Code No: 2599/CBCS/BL

FACULTY OF ENGINEERING

B.E. V - Semester (CBCS)(Civil) (Backlog) Examinations, October 2020

Subject : Concrete Technology

Time: 2 Hours **Max. Marks :70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1. Explain Hydration of cement.
2. What is the difference between segregation and bleeding?
3. What is maturity concept?
4. What do you understand from micro cracking of concrete?
5. Difference between nominal mix and design mix of concrete.
6. Give any three advantages of quality control.
7. What is Ready mix concrete?
8. What is the role of chemical admixtures in concrete?
9. What is Recycled aggregate concrete?
10. Give any two advantages of High strength concrete?

PART-B

Note : Answer any Four Questions **(4 x 15 = 60 Marks)**

11. (a) Explain what are the factors that are effecting the workability of concrete.
    (b) What are the different types of vibrators. Explain the advantages of each type.

12. (a) Explain the different curing methods of concrete.
    (b) Discuss in detail the durability of High strength and Low strength concrete mix design according to IS specifications.

13. (a) Design a mix M30 grade concrete using IS-10262-2009.Assuming all the physical properties of the concrete making materials.
    (b) Write the step wise procedure for the concrete mix design according to IS specifications.

14. (a) Differentiate between mineral and chemical admixture and explain with suitable examples.
    (b) Explain durability of Ready mix concrete.

15. (a) Explain the preparation of high density concrete with its applications.
    (b) What is the need of Fiber reinforced concrete? Explain the mechanism involved in it.

16. (a) Differentiate between High strength and High performance concrete.
    (b) Discuss the need for the Ready mix concrete.

17. Write a short notes on the following.
    (a) Measurement of work ability.
    (b) Micro cracking of concrete.
    (c) Light weight concrete.

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Code No.2610/CBCS/BL

FACULTY OF ENGINEERING

B. E. (EEE/Inst) (CBCS) V – Semester (Backlog) Examination,

October 2020

Time: 2 Hours **Electrical Measurements and Instrumentation** **Max. Marks :70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1. List the differences between absolute and secondary instruments.
2. The torque of an ammeter varies as the square of the current through it. If a current of 5A produces a deflection of 90^0, what will be the deflection in the instrument when a current of 3A passes?
3. List the essential components of motor meters.
4. A meter whose constant is 600rev/kWh, makes 5 revolutions in 20 seconds. Calculate the load in kW.
5. A resistance is measured by the ammeter-voltmeter method. With the voltmeter connected across the resistance the readings of the ammeter and voltmeter are 0.4A and 3.2V respectively. The resistance of the voltmeter is 500Ω. Calculate the true value of resistance and the percentage error in the value of the resistance if the voltmeter current is ignored.
6. Explain why Wheatstone bridge cannot be used for precision measurements.
7. What is ration correction factor? Explain briefly.
8. Give the advantages and disadvantages of ring and bar specimens used in testing of magnetic materials.
9. What is volt-ratio box? Explain briefly.
10. The following readings were obtained during measurement of low resistance by means of a potentiometer: Voltage drop across a 0.1 Ω standard resistance: 1.0235V, Voltage drop across the low resistance under test: 0.4221V, calculate the value of unknown resistance, current.

PART-B

Note : Answer any Four Questions **(4 x 15 = 60 Marks)**

11. (a) The following figures give the relation between deflection and inductance of a moving iron instrument.

Deflection, Degree	20	30	40	50	60	70	80	90
Inductance, μH	335	345	355.5	366.5	376.5	385	391.2	396

Find the current and the torque to give a deflection of 80^0. Given that control spring constant is 0.4×10^{-6} N-m/deg.

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(b) Describe in detail the construction and principle of operation of a transfer instrument used in the laboratory for measurement of current.

12. (a) A watt hour meter is calibrated to measure energy on a 250V supply. On test a steady current of 15A is passed through it for 5 hours at unity power factor. If the meter readings before and after test are 8234.21 KWh and 8253.13 kWh respectively. Calculate the percentage of error.

(b) Explain with a neat sketch the working of a Weston type of Synchroscope.

13. A four branch bridge network ABCD balanced at 500Hz has branches AB and BC of pure resistance of 100 Ω and 1250 Ω respectively. An unknown impedance forms the arm CD and the branch DA consists of a standard capacitor of 0.5μF capacity and negligible resistance, connected in series with a non-inductive resistance of 20Ω to give balance. The supply voltage is 15 V and the supply is given at the points B and D. Find the components of unknown impedance and draw the necessary phasor diagram.

14. (a) Explain the oscillographic method of determination of hysteresis loop of a magnetic material.

(b) Explain the principle of Ballastic Galvanometer and also derive an expression for deflection of this meter.

15. (a) Describe with the help of suitable diagrams, how A.C. potentiometer can be used for: (i) Determination of self inductance of coil (ii) Calibration of voltmeter.

(b) Explain how cathode ray oscilloscope is used for measurement of phase and frequency.

16. (a) A current transformer has a bar primary and 200 secondary winding turns. The secondary winding burden in an ammeter of resistance is 1.2Ω and reaction of 0.5 ohm, the secondary widing has a resistance of 0.2 ohm and reactance of 0.3 ohm. Magnetizing mmf for the core is 100AT and requires 50A for core losses.

(i) Find the primary winding current and ratio error when the ammeter in the secondary winding circuit indicates 5A.

(ii) How many turns could be reduced in the secondary winding in order that the ratio error be zero for this condition.

(b) Define the following terms as used for instrument transformers:

(i) Nominal ratio (ii) Ratio error.

17. Explain any two from the following:

(a) Universal shunt.

(b) Alternating type power factor meter.

(c) Hall effect transducers.

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Code No: 2624/CBCS/BL

FACULTY OF ENGINEERING

B.E. V- Semester (CBCS) (ECE) (Backlog) Examination Ocober 2020

Subject: Digital Signal Processing

Time: 2 Hours **Max. Marks :70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1. List the properties of Twiddle factor.
2. Find the DFT of x(n)={1 2 3 4 5}
3. Explain Warping effect.
4. Give the equations specifying Rectangular and Bartlett windows
5. What are the conditions for a FIR system to have linear phase.
6. Determine the H(z) for the given analog filter transfer function H(s)=2/(s+1)(s+2) using impulse invariance method.
7. What is the need for anti-imaging filter after upsampling a signal.
8. List any 3 arithmetic instructions of TMS320C54XX processor.
9. What are the various types of on-chip memory in TMS320C54XX family of processors?
10. What are the advantages of Digital Signal Processing?

PART-B

Note : Answer any Four Questions **(4 x 15 = 60 Marks)**

11. a) Compute linear convolution of the 2 sequences x(n)={1,2,0.5,1} and h(n) = {1,2,1,-1}
    b) Determine the IDFT of the given x(k)=[7, 1, -1, 1,-1, 1, -1, 1] using DIT FFT.

12. a) Find the DFT of the given x(n)=[1 2 3 4 4 3 2 1] using FFT DIT/DIF.
    b) List any 3 properties of DFT.

13. Design the Butterworth Digital IIR Low Pass filter using Billinear transformation by taking T=1sec for the following specifications
    $0.5 \le |H(e^{j\omega})| \le 1.0$; for $0 \le \omega \le 0.4\pi$
    $|H(e^{j\omega})| \le 0.2$; for $0.8\pi \le \omega \le \pi$ and Realize using Direct Form-1.

14. Design an ideal HPF whose desired frequency response is
    $H_d(e^{j\omega}) = 1$ for $\pi/4 \le |\omega| \le \pi$
    $= 0$ for $|\omega| \le \Pi/2$
    Using Hamming window for N=9.

15. a) Explain the algorithm to decrease the sampling frequency by a factor D.
    b) Explain about finite word length effects.

16. a) Explain the addressing modes of TMS320C54XX processor.
    b) Explain any two data transfer instructions of TMS320C54XX processor.

17. Write short notes on the following
    a) FIR and IIR Filters
    b) Interpolation and Decimation.
    c) Need of Multi-rate signal processing.

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Code No. 2630 / CBCS/BL

FACULTY OF ENGINEERING

B.E. (M / A.E) V – Semester (CBCS) (Backlog) Examination, October 2020

Subject: Heat Transfer

Time: 2 Hours **Max.Marks: 70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1 Differentiate between three modes of heat transfer.
2 Define thermal conductivity?
3 What is the physical significance of Biots number? Is the Biot number more likely to be large for highly conducting solids or poorly conducting ones?
4 Define fin effectiveness. When is the use of fin not-justified?
5 Explain the following terms of forced convection: (a) Displacement thickness (b) Momentum thickness (c) Energy thickness.
6 Define local and mean heat transfer coefficients.
7 Explain the following (a)Irradiation, (b)Radiosity (c) Reradiation
8 State and explain Kirchhoff's law of thermal radiation.
9 Explain the Fouling effects in heat exchanger.
10 Write the expression for NTU of a heat exchanger?

PART-B

Note : Answer any Four Questions

(4 x 15 = 60 Marks)

11 Steam at $T_{\infty 1}$ = 320°C flows in a cast iron pipe (k = 80 W/m °C) whose inner and outer diameters are D_1 = 5 cm and D_2 = 5.5 cm, respectively. The pipe is covered with 3-cm-thick glass wool insulation with k= 0.05 W/m°C. Heat is lost to the surroundings at $T_{\infty 2}$ = 5°C by natural convection, with a heat transfer coefficient of h_2 = 18 W/m^2°C. Taking the heat transfer coefficient inside the pipe to be h_1 = 60 W/m^2 °C, determine the rate of heat loss from the steam per unit length of the pipe. Also determine the temperature drops across the pipe shell and the insulation.

12 A slab of aluminium 12 cm thick is originally in a temperature of 600^{o}C. It is suddenly immersed in a liquid at 100^{o}C resulting in a heat transfer coefficient of 1250 W/m^{2}K. Determine the temperature at the centreline and the surface 1 minute after the immersion. Also calculate the total thermal energy removed per unit area of the slab during this period.

13 A very long 25 mm diameter copper rod (k=380 W/m^{o}C extend horizontally from a plane heated wall at 120^{o}C. The temperature of the surrounding air is 25^{o}C and the convective heat transfer coefficient is 9.0 W/m^{2o}C.
   i) Determine the heat loss,
   ii) How long the rod be in order to be considered infinite?

14 Air at 20^{0}C and 1bar pressure flows over a flat plate at 35 m/s, the plate is 75 cm long and is maintained at 60^{0}C. Calculate the heat transfer from the plate per unit width of plate. Also calculate the turbulent boundary layer thickness at the end of the plate, assuming it to develop from the leading edge of the plate.

15 *A pipe carrying steam has an OD of 22 cm and run in a large room*. It is exposed to air at a temperature of 30°C. Calculate the loss of heat to surroundings per metre length of pipe due to thermal radiation. The emissivity of the pipe surface is 0.8. Find the reduction in that loss if the pipe is enclosed in a 40 cm brick conduct of emmisivity 0.9.

16 A counterflow double pipe heat exchanger is used to heat water using oil as the heating fluid. The heat exchanger area is 16 sq.m and its is observed that water inlet and outlet temperatures are 35ºC and 75ºC while the corresponding oil temperatures are 110ºC and 75ºC. If water flows at the rate of 68 kg/min, calculate the overall heat transfer coefficient for the heat exchanger. Take specific heat of oil as 1.9 kJ/kg °C.

17 Explain the following:

a) Explain the significance of Biot and Fourier number.

b) Bring out the essential differences between forced convection and free convection heat transfer.

c) Show the various regimes in Pool Boiling and discuss the heat transfer mechanisms in each region in brief.

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Code No.2635/CBCS/BL

FACULTY OF ENGINEERING

B. E. (Production) (CBCS) V – Semester (Backlog) Examination, October 2020

Subject: Machine Tool Engineering

Time: 2 hours **Max. Marks: 70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1. State characteristics of cutting tool.
2. State the coolants used for A1-steel, stainless steel.
3. Sketch ISO tool geometry single point cutting tool.
4. Sketch form tool geometry.
5. What is function of lathe carrier and catch plate?
6. State the role of steady state rest on the lathe.
7. Specification of HM milling machine.
8. Sketch face milling tool signature-i.e. geometry.
9. State specification of grinding wheel is marking IS system.
10. What is a canned cycle in CNC machining operation?

PART-B

Note : Answer any Four Questions **(4 x 15 = 60 Marks)**

11. (a) In the Orthogonal cutting based on thin zone model, determine the shear plane angle in orthogonal cutting.
    (b) Sketch cutting tools geometry and sketch specification-DIN system NRS tool angles.
12. (a) The tool life equation: taylor tool life eqn – $VT^n = C$ (work-tool), explain its significance?
    (b) One tool failure criteria is criteria of width of wear land at flank-explain.
13. (a) Sketch kinematic scheme of lathe design.
    (b) Sketch the operations of lathe by holding work piece between centers.
14. (a) Explain the working of simple index method for cut spur gear teeth on HM machine.
    (b) Derive the machining time in milling wrt respect to (a) plain milling, (b) face milling.
15. (a) Sketch the application of (i) internal (ii) on-center (iii) off-centre grinding process.
    (b) Explain the centre grinding operation (a) through grinding (b) infeed grinding, (c) end feed grinding.
16. (a) Sketch ten types of lathe chucks.
    (b) State and sketch external and internal cylindrical grinder types.
17. (a) Specify the grinding wheel composition with respect grit size.
    (b) State ten different operation performed in milling machine.

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Code No. 2641/CBCS/BL

FACULTY OF ENGINEERING

B.E. (CSE) V – Semester(CBCS) (Backlog) Examination, October 2020

Subject: Automata Languages and Computation

Time: 2 Hours **Max. Marks :70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1 Construct DFA that accepts all strings of a's and b's where each string starts with 'a' and ends with 'ab' over alphabet {a,b}.
2 State pumping lemma for regular languages.
3 Define PDA and the languages accepted by a PDA.
4 Give grammar for the language $L(G) = 0^n1^n | n \geq 1$.
5 What are the Normal forms of CFGs?
6 What is undecidability?
7 Define inherent ambiguity.
8 What are the reasons for a TM not accepting its input?
9 What are the types of Turing machines?
10 What do you mean by Recursively enumerable languages?

PART-B

Note : Answer any Four Questions **(4 x 15 = 60 Marks)**

11. a) Construct a DFA

		0	1
→	qo	{qo,q1}	{q0}
	q_1	Φ	{q2}
	qo	Φ	{q3}
*	qo	{q3}	{q3}

b) Construct an NFA equivalent to the regular expression 10 + (0+11) 0∗1 with epsilon-transitions.

12. (a) Design a PDA recognizing the set L of all non-palindromes over {a, b}.
(b) Convert the grammar S → aSb/ab into Chomsky Normal Form. [5]

13. (a) Give the new set of productions after removing the unit productions from the following CFG.
S → AA, A → B / BB, B→ abB / b/ bb.
(b) Show that the set of palindromes over {0, 1} is not regular using pumping lemma.

14. a) Convert the following grammar to CNF.

S → aAa | aBC
A → aS | bD | ε
B → aBa | C | b
C → abb | DD
D → aDa

b) State pumping Lemma for CFL's. What are its applications?

15. Design a TM to accept $a^nb^nc^n / n \geq 1$.

16. a) Construct a TM to accept the language of palindromes over the alphabet {a, b}.
b) Explain Halting problem of a TM.

17. Give short notes on the following:
a) CHOMSKY hierarchy
b) Recursive and Recursive enumerable languages.

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Code No. 2650/CBCS/BL

FACULTY OF ENGINEERING

B.E. (IT) V-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Automata Theory

Time : 2 hours **Max. Marks : 70**

PART –A

Note : Answer any Five Questions **(5x2 = 10 Marks)**

1 Distinguish between DFA and NFA.
2 Construct NFA to accept the substring 'ba' for Σ = {a, b}.
3 What are the applications of R.E.?
4 Find whether the given G is Ambiguous or not

$S \rightarrow aS \mid x$

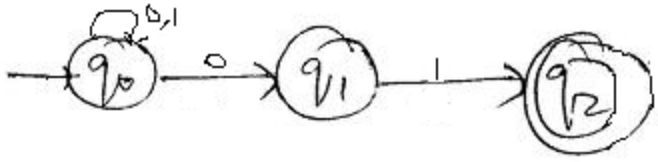
$X \rightarrow aX \mid a$

5 What are t-production and unit production?
6 Define parse tree with example.
7 Define PDA.
8 Explain ID of a PDA with an example.
9 Define storage in the state in TM.
10 Define PCP.

PART-B

Note : Answer any Four Questions **(4 x 15 = 60 Marks)**

11 Convert the following NFA to DFA.



12 State and explain algebraic laws for regular expression in detail.

13 Consider the following G

$S \rightarrow AB \mid BC$

$A \rightarrow BA \mid a$

$B \rightarrow CC \mid b$

$C \rightarrow AB \mid a$

Test whether the string "baaba" is in the language by cyk algorithm.

14 Obtain PDA to accept the language
$L(M) = \{W \subset W^r \mid W \in (a+b)^*\}$ by final state.

15 Explain the programming techniques for TM.

16 Define PCP and show whether the list is having solution.

	A	B
1	1	111
2	10111	10
3	10	0

17 State and prove pumping lemma for regular language.

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Code No. 2084/BL

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (Backlog) Examination, June / July 2020

Subject : Theory of Structures-I

Time: 2 Hours **Max. Marks: 75**

PART- A

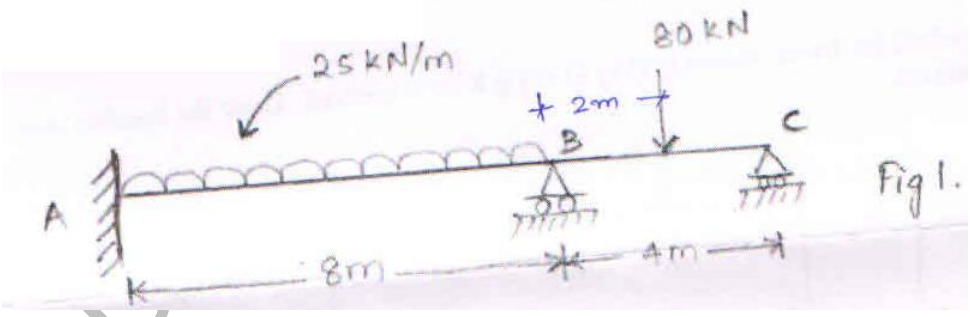
Answer any Seven question. **(7 x 3 = 21 Marks)**

1 Define the term kinematic indeterminacy?
2 Write the generalized form of slope deflection equations.
3 Define member stiffness in moment distribution method?
4 What is distribution factor? Illustrate using an example of joint.
5 Define rotation factor in Kani's method?
6 Write the generalize form of the equation for end moments of a beam element AB sued in Kani's method.
7 State Castigliano's first theorem.
8 Determine the deflection of the free end of a cantilever beam of length 'L' subjected to a point load 'W' at the free end, using castigliano's theorem?
9 State the Eddy's theorem for arches.
10 Define an arch. How does an arch differ from a beam?

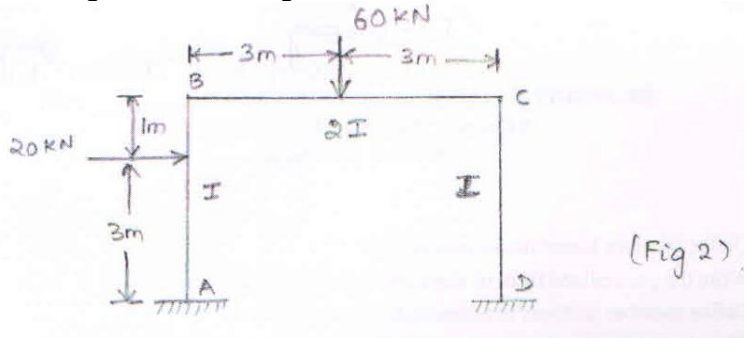
PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11 Analyse the continuous beam shown in the figure below (fig.1) by slope deflection method, if the joint B sinks by 12mm. Take EI=4200 kNm^2. Draw the shear force and bending moment diagrams.



12 Analyse the symmetric frame shown below (fig 2) by slope deflection method, and draw the bending moment diagram.



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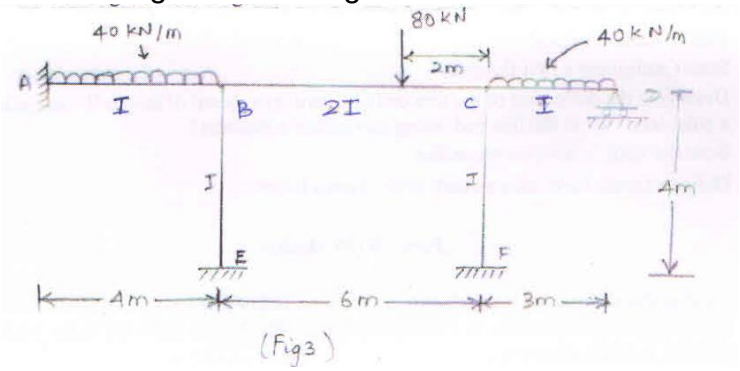
13 Analyse the frame shown below (Fig 3) using the moment distribution method. Draw the bending moment diagram.



(Fig3)

14 Analyse the frame shown in (Fig 4) using Kani's method. Draw the bending moment diagram.

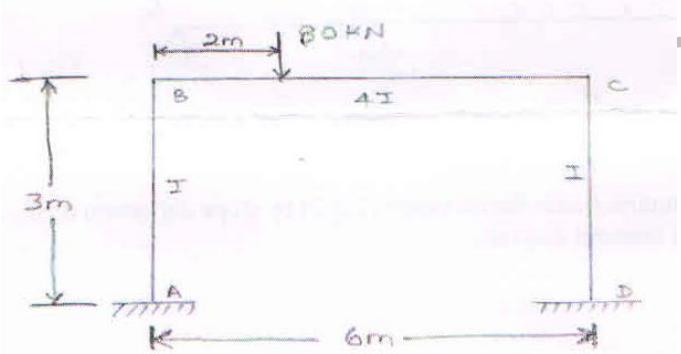
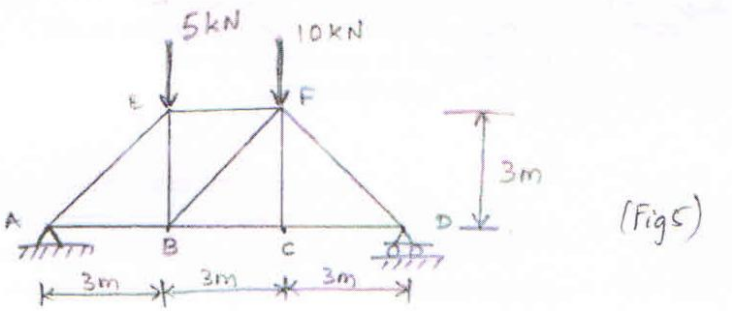


Fig.4

15 Find the downward displacement of joint B in the truss shown in Fig.5 by the unit load method. Take area of cross section of each member as 400 mm^2 and E = 200 kN/mm^2.



(Fig5)

16 The span and rise of a three hinged parabolic arch are 40m and 10m respectively. The equation of the arch is y = x-(x2/40), where the origin is at the left abutment, x-axis directed towards right and y-axis upwards. A u.d.1 of 15 kN/m is applied on the left half of the arch. Find the reactions at the abutments. Draw the bending moment diagram. Determine the locations of maximum bending moments.

17 A two-hinged parabolic arch of span 50m and rise 5m is subjected to a central concentrated load of 60kN. It has an elastic supports which yields by 0.0001 mm/kN. Calculate the horizontal thrust developed when the temperature rises by 20^{0}c, assuming secant variation and neglect rib shortening. Take E=200kN/mm^2, I = 5 x 109 mm^4, Average area, A=10000 mm^2 and α = 10 X 10^{-6}/^{0}c

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Code No. 2090/BL

FACULTY OF ENGINEERING
BE 3/4 (EEE/Inst.) I – Semester (Backlog) Examination, October 2020

Subject: Power Electronics

Time: 2 Hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1. What are power diodes? Mention the applications of them.
2. Latching current for an SCR is 100 mA, DC source of 200 V is also connected from the SCR to the L load. Compute the minimum width of the gate pulse required to turn on the device. Take L = 0.2 H.?
3. Explain secondary break down problem of BJT?
4. Draw the structure and V-I characteristics of IGBT.
5. A 230V, 50 Hz, single pulse SCR is triggered at a firing angle of 30° and the load current extinguishes at an angle of 210°. Find the circuits turn off time.
6. Draw the circuit and output wave form of a 1-Φ fully controlled converter with RLE load. Assume α=60°.
7. List out the types of Chopper. Derive the average output voltage of a step down chopper.
8. What is the working principle of Cyclo converters?
9. Describe the working principle of 1-ϕ full bridge inverter.
10. List out the gating schemes in a 3-Φ bridge inverter?

PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11. a) Describe R and RC triggering method of a thyristor.
    b) Explain the switching characteristics of PMOSFET with necessary diagrams.

12. a) Draw and explain the structure of a IGBT.
    b) What is load line of a BJT, and its significance?

13. a) Why commutation overlap occurs in phase controlled converters. Explain its effects.
    b) A three phase fully controlled bridge rectifier is supplied at 230 V/phase and at a frequency of 50Hz. The Source inductance Ls=5 mH and the load current on the dc side is constant at 12A. If the load consists of a DC source voltage of 230v having an internal resistance of 2 Ω, find
    (a) firing angle α, (b) overlap angle μ.

14. a) Four-quadrant chopper is driving a separately excited dc motor load. The parameters are R=0.1ohm,L=10mH.The supply voltage is 200 V D.C. If the rated current of the motor is 10A and motor is driving the rated torque. Determine
    (i) Duty cycle of the chopper if E_b=150V.
    (ii) Duty cycle of the chopper if E_b= -150 V.
    b) Draw and explain the operation of dual converter with neat output wave forms.

15. Explain in detail working of 3-phase voltage source inverter with neat waveforms. Also derive the phase and line voltages for 180º mode of operation.

16. a) Explain the operation of a 1-ϕ semi converter with RL- load.
    b) Explain the working of a Buck regulator.

17. Write a short note on:
    a) UJT
    b) Multilevel inverters

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Code No. 2098/BL

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester (Backlog) Examination, October 2020

Subject : Digital System Design with Verilog HDL

Time: 2 Hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1 Explain timescale 1 ns/ 1ps.
2 Discuss continuous assignment statement with example.
3 Define Logic Synthesis.
4 Differentiate between sequential and parallel blocks.
5 What are the advantages of one hot encoding over binary encoding?
6 Write Verilog code for D-Latch using transmission gates.
7 Explain ASM blocks.
8 Classify hazards with examples.
9 Draw simple architecture of CPLD.
10 List few CAD tools used in circuit design.

PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11 a) Write Verilog code for 4-bit Binary Adder, design a stimulus block.
b) Write Verilog code for 8-bit comparator.

12 Explain all the types of timing controls with examples for each.

13 a) Design a mod-8 counter using D-FFs and write Verilog code for the same.
b) Write verilog code for 8 bit SIPO shift register.

14 a) With neat diagram explain race condition.
b) Draw ASM chart for the Arbiter and write its Verilog code.

15 a) Explain the types of memories.
b) Draw and explain ASIC design flow.

16 a) Bring out the differences between tasks and functions.
b) What is PLI. Explain with a suitable example.

17 Write short note on :
a) Incompletely specified state tables
b) One hot/one cold state controller
c) Standard-cell based design

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Code No: 2106/BL

FACULTY OF ENGINEERING
B.E. 3/4 (M/P) I-Semester (Backlog) Examination, October 2020

Subject: Design of Machine Elements

Time: 2 hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1 Define variable load and give some applications.
2 How can you differentiate between Strength and rigidity?
3 Define the term 'bearing pressure intensity'
4 Briefly explain about tensional stiffness of the shaft.
5 In what basis keys are selected?
6 Explain the knuckle joint with neat diagram.
7 In what way clutches are differed from flange couplings?
8 What are the types of screw threads used in Power screws?
9 How is the efficiency of riveted joint calculated?
10 Discuss the procedure for the design of eccentric loaded welded joint with neat sketches.

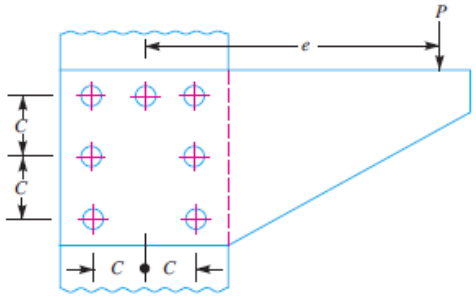
PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11 A rod is made of cast steel of yield strength 540MPa is subjected to static loads consisting of torsional moment 25000N-m and bending moment 12000N-m. Find the diameter of the rod using the following theories.
a) Maximum principal stress theory
b) Maximum shear stress theory
c) Maximum distortion energy theory
Consider a factor of safety as 2.5. Take E= 200GPa and Poisson's ratio =0.3

12 The material and length of the hollow and solid shafts are same. Compare the strength, weight and stiffness of a hollow shaft of the same external diameter as that of solid shaft. The inside diameter of the hollow shaft being 0.5 times the external diameter.

13 An eccentrically loaded lap riveted joint is to be designed for a steel bracket as shown in figure. The bracket plate is 25mm thick. All rivets are to be of the same size. Load on the bracket, P = 50kN; rivet spacing, C = 100mm; load arm, e = 400mm.Permissible shear stress is 65MPa and crushing stress is 120MPa. Determine the size of the rivets to be used for the joint.



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14. A mild steel plate 120 mm wide and 15 mm thick is to be welded to another plate by means of parallel fillet welds. The plates are subjected to an axial load of 50kN. Determine the length of the weld so that the maximum stress does not exceed 60kN/mm^2 if the joint is under
    a) Static loading b) Fatigue loading
    Take stress concentration factor for parallel Fillet welding is 2.5

15. Design and draw socket and spigot cotter joint to support a load of 6kN. Assume
    Permissible tensile stress = 60 N/mm^2
    Permissible crushing stress = 90N/mm^2
    Permissible shear stress = 40 N/mm^2

16. A pulley of 0.9 m diameter revolving at 200 r.p.m. is to transmit 7.5 kW. Find the width of a leather belt if the maximum tension is not to exceed 145 N in 10 mm width. The tension in the tight side is twice that in the slack side. Determine the diameter of the shaft and the dimensions of the various parts of the pulley, assuming it to have six arms. Maximum shear stress is not to exceed 63 MPa.

17. Write short notes on
    a) Bolt of uniform strength
    b) Differential and compound screw
    c) Goodman's equation.
    d) Cumulative fatigue

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Code No.2407/BL

FACULTY OF ENGINEERING

B. E. 3/4 (A.E.) I – Semester (Backlog) Examination, October 2020

Subject: Design of Machine Components

Time: 2 hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1. Briefly explain about Maximum shear stress theory.
2. Define the following terms:
   (i) Factor of safety (ii) Allowable stress.
3. Explain the following terms subjected to variable loads:
   (i) Endurance limit (ii) Notch sensitivity.
4. Explain Soderberg's equation.
5. Enumerate the type of stresses induced in shafts.
6. Specify the types of Couplings.
7. What is a cotter? Explain with help of neat sketch.
8. Define the following terms subjected to bolts and nuts:
   (i) Nominal diameter (ii) Core diameter.
9. What do you understand by compound screw?
10. Explain briefly circular fillet weld subjected to torsion and bending moment with neat sketches.

PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11. A bar consists of a axial pull of 12kN together with a transverse shear force of 6kN. Find the diameter of bar required according to 1. Maximum principal stress theory; 2. Maximum shear stress theory; 3. Maximum principal strain theory; 4. Maximum strain energy theory; and 5. Maximum distortion energy theory.
    Permissible tensile stress at elastic limit = 110MPa and Poisson's ratio = 0.27.
12. Find the thickness of a 125mm wide uniform plate which is to be subjected to a tensile load that has a maximum value of 255kN and a minimum value of 105kN. Endurance limit stress and Yield point stress of the plate material are 220MPa and 310MPa respectively. The factor of safety based on yield point may be taken as 1.4.
13. Design and draw a protective type flange coupling to transmit 15kW at 900r.p.m. from an electric motor to a pump. The service factor may be assumed as 1.35. The following permissible stresses may be used: Shear stress for shaft, bolt and key material is 40MPa Crushing stress for bolt and key is 80MPa Shear stress for coupling is 8MPa.

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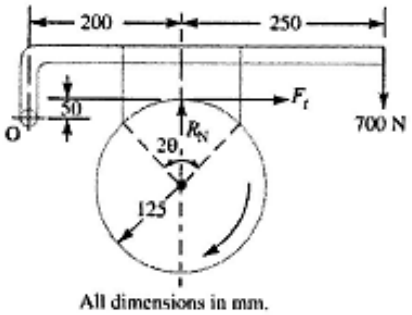
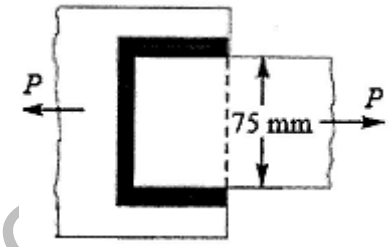
14. Discuss the design procedure of spigot and socket cotter joint.

15. Find the torque that may be transmitted by the block brake as shown in Figure. The diameter of the drum is 250 mm and the angle of contact is 90^0. If the operating force of 700 N is applied at the end of a lever and the coefficient of friction between the drum and the lining is 0.35.



16. Determine the length of each parallel fillet weld, if the joint is subjected to both static and fatigue loading. A plate 65mm wide and 14mm thick is joined with another plate by a single transverse weld and a double parallel fillet weld. The maximum tensile and shear stresses are 75MPa and 55MPa respectively. The stress concentration factor for transverse welds is 1.5 and for parallel fillet welds is 2.7.



17. Write short notes on:
    (i) Types of theories of failure are applied in shaft design.
    (ii) In what ways shaft couplings are differed from pipe joints?
    (iii) Kinds of failure will occur in a riveted joint and how they are rectified.
    (iv) Briefly discuss about stress concentration.

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Code No: 2118/BL

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I Semester (Backlog) Examination, October 2020

Subject: Automata Languages and Computation

Time: 2 Hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1. Design a DFA for the Lang L over the alphabet ∑ = {a, b}in which each string w begins with a and ends with b.
2. Give delta the transition function for NFA and DFA?
3. State Closure Properties of Regular Languages.
4. What is ambiguous grammar?
5. What is a Greibach Normal Form?
6. State pumping lemma for CFL?
7. What is undecidability?
8. What is a Turing Machine?
9. State halting problem of a turning machine?
10. Write the two applications of Regular expressions?

PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11. Prove that for every Non-deterministic FA there exists a Deterministic FA that simulates the behaviour of Non-deterministic FA.

12. For the grammar S ->ASB / ε (Epsilon)
    A ->AAS / a
    B ->SbS /A / bb
    (i) Eliminate useless symbols
    (ii) Eliminate ε -production
    (iii) Eliminate unit production
    (iv) Convert the grammar into CNF

13.a) Design a TM to accept language $L=\{a^n b^n / n \geq 1\}$
    b) Construct a PDA equivalent to the following grammar.
    S -> aB/bA
    A -> a/aS/bAA
    B -> b/bS/aBB

14. (a) Determine a derivation tree of a*b + a* b given that a* b + a* b is in L(G) where G is given by the production S->S+S / S∗S / a / b.
    (b) Show that the set of palindromes over {0, 1} is not regular using pumping lemma.

15. Construct a PDA equivalent to the following CFG.
    S ->OBB
    B ->OS / 1S / O Test whether 010^4 is in N(A).

16. Show the PCP with two lists X = (b, bab^3, ba) and Y = (b^3, ba, a) has a solution. Give the solution sequence.

17. Explain minimization of an FSM with an example.

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Code No: 2126/O/BL

FACULTY OF ENGINEERING

B. E. 3/4 (I.T) I Semester (Old) Examination, October 20120

Subject: Digital Signal Processing

Time: 2 Hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1. Prove convolution property of DFT.
2. What is finite word length effect? Explain.
3. What is Gibb's phenomenon in FIR filter design?
4. Compare FIR and IIR filters.
5. Compare linear and circular convolution.
6. Explain Impulse invariant technique.
7. List the Data addressing modes of TMS320C54xxDSP processor?
8. What is the effect of Round-off in Digital Filters?
9. What is barrel shifter?
10. What are the features of General purpose processor?

PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11. Obtain DFT of the sequence x(n) = (1,-1,2,-2,0,0,3,-3) using DIT-FFT algorithm. Draw signal flow graph.

12. Design low pass FIR filter using hanning window for no. of samples 9, cutoff frequency 0.5 π, T = 1 sec. Realize the structure.

13. a) Explain bilinear transformations technique of FIR filter design.
    b) Obtain transfer function of 3-order Butterworth filter?

14. Explain design of practical sampling rate converter in detail.

15. Explain the architecture and instruction set of TMS 320C54XXDSP processor.

16. a) Compare various types of windows used in FIR filter design.
    b) Compare FFT and DFT with respect to multiplication and addition.

17. Write short notes on the following:
    a) Application of multirate signal processing.
    b) Realisation of filters.

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Code No.2123/BL

FACULTY OF ENGINEERING

B.E.(I.T.) I – Semester (Backlog) Examination, October 2020

Subject: Design & Analysis of Algorithms

Time: 2 Hours **Max. Marks: 75**

PART- A

Answer any Seven question. **(7 x 3 = 21 Marks)**

1 Write about min-heap with an example.

2 Write the control abstraction of divide and conquer approach.

3 State the Job sequening wit deadline problem.

4 Differentiate between feasible and optimal solution.

5 What is the graph coloring problem?

6 State Cook's theorem.

7 What are non-deterministic algorithms? Give example.

8 Write the algorithm for weighted union.

9 Define Optimal Binary Search Tree.

10 Differentiate between explicit and implicit constraints.

PART- B

Answer any Three question. **(3x18 = 54 Marks)**

11 a) Write the algorithm for inserting an element in the MAX heap.
b) Define Big-Oh, Omega and Theta Notations with examples.

12 Write an algorithm for quick sort and explain with an example.

13 Calculate an optimal solution for the following instance of 0/1 Knap Sack problem: n=5, (P1,P2, P3, P4, P5) = (10,15,6,8,4), (W1, W2, W3, W4, W5) = (4,6,3,4,2), m=12.

14 a) Explain the 8-queens problem and how backtracking can be used to solve it.
b) Explain the control abstraction of LC search.

15 a) Explain node cover decision problem with an example
b) Explain the max clique decision problem with an example.

16 a) Explain Greedy algorithm to find MST with an example.
b) Write an algorithm for DFS traversal with an example.

17 Write short notes on
a) Randomized algorithms
b) Travelling Salesman problem

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