FACULTY OF ENGINEERING
B.E. (Prod.) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Tool Design

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

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. What are the characteristics of cutting tool materials?
2. List the common abrasive materials used in USM.
3. What is LASER? List the advantages of LBM.
4. What are the different tool holding devices in drilling machine?
5. Name drill bit materials. Which material is mostly used?
6. What is a double angle milling cutter?
7. What are the different elements of an ordinary cut broach?
8. What are the different types of reamers commonly used?
9. Outline the principles of jigs and fixtures design.
10. Why power devices are used in clamping?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. Sketch and explain the process of EDM in detail mentioning its applications.

12. (a) Classify the super finishing processes, and explain any two of them in detail.

    (b) Name various cutting tool materials. Briefly describe one important tool material along with its usability.

13. (a) Explain briefly the design considerations of flat and circular form tools.

    (b) Explain the geometry of Internal and External broaches.

14. Explain the design and manufacturing of twist drill and also the effect of variation of different angles on torque and thrust forces.

15. (a) What is a tap? How tap nomenclature is described?

    (b) Explain briefly about the geometry and reaming allowance.

16. (a) Explain the principle of location and advantages of jigs and fixtures.

    (b) Explain the types of clamps used with jigs and fixtures.

17. Write short notes on the following:

    (a) Redundant location, fool proofing.

    (b) Locating guide lines.

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FACULTY OF ENGINEERING
BE (A.E) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Automotive Air Conditioning

Time: 3 Hours   **Max marks: 70**

(Missing data, if any may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Represent the following lines on psychometric chart
   a) Dew point Temperature
   b) Wet Bulb Temperature
   c) Relative humidity lines
2. Define Dew point temperature
3. What is means by Apparatus Dew Point Temperature?
4. Define Room Sensible Heat factor
5. What are the functions of Accumulator?
6. What are various types of Condenser?
7. Define Critical Vapour Pressure
8. What are Desirable properties of Ideal Refrigerants?
9. What is Servicing of the Air-Conditioners?
10. What are different types of Ducts?

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11. The atmospheric air at 40°c dry bulb temperature and 18°C wet bulb temperature is flowing at the rate of 100m³/min through the space. Water at 18°C is injected into the air stream at the rate of 48kg/hr. Determine the specific humidity enthalpy of the leaving air, Also determine the dry bulb temperature, wet bulb temperature and relative humidity of the leaving air

12. Explain the Adiabatic Mixing of two air streams and derive the equations of it

13. An Air Conditioning plant is required to supply 60m³ of air per min at a DBT of 21°C and 55% RH. The outside air is at DBT of 28°C. and 60% RH. Determine the mass of water drained and capacity of the cooling coil. Assume the air conditioning plant first to dehumidify and them to cool the air.

14. How the variable displacement compressor works? Explain in detailed with neat sketch

15. a) How the Refrigerants are classified ?
    b) Give the properties of following Refrigerants i) R-11   ii) R-12.   Iii) R-134a

16. What is Automatic Temperature Control? And explain with schematic drawing

17. a) What are various methods of Leak Detection explain them
    b) Draw the various lines of the Psychometric and Name them

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FACULTY OF ENGINEERING
B.E. (CSE) VII - Semester (CBCS) (Backlog) Examination, March / April 2022
Subject: Compiler Construction

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

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1 Define Boot strapping.
2 List out the data structures of compiler.
3 Eliminate left recursion for

    $E \rightarrow E + T / T$
        $T \rightarrow T * F / F$
        $F \rightarrow (E) / id$

4 Find First and Follow for

      $S \rightarrow A a$
        $A \rightarrow BD$
        $B \rightarrow b / \in$
        $D \rightarrow d / \in$

5 Define Bottom-up parser.
6 What is YACC? Explain syntax.
7 What is Type checking?
8 Define Synthesized attribute with example.
9 Write Quadruple notation for: $- a * b + - a * b$.
10 Define Symbol Table.

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11 (a) What are phases of compiler? Explain phases in detail. Write the
      output of each phase for : Position = initial + rate $*$ 60.
    (b) Write short notes on Regular Expressions.

12 (a) Construct predictive – parser for :
        $E \rightarrow E + T / T$
          $T \rightarrow T * F / F$
          $F \rightarrow (E) / id$
    (b) Write steps for constructing predictive parser.

13   Constrict CLR for :
        $S \rightarrow CC$
          $C \rightarrow a C$
       $C \rightarrow d$

14 (a) Explain static Run-time Environment in detail.
    (b) Differentiate between synthesized and Inherited attributes.

15   Explain Data – Flow Analysis in detail.

16 (a)Explain Code-generation of logical Expression.
    (b)Explain Code-generation of procedure and function calls.

17 Write short notes on:
      (a) Problems in Top-Down parser
      (b) Ambiguous grammar
      (c) Type checking

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FACULTY OF ENGINEERING
B.E. (IT) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Very Large - Scale Integration Design
Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Draw the VLSI Chip design hierarchy.
2. Sketch pFET AOI circuit and pFET OAI circuit using pFET rules for the following.
   $$X = \overline{(a \cdot b) + (c \cdot d)}$$
   $$Y = \overline{(a + e) \cdot (b + f)}$$
3. How latch up problems in CMOS logic is eliminated?
4. What is latch up in CMOS logic? Give its prevention techniques.
5. Mention the different layers are used in VLSI design for drawing the layout and their colors.
6. Explain how Propagation Delay is estimated for an Inverter Switching Case.
7. Write two salient features and two drawbacks of Complementary Pass- Transistor Logic (CPL) approach.
8. What is EPROM? How it is different from EPROM.
9. Suppose a signal delay on an interconnect of length 4011m is known to be 0.12ps. If the line is increases to 1001.1m. What is the signal delay?
10. What is an Initialization vector in CMOS testing? How does this overcome mission a fault in testing?

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Explain the operation of NMOS transistor and derive its current equation in linear region.
    (b) Design 4 to 1 multiplexer using transmission gate logic.

12. (a) What are the different types of layers that are present in a MOSFET?
    (b) How to obtain series and parallel transistor structures in complex logic circuits?

13. Explain the CMOS process flow in the fabrication process.

14. (a) Write Verilog code (a) Explain the operation of dynamic CMOS logic circuit with an example.
    (b) Describe the operation modes of basic SRAM cell.

15. (a) Draw a 2 input XOR-XNOR logic Gate using differential cascade voltage switch logic and explain its operation.
    (b) Explain Read and write operation of 6T's RAM cell.

16. (a) Explain about behavioral and RTL Model.
    (b) Write a behavioural description of D-Flip-Flop.

17. Explain briefly about
    (a) Difference between active contact and via contact.
    (b) Photo Lithography.

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FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I - Semester (NON-CBCS) (Backlog) Examination,

March / April 2022

Subject: Power System Operation & Control

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

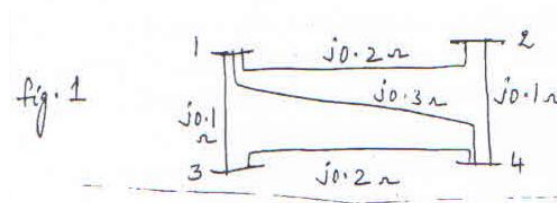### (Missing data, if any, may be suitably assumed)

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

PART – A (25 Marks)

1　For the system show in figure 1 find Y-Bus?

2　Explain the importance of slack bus in load flow studies.
3　What are the assumptions made in deriving B_{mm} coefficient?
4　Define:
　　i)　Incremental fuel rate
　　ii)　Incremental efficiency of a unit of Thermal power plant.
5　List out the advantages of pool operation.
6　What is coherency? Explain
7　Define steady state stability limit of a power system network.
8　A 50 HZ, 4 pole turbo generator rated 100 MVA, 11kV has an inertia constant of 80MJ/MVA. If the mechanical input is suddenly raised to 80 MW for an electrical load of 50 MW, find rotor acceleration. Neglect losses.
9　Classify FACTS controllers.
10　What is reactive power compensation?

PART – B (5 x 10 = 50 Marks)

11　For the system of figure 2. Find the voltages at the receiving end bus at the end of the first iteration. Load is 2 + j0.8 pu Voltages at the receiving end bus at the end of the first is 1.0 – j4.0pu. Transformer reactance is j0.4 pu. Off nominal turns ratio is 1/1.04. Use Gauss Seidel method. Assume VR = 1 Angle of 0^0.


Fig.2

12　The losses in the lines shown in below Figure 2 are proportional to the square of the Power flow. Both units are loaded at 250 MW. Due to transmission loss 12.5MW of power is lost, where should the extra 12.5 MW be generated for economic operation? Attempt a rescheduling to minimize the transmission loss.

..2
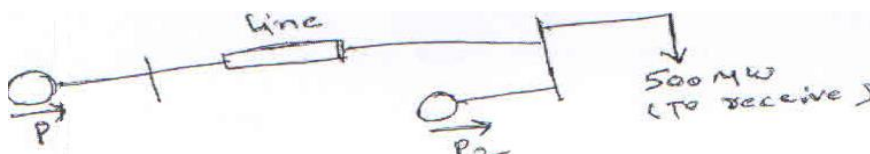
Give that line loss = .0002 p², w;
F1(p1) = F2(p2) = 400 + 7p + .002p² and

$$P_1 \begin{bmatrix} \text{min} = 70MW \\ \text{max} = 400MW \end{bmatrix} \text{and } P_2 \begin{bmatrix} \text{min} = 70MW \\ \text{max} = 400MW \end{bmatrix}$$

13 a) Explain the terms: i) Flat frequency control ii) Flat tie-line control.
   b) Two generators rated 200 MW and 400 MW are operating in parallel. Thedroop characteristics of their governors are 4% and 5% respectively. From noload to full load the speed champers are so set. That they operate at 50 Hz. Sharing a load 600 MW in the ratio of their ratings. If load reduces to 400 MW how will it be shared among the generators and what will be the system frequency.

14 a) Explain the reactive power generation by synchronous generators.
   b) Wa=hat are the basic FACTS controllers and with neat diagram explain the working of UPFC?

15 a) Derive expressions for economic distribution of load between generating units considering effect of transmission losses.
   b) What is equal area criterion? Discuss its application and limitations in the study of power system stability.

16   Determine the voltages at all the buses of the network show in below figure Use Gauss
      seidel method.
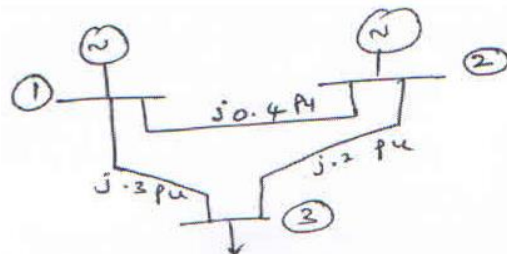
Bus 1: Slack Bus, $V = 1.05\angle 0^0$ p.u $Bus2 : PVBus, |V| = 1.0 p.u, pg = 3.p.u$
Bus 3: PQ Bus, PL = 4 p.u : QL = 2.p.u.

17 Write short notes on the following:
   a) Step by step solution of Swing equation.
   b) Draw the flow chart for a fast–decoupled load flow method.

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FACULTY OF ENGINEERING
B.E. 4/4 (EIE) I – Semester (NON-CBCS) Examination, March / April 2022

Subject: Analytical Instrumentation

Time: 3 Hours   Max marks: 75

(Missing data, if any, may be suitably assumed)

Note: Answer All questions from Part-A & any Five questions from Part-B.
PART – A (25 Marks)

1. Explain the various regions of electromagnetic radiation

2. Define PH.

3. Define Spectrophotometer

4. What is Globar?

5. What are the various detectors used in GC?

6. What is the difference between colorimeter and spectrophotometer?

7. Explain NMR principle

8. What is selective ion electrode?

9. Write a short on conductivity meter.

10. Define molar absorptivity.

PART – B

Note: **Answer any five questions**.   **(5 x 10 = 50Marks)**

11 Explain FT-IR spectroscopy in detail. Also explain the types of IR spectroscopy.

12 a) Explain in detail magnetic deflection mass spectrometer.
   b) Discuss about sources of errors in spectrophotometer.

13 a) With the help of diagram, explain conductivity meter.
   b) Explain PH meter with relevant diagram.

14 a) With the help of a mathematical equation, explain Beer Lambert's Law.
   b) What are the limitations of Beer Lambert's Law?

15 a) With a neat diagram, explain thermal conductivity analyzer.
   b) With a neat diagram, explain Infra-red gas analyzer.

16 Explain electrodes used in PH measurement.

17 Write short notes on:
   a) Polar graph   b) NMR

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FACULTY OF ENGINEERING
BE 4/4 (A.E) I - Semester (NON-CBCS) Examination, March / April 2022

Subject: Automotive Pollution and Control

Time: 3 Hours   **Max marks: 75**

(Missing data, if any, may be suitably assumed)

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

PART – A (25 Marks)

1. List the Sources of Atmospheric Pollution from a Petrol Engine

2. What is meant by Particulates?

3. Define Scavenging

4. Define Octane number

5. How the Cetane Number play an important role in smoke formation?

6. What is mean by EGR? Write its significance

7. What is meant by Crankcase Ventilation?

8. What is importance of un-Leaded Petrol?

9. Write standards of Indian Emission measuring

10. Write short note FTP

PART – B (5 x 10 = 50 Marks)

11. Explain the various sources of I.C-Engines responsible of Emission and pollutant formation

12. Explain the effect of Design and Operating variables on Gasoline Engine exhaust emissions

13. a) Explain the Mechanism of NO_x formation in C.I Engine
    b) What crank case blowby? How it is controlled?

14. What are the different types Cranks Case Ventilation? Explain them with a neat sketch.

15. a) How the NDIR – Analyses works in determination of emissions? Explain with a neat sketch.
    b) Explain the Orsat Apparatus with neat sketch

16. Explain various Design and Operating Variables which effects the Emission of C.I Engines.

17. a) Explain about the Three-way Catalytic Converter with a neat sketch
    b) What are the types of Fuel Cell, Write a short note on them.

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FACULTY OF ENGINEERING
B.E 4/4 (Civil) I - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Structural Engineering Design and Detailing - II (Steel)

Time: 3 Hours   **Max marks: 75**

(Missing data, if any, may be suitably assumed)

Note: Answer All questions from Part-A & any three questions from Part-B.

PART – A (25 Marks)

1. Give the expression for economical depth of Plate girder.
2. What are the functions of end bearing stiffeners in plate girders?
3. Explain the terms web buckling and web crippling.
4. Sketch any three types of Web splice which are used commonly.
5. For a railway bridge with single track main line loading, what is the allowable impact factor?
6. Distinguish between deck and through type railway bridges.
7. What are the failure conditions of a Deck-Type Plate Girder and how is it resisted by providing safety factors
8. Explain flange curtailment with the help of a sketch.
9. List out the forces acting on a gantry girder.
10. Draw typical cross section of a through type plate Girder Bridge.

PART – B (50 Marks)
Note: Answer any three questions. Selecting any one from each unit.
UNIT – I (15 Marks)

11. Design a simply supported welded plate girder 26m span and laterally restrained throughout. It has to support an UDL of 120kN/m, throughout the span exclusive self-weight. Design the cross section of the girder without intermediate stiffness (Limit State Design). Design up to end bearing stiffeners with welded connection of flange and web.

OR

12. Design a welded plate girder of 20 m span with the following factored forces: Bending Moment = 4000 KN -m. Shear Force = 1100KN. Dimensions of web are 1600mm x 12 mm and flanges are 440mm x 32 mm thick. Design intermediate stiffeners. Adopt Fe 410 steel and use limit state method.

UNIT – II(15 Marks)

13. Design the cross section of a gantry girder for maximum BM for the following data:
Span of gantry girder = 10m
Crane capacity = 150 kN
Weight of crab = 60 kN
Total weight of crane girder = 100 kN
Span of crane girders = 16 m
Minimum approach of hook to the gantry gravity = 1m
Wheel base = 2m.   **..2**

OR

14. Design a rocker bearing for a bridge for following data:
    Total gravity load including impact = 720 kN
    Vertical load due to wind = 80 kN
    Lateral load due to wind = 60 kN
    Longitudinal force = 200 kN
    Compressive strength of concrete = 7 N/mm^2.

UNIT – III (20 Marks)

15. Design a Deck type Plate Girder Bridge for a single track B.G. Main line loading for the following data.
    Effective span of the bridge = 30 m
    Spacing of Plate Girders = 2m (C/C)
    EUDL-B.M. = 2800 kN: EUDL-S.F. = 3023 kN
    Design the stiffeners and connections, also draw neat sketches of design details.

OR

16. Design one top chord and one bottom chord of a Pratt truss having 5 panels of 5m each. Height of truss is 10. The truss is subjected to EUDL of 2000 kN per track.

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FACULTY OF ENGINEERING
B.E (Civil) I - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Structural Engineering Design and Drawing – II (Steel)

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

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1 Under what Conditions web buckling of plate girder take place?
2 Explain difference between bearing stiffener and other vertical stiffeners.
3 What are the loads acting on gantry girder? Explain with a neat sketch.
4 What is impact effect considered in design of plate girder bridge?
5 What is the condition for maximum bending moment in gantry girder?
6 Draw neat Sketches of (a) Rocker bearing   (b) Rocker and Roller bearing
7 Explain the different stresses to which bridge bearings are subjected.
8 State the guidelines for economical span of truss girder bridge.
9 Mention the advantages and disadvantages of deck type bridges.
10 In what respect plate girder differs from a compound beam.

PART – B (50 Marks)
Note: Answer any three questions. Selecting any one from each unit.
UNIT – I (15 Marks)

11. A simply supported welded plate girder of effective span 25m is laterally
     supported. The girder is subjected to the working UDL of 30KN/m excluding its
     self – weight. Design cross section of the girder. Stiffeners need not be
     Designed. Adopt Fe410 grade Steel and use Limit State method.

OR

12. A welded of plate girder effective span 22m is subjected to a UDL of 50KN/m
     including all the loads. The web is 1800mmx 10mm and the flange is 500mm x
     40mm. Design intermediate stiffner and end bearing stiffner. Adopt Fe410 steel
     and use limit state method.

UNIT – II (15 Marks)

13. Design a simply supported gantry girder for the following data: fix the cross-
    section check for moment capacity and buckling resistance only.
    Crane capacity 200KN
    Self – weight of crane excluding trolley 200KN
    Self – weight of trolley, electric motor, hook 50KN
    Approximate minimum approach of the crane to gantry girder 1.3m
    Wheel – base 3.25m
    c/c distance between gantry rail 14m
    c/c distance between columns 9m
    self – weight of rail section 320 N/m
    Diameter of crane wheel 150 mm
    Steel grade is Fe410.

OR

14. The effective span of plate girder deck type bridge for a single meter gauge track is 24m. The dead load impact load and live load is 900KN. The vertical reactions due to overturning effect of wind is 110KN. Design suitable bearings.

UNIT – III (20 Marks)

15. Design deck type plate girder bridge for single track broad gauge main line loading for following data.
    Effective span : 24m
    Spacing of plate girder: 2m c/c
    Fix the cross – section. Carry out the usual checks. Draw neat sketch. Take permissible stresses as per railway steel bridge code.

OR

16. Design top chord member for a through type truss girder for a railway bridge for the following data.
    EUDL for moment: 2700KN/track EUDL for shear: 2900KN/track
    Total self-weight: 500 KN/track
    Draw neat sketch of details, span of girder is 25m and it has 5 panels.

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