

FACULTY OF ENGINEERING

B. E. (Civil) (CBCS) VII – Semester (CBCS) (Main) Examination, December 2019

Subject: Structural Engineering Design and Detailing II (Steel)

Time: 3 hours

Max. Marks: 70

Note: Answer all questions from Part-A. Answer any THREE questions from Part-B choosing one question from each unit..
Use of IS 800 2007, Steel Tables & Bridge Codes is permitted.

PART – A (20 Marks)

1. What is web buckling? Explain briefly.
2. Under what conditions stiffeners are provided in plate girders.
3. Explain briefly about tension field action.
4. Draw neat sketches of different sections generally used for gantry girders.
5. What are the functions of rocker and roller bearings in bridges?
6. How are longitudinal and lateral loads calculated in gantry girders?
7. Explain about curtailment of flange plates in plate girders.
8. Explain about racking and tractive forces.
9. Differentiate between through type and deck type railway bridges.
10. In what respect plate girder differs from a compound beam.

PART – B (50 Marks)**Unit - I**

11. Design a simply supported welded plate girder 22m in span and laterally restrained throughout. It carries a UDL of 45 KN/m throughout the span exclusive of self weight. Design the cross section and weld connection between flanges and web. Use Fe 410 (E250) steel. Use limit state design. [15]

OR

12. Design a welded plate girder of 26m span. It supports a UDL of 30 KN/m throughout. Dimensions of web are 1800mm x 12mm and flanges are 500mm x 32mm thick. Design intermediate and end bearing stiffeners. Adopt Fe410 steel and use limit state method. [15]

Unit - II

13. A gantry girder has a span of 8m. Design the gantry girder for following data. Fix the cross section dimensions and carry out usual checks. Crane capacity = 300 KN. Weight of trolley = 50 KN, weight of hook = 10 KN, wheel base = 3m, span of crane girder = 16m, self weight of crane girder = 120 KN. Minimum hook approach = 1.2m. Adopt Fe 410 steel and use limit state method. [15]

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OR

14. Design a rocker cum roller bearing for a bridge for following data. Reaction due to DL+LL+IL = 850 KN, lateral load due to wind = 75 KN, longitudinal load = 250 KN. Compressive strength of concrete = 7 N/mm². [15]

Unit - III

15. Design a deck type plate girder for a railway bridge for broad gauge main line loading of EUDL of 2000 KN/track for BM and 1900 KN/track for SF. Effective span of girder is 24m. Design the cross section, end bearing and intermediate stiffeners. Draw neat sketch of cross section of the girder. [20]

OR

16. Design one top chord and one bottom chord of a pratt truss having 6 panels of 5m each. Height of truss is 7m. The truss is subjected to EUDL of 2200 KN per track. [20]

FACULTY OF ENGINEERING

B.E. VII-Semester (CBCS) (EEE) (Main) Examination, December 2019

Subject : Power System Operation and Control

Time : 3 Hours

Max. Marks: 70

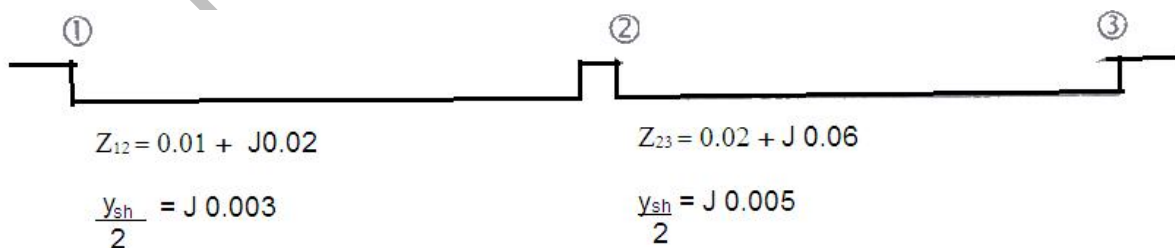
Note: Answer all questions from Part - A & answer any five questions from Part-B.

PART – A (10 x 2 = 20 Marks)

1. What is the size of the sub matrix "H" of the jacobian, if n_1 is the number of PV buses and n_2 the number of PQ buses?
2. What are the unknown at voltage-controlled bus?
3. Why a generator cannot operate above P_{max} explain?
4. What are the assumptions made in deriving B_{mn} coefficient?
5. What is coherency? Explain.
6. What is the necessity of maintaining frequency of a power system network within the strict limits?
7. A 50-Hz, 4-pole turbo generator of rating 20 MVA, 15.6 kV has an inertia constant of $H = 10\text{kW}\cdot\text{sec./KVA}$. Find the kinetic energy stored in the rotor at synchronous speed.
8. A 50 Hz, 4- pole turbo generator rated 100 MVA, 11KV has an inertia constant of 10MJ/MVA. Find the stored energy in the rotor at synchronous speed.
9. What is the effect of reactive power on voltage magnitude?
10. Draw and explain the operation of STATCOM.

PART – B (5 x 10 = 50 Marks)

11. (a) Explain FDLF method for n bus system with one slack bus and remaining as PQ buses.
(b) Find Y_{bus} for the system shown in fig. 1. 5+5



12. (a) Derive the necessary condition for economic operation of n -plants considering transmission losses. 5+5
(b) The incremental fuel costs of two units are

$$\frac{dC_1}{dP_1} = 0.1P_1 + 22 ; 20 \leq P_1 \leq 100 \text{ Mw} ;$$

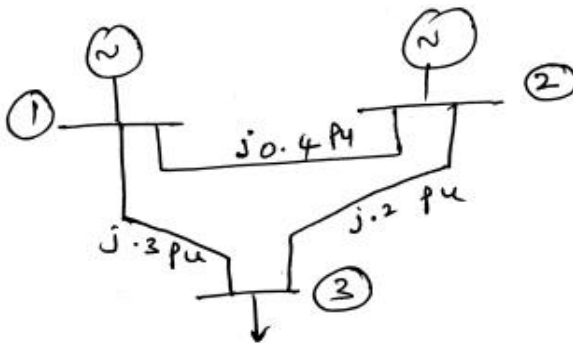
$$\frac{dC_2}{dP_2} = 0.12P_2 + 16 ; 20 \leq P_2 \leq 100 \text{ Mw}$$

Determine the economic load allocation between the units when the total load on

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the system is 160 Mw. C is in Rs/hr and P is in MW.

13. a) Explain the terms:
- Flat frequency control
 - Flat tie -line control.
- b) Two generators rated 200 MW and 400 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively. From no load to full load the speed changers are so set. That they operate at 50 Hz. sharing a load of 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) What are the basic FACTS controllers and with neat diagram explain the working of UPFC?
15. (a) Explain the reactive power generation by synchronous generators.
- (b) What are the basic FACTS controllers and with neat diagram explain the working of UPFC?
16. Determine the voltages at all the buses of the network shown in Fig. 2. Use Gauss seidel method.



Bus 1 : Slack Bus, $V = 1.05 \angle 0^\circ$ p.u

Bus 2 : PV Bus, $|V| = 1.0$ Pu, $P_g = 3$.Pu

Bus 3 : PQ Bus, $P_L = 4$ Pu : $Q_L = 2$. P.u.

17. Write short notes on the following:
- Tie line bias control.
 - Advantages and disadvantages of series compensation.
 - Dynamic response of single area system.

FACULTY OF ENGINEERING**B.E VII-Semester (CBCS) (EIE) (MAIN) Examination, December 2019****Subject: Opto-Electronic Instrumentation****Time:3 Hours****Max.Marks:70****Note: Answer all questions from Part-A & any five questions from Part -B****PART – A (10 x 2 = 20 Marks)**

1. In a two energy level system transition of higher to lower energy levels with emit wave of 350 nm, Calculate the ratio of the population of two energy level at 27°C, with wave given $g_1 = g_2$
2. Write the methods of excitation.
3. Give the principle of laser interferometer.
4. Discuss the industrial applications of laser.
5. Write the equations of numerical aperture acceptance angle and critical angle.
6. List the fibre fabrication techniques.
7. Write the classification of fibre optic sensor.
8. Explain liquid level measurement using optical fibre.
9. Draw the characteristics of solar cell.
10. Define LED and list its types.

PART – B (5 x 10 = 50 Marks)

- | | |
|--|----|
| 11. Explain the ND-YAG laser in detail. | 10 |
| 12. Explain about Laser Interferometer. | 10 |
| 13. Explain any three types of fibre fabrication and manufacturing techniques. | 10 |
| 14. Write short notes on temperature, voltage and liquid level measurement using optical sensor. | 10 |
| 15. Explain using suitable block diagram about LED and PLASMA display. | 10 |
| 16. a) List the methods of Q switching and explain any one in detail. | 5 |
| b) Explain biomedical applications of laser in detail. | 5 |
| 17. a) Explain about electric arc fusion splicing with the help of suitable diagram. | 5 |
| b) Explain measurement of Acceleration and Pressure level with the help of suitable diagram. | 5 |

FACULTY OF ENGINEERING**B.E (ECE) VII-Semester (CBCS) (Main) Examinations, December 2019****SUBJECT: VLSI Design****Time: 3 Hours****Max Marks: 70****Note:** Answer all Questions from PART –A and any five Questions from PART-B.**PART-A (10 X 2 = 20 Marks)**

1. Draw the I_{ds} versus V_{ds} curves for an N-channel Enhancement mode MOSFET (2)
2. What is latch -up effect in CMOS and how to prevent it. (2)
3. Why a good design should follow lamda based design rules. (2)
4. Define sheet resistance? Give Equation. (2)
5. Compare DRAM with SRAM. (2)
6. Draw the logic implementation of NOR based ROM. (2)
7. Draw CMOS D-latch. (2)
8. What is the need for testing and BIST. (2)
9. Draw the small signal model of a common gate amplifier with current Mirror load. (2)
10. Give the expression for the output impedance of a source degenerated Current mirror. (2)

PART-B (5 X 10 = 50 Marks)

- 11 a) Derive the drain current for n-channel enhancement MOSFET operating in Non-Saturation and Saturation regions of operations. (6)
- b) Define the term threshold voltage of MOSFET and explains its significance. (4)
- 12 a) Draw the stick and layout diagram for the given function $f = (A+B)*C$ (4)
- b) Determine the pull-up to pull-down ratio of NMOS inverter driven through one or more pass transistors. (6)
- 13 a) Explain the design and operation of a barrel shifter. (5)
- b) Explain the read and write operation of 6T SRAM cell. (5)
- 14 a) Explain the behaviour of Bi-stable elements and clocked latch. (5)
- b) What are the layout design for improved Testability. (5)
- 15 a) Derive the expression for the o/p current of a basic BJT current mirror. (5)
- b) Explain the characteristic of common source amplifier with neat diagram. (5)
- 16 a) Calculate gate capacitance value of $5\mu\text{m}$ technology with relative minimum sized transistor with gate to channel capacitance value of $4 \times 10^{-4} \text{pF}/\mu\text{m}^2$ (5)
- b) Draw the stick and layout diagram of 3 input CMOS NOR gate. (5)
17. Write short notes on any two: (10)
 - a. 3T DRAM cell.
 - b. Operation of MOS transistor with various loads.
 - c. VLSI Design flow.

FACULTY OF ENGINEERING
B.E VII Semester (CBCS) (Mech.)(Main) Examination, December 2019

Sub: Thermal Turbo Machines

Time: 3 Hours

Max Marks: 70

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

PART – A (20 Marks)

1. Explain Mach cone and Mach angle.
2. Explain stagnation pressure and stagnation temperature.
3. Explain critical velocity of sound.
4. What is a shock Wave?
5. What is the classification of Rotary compressors?
6. Explain surging and choking in compressors.
7. Explain degree of reaction in reaction turbine.
8. What is compounding in steam turbines?
9. What are the uses of gas turbine?
10. Explain propulsive efficiency.

PART – B (5 x 10 = 50 Marks)

11. (a) What is Rayleigh line? Explain with diagram. (4)
 (b) Air flowing in a duct has a velocity of 300 m/s, pressure 1 bar and temperature 290 K. Take $\gamma = 1.4$, $R = 287 \text{ J/kgK}$. Determine
 (i) Stagnation temperature, stagnation pressure
 (ii) Velocity of sound in dynamic and stagnation conditions
 (iii) Stagnation pressure assuming constant density. (6)
12. A circular duct passes 8.25 kg/sec of air at an exit Mach number of 0.5. The entry pressure and temperature are 3.45 bar and 38°C respectively and the coefficient of friction is 0.005. If a Mach number at entry is 0.15, determine
 (i) diameter of duct
 (ii) length of the duct
 (iii) Pressure and temperature at exit
 (iv) Stagnation pressure loss. (10)
13. A centrifugal compressor delivers 16.5 kg/s of air with a total head pressure ratio of 4:1. The speed of the compressor is 15000 rpm. Inlet total head temperature is 20°C , Slip factor 0.9, Power input factor 1.04 and 80% isentropic efficiency. Calculate
 (i) Overall diameter of the impeller
 (ii) Power input (10)
14. A simple impulse turbine has a mean blade speed of 200 m/s. The nozzles are inclined at 20° to the plane of rotation of the blades. The steam velocity from nozzles is 600 m/sec. The turbine uses 3500 kg/hr of steam. The absolute velocity at exit is along the axis of the turbine. Determine
 (i) The inlet and Exit angles of the blades.
 (ii) The power output of the turbine
 (iii) The diagram efficiency. (10)

15. A gas turbine unit receives air at 1 bar and 300 K and compresses it adiabatically to 6.2 bar. The compressor efficiency is 88%. The fuel has a heating value of 44186 kJ/kg and the fuel air ratio is 0.017 kL/kg of air. The turbine internal efficiency is 90%. Calculate the work of turbine and compressor per kg of air compressed and thermal efficiency.
For products of combustion $C_p = 1.147$ kJ/kgK and $\gamma = 1.333$ (10)
16. (a) Explain Ram jet with figure. (5)
(b) Explain Rocket engine with figure. (5)
17. (a) Explain Delaval turbine. (5)
(b) Explain Open cycle gas turbine cycle. (5)

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FACULTY OF ENGINEERING

BE VII – Semester (Prod) (CBCS) (Main) Examination, December 2019

Subject: Tool Design

Time: 3 Hours

Max. Marks: 70

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

PART – A (2 x 10 = 20 Marks)

- 1 How does orthogonal cutting differ from oblique cutting?
- 2 State the need of chip breaker?
- 3 What are the sources of heat in metal cutting?
- 4 Differentiate between single point and multi point cutting tools?
- 5 What are the requirements of good tool material?
- 6 What are the properties and applications of High Speed Steel?
- 7 What is the effect of excessive die clearance?
- 8 What is meant by strip layout?
- 9 Define and draw twist drill?
- 10 What is meant by 3-2-1 principle of location?

PART – B (5 x 10 = 50 Marks)

- 11 (a) Draw and explain about Merchant's force diagram?
(b) Write about different type of chip formation during cutting?
- 12 (a) What is meant by Tool signature? Explain Tool nomenclature in American Standard Association System.
(b) Explain Economics of Machining?
- 13 (a) What is meant by Machinability and how it is evaluated?
(b) What are the basic requirements of the cutting tool? Discuss about various types of cutting tools used in the machining of various metals?
- 14 (a) What is cutting fluid? State the basic requirements of cutting fluid?
(b) Explain the classification and coding of Carbide tools?
- 15 (a) Write short notes on Blanking and Piercing?
(b) Explain about drawing and deep drawing?
- 16 (a) Define Jig and Fixture? State the difference between them?
(b) What are the different types of clamps? Describe any two in detail?
- 17 (a) Explain about the cutting action of broach?
(b) State design considerations of single point cutting tool?

FACULTY OF ENGINEERING
BE VII semester (CBCS) (A.E.)(Main) Examination, December 2019

Subject: Automotive Air Conditioning

Time: 3 Hours

Max. Marks: 70

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

PART – A (10 x 2 = 20 Marks)

1. Define dew point temperature and wet bulb depression.
2. Indicate the humidification and adiabatic dehumidification processes on psychometric chart.
3. What is the significance of bypass factor?
4. Define grand sensible heat factor.
5. What are the functions of thermostatic expansion valve?
6. Draw the schematic diagram of Vapour compression refrigeration system.
7. Name the refrigerants used in domestic refrigerators and Air-conditioners.
8. What is the need of heater system in automotive vehicles?
9. What are the functions of air routing systems?
10. What are the factors for selecting refrigerant pipe size?

PART – B (5 x 10 = 50 Marks)

11. The atmospheric conditions are at 30°C and specific humidity of 0.0125 kg/kg of dry air. Calculate the followings
 - (i) Partial Pressure of vapour
 - (ii) Relative Humidity
 - (iii) Dew point Temperature and
 - (iv) Enthalpy of air. Take atmospheric Pressure = 756 mm of Hg.
12. A hall is to be maintained at 24°C DBT and 60% RH under the following conditions:
Outside conditions = 38° C DBT and 28°C WBT
Sensible heat load in the room = 46.4 kW
Latent heat load in the room=11.6kW
Total infiltration air = 1200 m³/hr
Apparatus dew point temperature = 10°C
Quantity of recirculated air from the hall = 60%
If the quantity of recirculated air is mixed with the conditioned air after the cooling coil, find the following:
 - a) The condition of air leaving the conditioner coil and before after mixing with the recirculated air.
 - b) The condition of air before entering the hall
 - c) The mass of air entering the cooler.
 - d) The mass of total air passing through the hall;
 - e) The by-pass factor of the cooling coil; and
 - f) The refrigeration load on the cooling coil in tonnes of refrigeration.
13. a) Explain the calibration procedure for expansion valve in an air conditioning system.
b) Give the comparison between air cooled and water-cooled condenser.

14. (a) Give a brief classification of refrigerants with suitable examples.
(b) Differentiate between manually controlled and automatic control air conditioning system.
15. a) Describe the various manually controlled and automatic control air conditioning system.
b) When overhauling a compressor, what all parts should be checked and how?
16. (a) With the help of psychometric chart explain the processes humidification and adiabatic humidification.
(b) Explain the working principle of evaporator temperature regulator.
17. Write a short notes on the following
 - a) Selection of refrigerants
 - b) Trouble shooting of an air conditioning system.

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FACULTY OF ENGINEERING

BE VII Semester (CSE) (CBCS)(Main) Examination, December 2019

Subject: Compiler Construction

Time: 3 hours

Max. Marks: 70

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

PART – A [Marks: 20]

- | | | |
|----|--|---|
| 1 | Define the terms Language Translator and compiler. | 2 |
| 2 | Write short notes on Bootstrapping and Porting. | 2 |
| 3 | Define left recursion. Is the following grammar left recursive?
$E \rightarrow E+E \mid E^*E \mid a \mid b$ | 2 |
| 4 | Define Handle and handle pruning? | 2 |
| 5 | Write LR(0) items for $A \rightarrow (A) \mid a$ | 2 |
| 6 | Explain the error recovery strategies in syntax analysis. | 2 |
| 7 | Define static allocations and stack allocations. | 2 |
| 8 | Define a syntax-directed translation? | 2 |
| 9 | What are basic blocks and flow graphs? | 2 |
| 10 | What are the properties of optimizing compilers? | 2 |

PART – B [5 x 10 = 50 Marks]

- | | | |
|-----|--|---|
| 11 | a) What is an ambiguous grammar? Give example. | 3 |
| | b) What are the phases of the compiler? Explain the phases in detail.
Write down the output of each phase for the expression
$a: = b + c * 50$ | 7 |
| 12. | a) Enumerate the rules for computing FIRST() and FOLLOW(). | 4 |
| | b) Define an LL(1) grammar. Is the following grammar LL(1).
$S \rightarrow iEtS \mid iEtSes \mid a$
$E \rightarrow b$ | 6 |
| 13. | a) Check whether the following grammar is SLR (1) or not. Explain your answer with reasons.
$S \rightarrow L = R \mid R$
$L \rightarrow *R \mid id$
$R \rightarrow L$ | 5 |
| | b) Construct an LR(1) parsing table for the following given grammar
$S \rightarrow XX$
$X \rightarrow aX$
$X \rightarrow b$ | 5 |
| 14. | a) What are different storage allocation strategies? Explain. | 5 |
| | b) Discuss in detail about the run time storage arrangement. | 5 |

15. a) Construct a DAG for the expression: $a+a*(b-c)+(b-c)*d$ 4
b) Explain the following with example: 6
i) Quadqaples
ii) Triples
iii) Indirect triple
16. a) Discuss the various issues in the code Generation. 5
b) What is LEX? Discuss the usage of LEX in Lexical Analyzer generation. 5
17. Write Short Notes on any two of the following 5+5
a) LALR(1)
b) Peephole optimization
c) symbol table organizations

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FACULTY OF ENGINEERING**B.E. (I.T) VII – Semester (CBCS) (Main) Examination, December 2019****Subject: VSLI Design****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions form Part-A and any five questions from Part-B****PART – A (10x2 = 20 Marks)**

1. Explain how a MOSFET works as a switch. (2)
2. Write about the FET threshold voltages. (2)
3. Draw full adder using half adder (2)
4. Write about the layers used to create MOSFET. (2)
5. Write in brief about the stick diagrams? (2)
6. Draw the layout of series and parallel connected FETs. (2)
7. Explain with a diagram Tri State circuit. (2)
8. What is propagation delay and write the expression for the same? (2)
9. Write the verilog code of SR Latch. (2)
10. Write in brief about testing (2)

PART – B (5x10 = 50 Marks)

11. (a) Derive the expression for resistance and capacitance using FET RC model. (5)
- (b) Illustrate bubble pushing using De Morgan's Law. (5)
12. (a) Draw the layout of $f = \overline{a + bc}$. (5)
- (b) With a neat diagram explain CMOS process flow for fabrication. (5)
13. (a) Draw and explain the DC Characteristics of CMOS inverter. (5)
- (b) With the help of a neat diagram write about cell concepts and cell based design. (5)
- 14 (a) Explain read and write operation of DRAM cell. (5)
- (b) Explain the precharge and evaluation mode of operation in Dynamic CMOS logic circuits. (5)
15. (a) What is an interconnect? Derive the delay modeling of an interconnect. (5)
- (b) Write the verilog code for master slave D flip flop. (5)
16. (a) Write about high speed adders. (5)
- (b) Explain the charge leakage in C²MOS. (5)
17. (a) Design a 8:1 Multiplexer using transmission gate 2:1 Mux. (5)
- (b) Write about RTL and Behavioral modelling. (5)

FACULTY OF ENGINEERING**B.E.4/4 (Civil) I-Semester (Backlog) Examination, December 2019****Subject : Structural Engg. Design and Detailing-II (Steel)****Time: 3 Hours****Max. Marks: 75**

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

Choosing one Question from each Unit

Part –A (2.5 x 10 = 25 Marks)

- 1 Under what circumstances plate girders are used instead of rolled steel beams.
- 2 How do you estimate the self weight of a plate girder.
- 3 Briefly explain about proportioning of web in plate girders.
- 4 Explain the condition to be considered for finding maximum shear force in the design of gantry girder.
- 5 List out the various loads and forces acting on a gantry girder.
- 6 List out the stresses developed in bearings provided in bridges.
- 7 Differentiate between through type and deck type railway bridges.
- 8 Draw a figure showing the elevation of a deck type plate girder bridge.
- 9 Explain about curtailment of flange plates.
- 10 Draw a neat sketch of a rocker and roller bearing

Part –B (50 Marks)**Unit-I**

- 11 Design a welded plate girder, simply supported to carry a superimposed distributed load of 50kN/m. In addition to this the girder supports two concentrated loads of 600kN each on the top flange at 5m from ends. The effective span of the girder is 15m. The compression flange of the girder is laterally supported. End bearing stiffeners need not be designed use Fe410 steel. Use limit state design. 15

OR

12. Design a welded plate girder of 20m span using the tension field action method. For the following factored forces. Maximum factored Moment $M_z = 5000\text{kN-m}$. Maximum factored shear force = 900kN the girder is laterally restrained connections and end bearing stiffeners need not be designed use Fe410 steel. Use limit state design. 15

Unit-II

13. Design a gantry girder to be used in an industrial building carrying an electric overhead travelling crane for the following data. Crane capacity = 200kN, self weight of the crane girder excluding trolley=200kN self weight of the trolley, electric motor, hook etc = 40kN, Approximate minimum approach of the crane hook to the gantry girder = 1.2m Wheel base = 3.0m, center to center distance between gantry rails = 20m. centre to centre distance between columns = 8m, self weight of rail section = 300N/m. yield stress of steel = 250N/mm². 15

OR

14. Design a suitable bearing for a plate girder of span 20m. The dead load, live load and impact load reaction is 800kN the vertical reaction due to effect of wind at each end of the girder is 120kN. Assume the permissible stresses suitably. 15

Unit-III

15. Design a deck type plate girder bridge for single track broad guage main line loading for the following data effective span=26m

Spacing of plate girders=2m c/c

Fix up the cross section. Carry out the usual checks. Draw a neat sketch. Take permissible stresses as per railway steel bridge code.

20

OR

16 A through type Pratt truss girder bridge on broad guage main line (single track) has a span of 50m. Find the forces in any one top chord member and one web member due to DL, LL and impact load (sway bracing and portal bracing effects need not be considered)

20

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FACULTY OF ENGINEERING**B. E. 4/4 (EEE) I Semester (Backlog) Examination, December 2019****Subject: Power System Operation and Control****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 the expression for static load flow equations. [3]
2. Why are decoupled load flow methods simpler and faster? [3]
3. State the condition for economic sharing between generators in a system where losses are neglected. [2]
4. Define and draw fuel cost and incremental fuel cost curves. [2]
5. What is the purpose of fly ball governor in speed governing system. [3]
6. Plot the dynamic response of load frequency controller of an isolated system with and without integral control action. [3]
7. Comment on First swing stability. [2]
8. What are the advantages and limitations of Equal Area Criterion? [3]
9. How are voltage in system and reactive power interrelated? [2]
10. Plot the operating characteristics of STATCOM. [2]

PART – B (5 x 10 = 50 Marks)

11. a) How can a phase shifting transformer be modeled for load flow studies? [3]
b) Explain the Newton-Raphson method in polar form with the help of a flowchart and necessary equations. [7]
12. a) List various equality and inequality constraints of the economic scheduling problem. [3]
b) Incremental cost of two units in a plant are:

$$IC_1 = 0.78P_1 + 150 \text{ Rs/M Whr}; \quad IC_2 = 0.92 P_2 + 120 \text{ Rs/M Whr.}$$

Where P_1 and P_2 are power output in MW. Assume that both the units are operating at all times. Total load varies from 50 to 220 MW and the minimum and maximum loads on each unit are 20 and 120 MW respectively. Find the incremental cost and optimal allocation of loads between the units for various total loads and furnish the results in a graphical form. [7]

13. a) Define control area and Area control error. [3]
b) Give a detail account of steady state and dynamic performance of the LFC system of a single area power system. [7]
14. a) Explain the stability of the system when there is a fault at midpoint of a single machine connected to infinite bus, and the power is restored after the fault is cleared, by using Equal Area criterion. [5]
b) A 50 Hz synchronous generator is connected to an infinite bus through a line. The pu reactance of generator and the line are $j0.3$ pu and $j0.2$ pu. respectively. The generator no load voltage is 1.1 pu. And that of the infinite bus is 1.0 pu. The inertia constant is 3.0 MW-sec/MVA. Determine the frequency of natural oscillations if the generator is loaded to 75% of its maximum power. [5]

15. Give the relation between voltage and reactive power in a system. Explain any one method of voltage control. [10]
16. a) Explain the differences between SVC and STATCOM. [5]
b) Compare various load flow methods in different aspects of their abilities. [5]
17. Write short notes on: [10]
a) Load frequency of isolated power system.
b) Autoreclosures

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FACULTY OF ENGINEERING

B.E. 4/4 (INST) I-Semester (Backlog) Examination, December 2019

Subject : Analytical Instrumentation

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A & answer any five questions from Part - B.**PART – A (10 x 2 = 25 Marks)**

- 1) Define molar extinction coefficient. [2]
- 2) What is the difference between colorimeter and spectrophotometer? [3]
- 3) What is the principle of absorption instruments? [3]
- 4) Draw the diagram of magnetic deflection mass spectrometer. [2]
- 5) Write a short note on calomel electrode. [3]
- 6) Define diffraction grating. [2]
- 7) Enlist any two-air pollutants with their sources. [3]
- 8) Why high vacuum is essential for mass spectrometer? [2]
- 9) Write the principle of thermal conductivity meter. [3]
- 10) Define electrochemical cell. [2]

PART – B (5 x 10 = 50 Marks)

11. With the help of a block diagram, explain the double beam spectrophotometer. [10]
12. a) Describe chemically sensitive semiconductor devices. [5]
b) Explain Selection ion electrode. [5]
13. Draw the block diagram of NMR and explain it in detail. [10]
14. Discuss interference filters and explain how diffraction grating can be used as monochromator. [10]
15. a) Explain Quadrapole mass spectrometer. [5]
b) Explain the operation of pH meter with schematic diagram. [5]
16. a) Explain sample handling techniques in detail. [5]
b) Write about water pollution monitoring instrument. [5]
17. Write a short note on
a) Thermal Conductivity meter
b) Amino acid analyser. [10]

FACULTY OF ENGINEERING
B.E 4/4 (ECE) I-Semester (Backlog) Examination, December 2019

Subject: MICROWAVE ENGINEERING

Time: 3 Hours

Max. Marks: 75

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

Part-A (25 Marks)

1. Mention the advantage of wave guide propagation over other propagation methods. (2M)
2. List the applications of Cavity Resonator. (2M)
3. A Rectangular Wave guide with dimension 3x2 cms operates in the TM_{11} mode at 10GHz. Determine the characteristic impedance of wave guide. (3M)
4. What is a Scattering Matrix? List the properties of S-Matrix. (3M)
5. Differentiate between Reciprocal & Non-Reciprocal Devices. (2M)
6. Define Velocity Modulation and Bunching. (3M)
7. List two applications of TWT & BWO. (2M)
8. How is bunching achieved in a Cavity Magnetron. Explain Phase - Focusing effect. (3M)
9. Classify Solid State Microwave Devices. (3M)
10. Define Phase velocity and Group velocity and also give its relation (2M)

Part-B (50 Marks)

11. Derive the field expressions for TM in parallel plane waveguides. (10M)
12. Derive expressions for propagation of TM waves in Rectangular and Circular Waveguide (10M)
13. a) Derive the Scattering Matrix of a Magic-Tee. (6M)
 b) With neat sketches explain why H-Plane Tee & E-Plane Tee junctions are called 3-dB power splitters. (4M)
14. Explain the principle and operation of a Reflex Klystron with its mathematical analysis and prove that the theoretical efficiency is 22.78%. (10M)
15. a) With a neat sketch explain the construction and working principle using RWH theory of GUNN diode. (8M)
 b) A typical GUNN Diode has the following specifications: operating frequency is 10GHz, Device length is $75\mu\text{m}$, and voltage pulse amplified is 25V. Determine threshold Electric Field. (2M)
16. a) Sketch the Geometry of Strip lines, Micro-Strip lines, Fin lines and Slot lines. (4M)
 b) Derive the expressions for Frequency (f_0) for Rectangular Cavity Resonators. (6M)
17. Write a short note on any two of the following
 - a) Circulators. (5M)
 - b) Cross Field amplifiers. (5M)
 - c) Attenuators. (5M)

FACULTY OF ENGINEERING

B.E. 4/4 (Prod.) I – Semester (Backlog) Examination, December 2019

Subject: Production Drawing Practice

Time: 3 Hours

Max. Marks:75

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

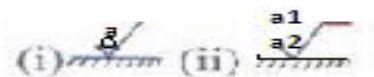
PART – A (25 Marks)

1. What is tolerance, limit, deviation, allowance? 2
2. What are fundamental tolerances? How many are there? 2
3. Fill in the blanks. 2

IT5	IT6	IT7	IT8	IT9	IT10
	10i				64i



4. What is meaning of frame box. 2
5. Sketch Characteristics of geometric symbols used for tolerances of Orientation related features. 2
6. Sketch the **drawing indication** of tolerances for
 - (i) Position
 - (ii) Concentricity.2
7. Sketch the **Interpretation** of tolerances for (i) parallelism?, (ii) perpendicularity, (iii) Angularity. 3
8. Indicate type of fits-clearance/transition/interference (i) H7-c8, (ii) H6-h5 (iii) H6-n5 3



9. Interpret the roughness machining symbols given as - 2
10. Fill in the blanks

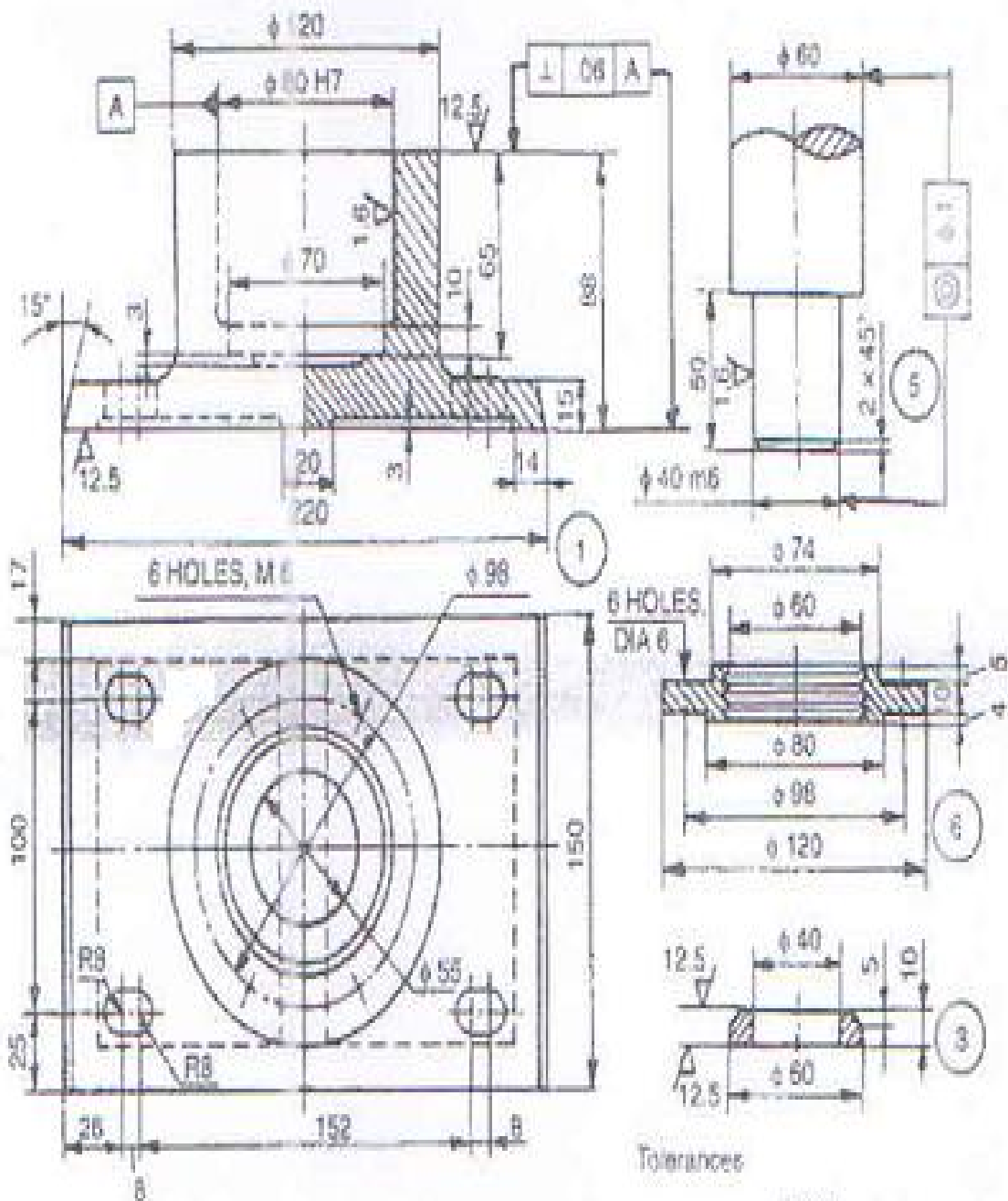
a. \sqrt{Ra} range of Ra___:

Manufacturing Process ____; ____; ____ grade

Number ____

11. Machine components conventions,
 - (i) Splined shafts,
 - (ii) bevel gear2
12. Sketch the sketch Hydraulic conventions/symbols: Valve actuation by push button__ 1

PART – B (50 Marks)



footstep bearing

Tolerances

$+0.030$
 $80 \text{ H7} - 80 + 0.000$

$+0.025$
 $40 \text{ m6} - 40 + 0.009$

Part list	Qty.	Name	Matel
1.	1	Base	CI
2.	1	Thrust bearing	---
3.	1	Spacer	CI
4.	1	Ball bearing	---
5.	1	Shaft	MS
6.	1	cover	CI

- a. Draw the front sectional view. 15M
- b. Draw Top view. 15M
- c. Indicate the process planning base 10M
- d. What is the primary, secondary and tertiary datum located in the assembly. 3M
- e. How many geometric tolerance are indicated in components? 2M
- f. State all the geometric tolerance mentioned in the assembly. 5M

FACULTY OF ENGINEERING**B.E. 4/4 (AE) I-Semester (Backlog) Examination, December 2019****Subject : Automotive Pollution and Control****Time: 3 Hours****Max. Marks: 75****Note: Answer all questions from Part A. Answer any five questions from Part B.****PART – A (25 Marks)**

- 1 Define the term “Automotive Pollution”
- 2 What are the main pollutants emitted by SI engines
- 3 How carbon monoxide emissions could be reduced in SI engines?
- 4 What is the cause of diesel smoke
- 5 How can the smoke intensity intensity be measured?
- 6 What is the advantage of catalytic converter?
- 7 List out the common carrier gases used in chromatography
- 8 What is meant by CVS System? What for it is used?
- 9 What is EGR in an automobile?
- 10 What is chassis dynamometer?

PART – B (5x10 = 50 Marks)

- 11 a) Explain how vehicle population is contributing towards environment pollution?
And How it can be controlled?
b) Write a short notes on “Global Warming”
- 12 Explain in detail about the effect of combustion time & spark timing on Nitric Oxide formation in S.I. engines
- 13 a) Define smoke and discuss different factors which effect smoke formation in CI engines
b) Explain the methods to be adopted to reduce the noise pollution from automobiles
- 14 Explain the construction and working principle of thermal reactor & flame ionization detector.
- 15 What are the catalysts used in 3-way catalytic converter with a neat sketch explain
- 16 a) With a neat sketch explain the working principle of orsat apparatus.
b) Explain the working principle of NDIR
- 17 Write a short notes on
 - a) Two engine pollution
 - b) Dilution tunnel
 - c) Fuel cell technology

FACULTY OF ENGINEERING**B.E. 4/4 (I.T) I-Semester (Backlog) Examination, December 2019****Subject : Middleware Technologies****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 a file server | 2 |
| 2. What is a message driven bean? | 2 |
| 3. What are the various roles in EJB? | 3 |
| 4. What are the barriers to effective EAI? | 3 |
| 5. Differentiate CGI Vs servlets | 3 |
| 6. What is the purpose of CLR in NET? | 3 |
| 7. What are the types of variables in PERL? | 2 |
| 8. What are the methods for session tracking? | 3 |
| 9. Differentiate between client and server | 2 |
| 10. What is the purpose of ORB? | 2 |

PART- B (50 Marks)

- | | |
|---|----|
| 11. What are the different types of servers? Explain in detail | 10 |
| 12 a) Explain the various types of EAI integration | 6 |
| b) What are the advantages and disadvantages of EAI? | 4 |
| 13 a) Explain the Django Template system | 5 |
| b) Explain the request process of Django | 5 |
| 14 Explain the architecture of NET with a neat sketch | 10 |
| 15 a) Compare and contrast com and CORBA | 7 |
| b) What is an interface pointer? Explain briefly | 3 |
| 16 a) Explain the life cycle of an Entity Bean | 7 |
| b) What is the difference between local interface and Remote Interface? | 3 |
| 17 Write short notes on the following | |
| a) PERL CGI | 4 |
| b) CORBA IDL | 3 |
| c) Marshalling and unmarshalling | 3 |

FACULTY OF ENGINEERING

BE 4/4 (IT) I Sem. (old) Examination, December 2019

Subject: Middleware Technologies

Time: 3 Hours

Max. Marks : 75

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

PART – A (25 Marks)

- | | | |
|----|---|---|
| 1 | Enumerate the characteristics of Client Server architecture. | 3 |
| 2 | Define Service Specific Middleware. | 2 |
| 3 | What is a Servlet? List all the five methods of javax.servlet. Servlet Interface. | 2 |
| 4 | Explain briefly Modal-View-Controller Design Pattern. | 3 |
| 5 | Explain the role of Bean Provider in EJB. | 2 |
| 6 | Differentiate between Stateful session bean and stateless session bean. | 3 |
| 7 | What is an Object Request Broker? | 2 |
| 8 | Write short notes on Portable Object Adapter. | 3 |
| 9 | What is Stub and Skeleton? | 2 |
| 10 | List the advantages of using COM Technologies. | 3 |

PART – B (50 Marks)

- | | | |
|----|--|--------|
| 11 | a) List and explain the different types of Servers.
b) Explain the importance of REST services. | 5+5 |
| 12 | a) Demonstrate how JDBC API can be used for reading & writing to a database.
b) Discuss with example the life cycle of Servlet. | 5+5 |
| 13 | a) Explain the EJB architecture with neat diagram.
b) Compare EJB Session beans and entity beans. | 5+5 |
| 14 | Explain CORBA and networking model. | 10 |
| 15 | Explain how CLR executes the .NET source code with a neat architectural diagram. | 10 |
| 16 | a) Compare and contrast COM and CORBA.
b) Explain how CORBA Support Interoperability. | 5
5 |
| 17 | a) Explain Service Oriented Architecture.
b) Discuss the Validator framework in struts. | 5
5 |
