties of egg: k= 10 W/m^{0}C, ρ= 1200 kg/m^3, C_P = 2 kJ/kg^{0}C, h = 100 w/m^2 ^{0}C. Use lump theory. 5

17 a) Two large parallel plates are maintained at a temperature of 900 K and 500 K respectively. Each plate has an area of 6 m^2. Compare the net heat exchange between the plates for the cases (i) Both plates are black, (ii) Plates have an emissivity of 0.5 5

b) Water is boiled at the rate of 24 Kg/hr in a polished copper pan, 300 mm in diameter, at atmospheric pressure. Assuming nucleate boiling conditions, calculate the temperature of the bottom surface of the pan. 5

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Code No: 11506/CBCS

FACULTY OF ENGINEERING

B.E. (Prod.) V - Semester (Main) Examination, Nov/Dec 2018

Subject: Machine Tool Engineering

Time: 3 Hours **Max. Marks: 70**

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

PART – A (10x2 = 20Marks)

1. State four water soluble oils (water ernushois) used in cutting metals.
2. State the properties of CBN tool materials.
3. What is tool life?
4. State single point cutting tool signature.
5. Sketch lathe spinning process.
6. When and why boring operation is applied or used boring operation?
7. Sketch gear hobbling process set up.
8. Sketch arrangement set up for milling of helical gear.
9. State what is dressing and truing of grinding wheel?
10. State the uses of G and M codes in CNC machine tool programming.

PART – B (5x10=50 Marks)

11. a) Sketch and explain resultant cutting force in turning operation.
    b) Sketch different sources of heat generation and its distribution in single point cutting mechanism.

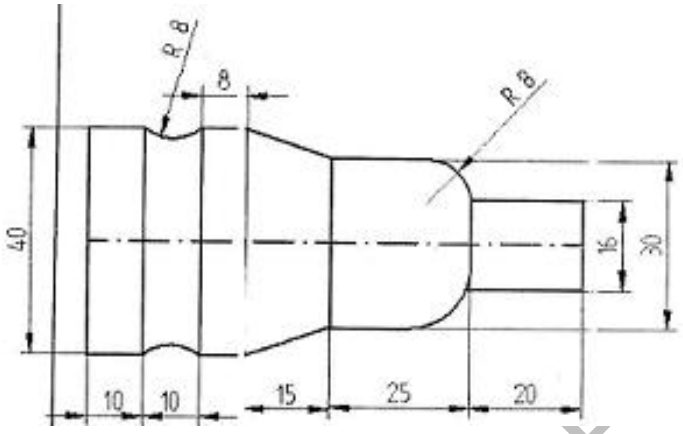
12. a) Explain the tool wear equation with respect to (i) Width land of Flank (ii) maximum depth of crater method.
    b) Explain the for conventional tool life tests and type of parameters evaluated.

13. a) State the different types of lathe chucks.
    b) Sketch how threads are machined in lathe machine.

14. a) Sketch the setup arrangement for milling helical gear.
    b) Sketch the level gear machining set up in milling machine.

Contd…2

15. a)State and explain the factors used in the selection of grinding wheel.
    b) Write CNC code for component given below with stock dimensions of dia 40 mm x 82 mm length.



16. a) Indicate the Specification of Grinding wheel as per IS standards.
    b) Explain MICLASS coding for Part Classification in Group Technology.

17. a) Explain the generative type of CAPP systems-with its essential features.
    b) Sketch and explain Lathe spinning process with

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Code No. 11512/CBCS

FACULTY OF ENGINEERING

B.E. (CSE) V - Semester (CBCS) (Main) Examination, November / December 2018

Subject : Automata Language and Computation

Time : 3 Hours **Max. Marks: 70**

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

PART – A (20 Marks)

1 Construct a DFA that accepts all strings of a's and b's where each string starts and ends with a different letter given ∑={a,b}
2 Define the term 'Automata' with an example.
3 State pumping lemma for Regular languages.
4 Mention closure properties of CFLs .
5 Give two applications of CFGs.
6 What are the reasons for a TM not accepting input?
7 What are Intractable problems?
8 Define PCP.
9 What are Recursively Enumerable Languages?
10 What do you mean by context sensitive Language?

PART – B (50 Marks)

11 (a) Construct an $\in$-NFA for $ab(a+b)^*ab(a^*+b^*)$. [5]
(b) Differentiate between Moore and Mealy machines giving examples. [5]

12 (a) Define a CFG and give a CFG for generating all integers. [5]
(b) Is the following grammar ambiguous? Justify
$S \to AB, A \to aA \mid \in, B \to ab \mid bB \mid \in$ [5]

13. Is the given grammar LR(0)? Why ?
E → E*B | E+B | B , B →0 | 1 [10]

14 (a) Design a TM which recognizes all stringsending in 101. [5]
(b) Design a TM to accept $a^n b^n a^n \mid n \geq 1$. [5]

15 (a) Explain Chomsky Hierarchy of languages. [5]
b) What are the reasons for TM not accepting input? [5]

16 (a) Give RLG and LLG for $(0+1)^*00(0+1)^*$. [5]
(b) Prove the equivalence of DFA and NFA. [5]

17 Give short notes on: [10]
(a) LBA
(b) UTM

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Code No. 11522 / CBCS

FACULTY OF ENGINEERING

B.E. (IT) V-Semester (CBCS) (Main) Examination, Nov. / Dec. 2018

Subject : Automata Theory

Time : 3 hours **Max. Marks : 70**

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

PART – A (2 x 10 = 20 Marks)

1 Compare and contrast DFA and NFA with example.
2 Write application of CFG
3 Differentiate PDA and DPDA.
4 Test whether the given grammar is ambiguous or not
$S \rightarrow aB \mid bA$
$A \rightarrow aS \mid bAA \mid a$
$B \rightarrow bS \mid aBB \mid b$
5 Construct DFA to accept the language $L = \{(ab)^n / n > 1\}$
6 Convert following NFA to DFA

	$\in$	0	1
q0	q1	q0	-
q1	q2	-	q1
q2	-	-	q2

7 Write CFG for RE 0*1 ()+1)*.
8 Write properties of Regular Language.
9 Differentiate PCP & MPCP.
10 What is SAT?

PART – B (5 x 10 = 50 Marks)

11 Construct a PDA for $L = \{a^n c b^n / n>1\}$. (10)

12 With the help of pumping lemma prove L = {an bn / n >=1} is not regular. (10)

13 Minimize the following DFA. (10)

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

..2

14 Convert the following productions into CNF. (10)

$S \rightarrow bA \mid aB$

$A \rightarrow bAA \mid aS \mid a$

$B \rightarrow aBB \mid bS \mid b$

15 a) Explain intractability with example. 4

b) Find weather following correspondence system has solution or not. 6

i	A	B
1	1	10
2	0	10
3	010	01
4	11	1

16 Design PDA that accept by empty stack, process sequence of if's and else in c program, where 'I' stands for if and "e" stands for else. (10)

17 Obtain Turing Machine for $L = \{a^n b^n c^n \mid n > 1\}$ and test weather string aabbcc is accepted or not using ID's. (10)

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