FACULTY OF ENGINEERING
BE VII - Semester (CBCS) (CE) (Main & Backlog) Examination, March / April 2021

Subject: Structural Engineering Design and Detailing-II (Steel)

Time: 2 Hours   Max .Marks: 70

PART – A

Answer any seven questions.   **(7x4=28 Marks)**

1 Briefly explain about proportioning of web in plate girders.
2 Explain the difference between a bearing stiffeners and other vertical stiffeners.
3 Under what conditions buckling of web of a plate girder takes place.
4 List out the various loads and forces acting on a gantry girder.
5 What is the allowable longitudinal thrust in cranes?
6 Explain the different stresses to which bridge bearings are subjected.
7 Mention the advantages and disadvantages of deck type bridges.
8 Explain what do you mean by EUDLL.
9 In which type of bridge counter bracing is provided and why?
10 Draw a neat sketch of a rocker cum roller bearings.

PART – B

Answer any two questions.   **(2x21= 42 Marks)**

11 Design a welded plate girder simply supported to carry a superimposed distributed load of 50 N/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. Use Fe410 grade.

12 Design intermediate stiffeners for a welded plate girder for the following data:
     Web plate-6mmx1400mm
     Flange plate: 350mmx8mm
     Flange Angles-@ISA 150x150x15mm
     Design shear force-700KN

13 Design a gantry girder for a manually operated crane of effective span 8.5m, the maximum reaction of wheel is 140KN and the minimum approach of hook is 1.2m. Wheel base is 3.5m. Use Fe410 grade steel?

14 Design a roller cum rocker bearing for a plate girder bridge for the following:
     Total vertical load inclusive of impact=1100kN
     Vertical load due to wind=200kN
     Lateral load due to wind=60kN
     Longitudinal force=300kN
     Use M20 concrete for pedestals. Draw design details.

15 A through type bridge has to be designed for the following data:
     Loading=single track BG main line loading
     Truss=Pratt truss
     Effective span=30m
     Spacing of main girders=8m c/c
     Design the bottom chord members and sketch the design details.

16 Design a central cross section of a deck type plate girder bridge for a span on 16m (broad gauge main line). Also design the connections. Draw neat sketches of design details.

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FACULTY OF ENGINEERING

B.E. (EEE) (CBCS) VII - Semester (Main & Backlog) Examination, March/April 2021

Subject : Power System Operation & Control

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

PART – A

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

1. Derive power flow equation in rectangular coordinate system
2. The incremental fuel cost in Rs/MWh of two generating stations are given by

$$\frac{dF\ 1}{dpG\ 1} = .008\ P1 + 7; \frac{dF\ 2}{dpG\ 2} = .0012\ + 8$$

   They system is operating on economic dispatch with P1=P2=450MW and $\frac{\partial PL}{\partial P\ 2} = 0.3$ find the
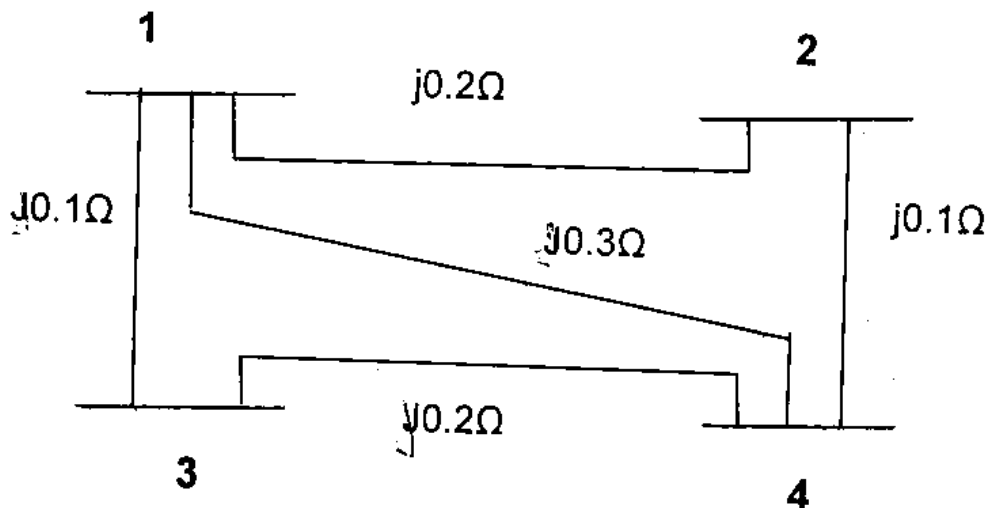
   Penalty Factor of plant2.
3. What is flat frequency control?
4. What is meant by area control error?
5. Draw the input output curve of a thermal plant. Define Incremental Fuel Rate also write its units.
6. What is Inertia Constant, write its units?
7. Distinguish between steady state stability and transient stability.
8. Write the assumptions made to Newton Raphson Method in deriving Decoupled load flow method.
9. Explain how reactive power is dependent on voltage with vector diagram?
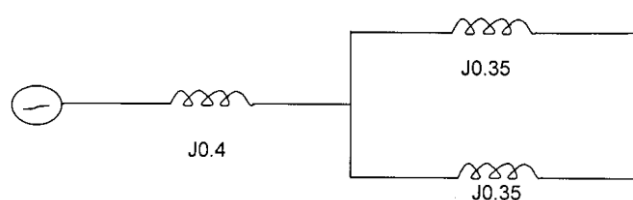10. Mention the advantages of FACTS controllers.

PART – B

Note: Answer any Four Questions   **(4x15 = 60Marks)**

11. a) Explain formulation of Y bus using inspection method. Find y-bus for the system shown.

b) Write algorithm and draw flow chart for Newton Raphson method in polar coordinate system.

12. a) Derive loss Co-efficient when two generators are supplying the load
   b) The Fuel cost functions in $/hr for 3 thermal plants are given by
   $F_1 = 350 + 7.2P_{G1} + 0.004 P_{G1}^2$
   $F_2 = 500 + 7.3P_{G2} + 0.0025 P_{G2}^2$
   $F_3 = 600 + 6.74P_{G3} + 0.003 P_{G3}^2$
   P_{G1}, P_{G2} & P_{G3} are in MW. Find the optimal schedule and compare the cost of this to the case when the Generators share load equally
   (i) if P_D = 450MW,
   (ii) P_D = 800MW.

13. A power system has a load of 1250MW at 50 HZ, D=1.5. If 50MW is tripped, find the steady state frequency deviation when (a) There is no speed control (b) The system has a reverse of 200MW spread over 500MW of generation capacity with 5% regulation on this capacity. All other generators are operating with valves wide open. Due to dead band only 80% of Governors respond to load changes.

14. Develop the block diagram of an isolated load frequency control area with relevant equations of each block.

15. A 50 Hz synchronous generator having an internal voltage 1.2 pu, H=5.2 MJ/MVA and a reactance of 0.4pu is connected to an infinite bus through a double circuit line, each line of reactance 0.35pu. The generator is delivering 0.8pu power and the infinite bus voltage is 1.0pu. Determine:
   a) Maximum power transfer
   b) Steady state operating angle.

16. Write short notes on :
   a) Swing Equation   b) Bmn coefficients

17. What are the basic FACTS controllers and with neat diagram explain the working of UPFC?

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FACULTY OF ENGINEERING
B.E. (Inst.) VII Sem. (CBCS) (Main & Backlog) Examination, March / April 2021

Subject: Opto-Electronic Instrumentation

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

PART – A
Note: Answer any five questions.   **(5 x 2 = 10 Marks)**

1. Mention properties of lasers generation.
2. In a two energy level system transition of higher to lower energy levels emit Wave Length of 350nm. Calculate the ratio of the population of two energy levels at $27^{\circ}c$ wave gain $g_1 = g_2$.
3. List out the laser application in Engineering.
4. Compute the NA, Acceptance angle and the critical angle of the fibre core having Refractive index = 1.0 and cladding refractive index = 1.05.
5. Mention different types of fibre fabrication techniques.
6. What is meant by Acousto-optic modulation technique?
7. Write the advantages of fibre optic sensors over electrical sensor.
8. Explain liquid level measurement using fibre optic sensor.
9. Mention the special features of LDRs.
10. Calculate the efficiency of PIN diode if the responsivity is 0.58A/W at 800nm.

PART – B
Note: Answer any four questions.   **(4 x 15 = 60 Marks)**

11. a) Explain with necessary diagrams mechanisms of Carbondioxide Lasers.
    b) Explain gas lasers with their respective energy levels with suitable diagram.

12. With necessary diagrams explain the following application of laser.
    a) Laser Nephelometry   b) Laser cutting

13. a) Explain any one type of laser interferometer.
    b) Explain in details of losses in Optical Fibre.

14. a) How fibre optic sensors are classified? What is basic principle of Fibre optic sensor with suitable diagram.
    b) How the current and voltage is measured using optical fibre.

15. a) Mention the features of LCD.
    b) Explain the working principle of LDR.

16. a) Explain the safety precaution while using Lasers.
    b) Write short notes on LED.

17. a) Explain Holographic Technique of reconstructing a 2-D image.
    b) Write short notes on Nd-YAG Lasers.

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FACULTY OF ENGINEERING

B.E. (ECE) VII – Semester (CBCS) (Main & Backlog) Examination, March/April 2021

Subject: Embedded Systems

Time: 2 hours   Max. Marks: 70

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1 List all the quality attributes of an embedded system
2 What is the need for a watchdog timer in embedded systems?
3 Write any three differences between ARM7-core Vs. ARM9-core.
4 Define latency and throughput of an ARM pipeline.
5 Mention any two important advantages of I2C protocol.
6 Explain the advantages of wireless devices.
7 What is the need for cross-compiler and cross-assembler in the design of Embedded systems?
8 What is the acronym of JTAG? Why this port is used in embedded design?
9 Mention the techniques available to port the embedded application into actual target hardware.
10 Describe the performance accelerating methods in the embedded system design.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 a) Define design metrics in embedded system. Discuss the various competing design metrics and their challenges in embedded system design.
   b) What are the skills needed by hardware and software engineer for designing small scale and medium scale embedded systems?

12 a) Explain operating modes of ARM and the usage of registers in each mode.
   b) What is Thumb mode? Mention any four important advantages of it.

13 a) What is CAN protocol? Mention its frame, advantages and applications.
   b) What do you mean by hot attachment and detachment? What is the bus protocols of buses UART, RS232, USB, Bluetooth and PCI that support hot attachment and detachment.

14 a) Explain about design cycle in the development phase for an embedded system.
   b) Describe about native tool chain in embedded system design. Differentiate between a native linker and cross-linker used in embedded system design.

15 a) What is an instruction set simulator? What are its advantages and shortcomings?
   b) Explain about testing methods and debugging techniques for an embedded hardware.

16 a) An automatic chocolate vending machine is to be designed in a project. What are the skills needed in terms of hardware and software engineers?
   b) Distinguish between pre-indexing and post-indexing modes of Load Data Transfer instruction in ARM with syntax and examples.

17 Write any Two of the following:
   a) ARM 3-stage pipeline architecture
   b) In Circuit Emulator
   c) Laboratory tools for debugging techniques.

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FACULTY OF ENGINEERING
B.E. (Mech.) VII-Semester (Main & Backlog) Examination, March/April 2021

Subject : Thermal Turbo Machines

Time: 2 hours   Max. Marks: 70

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1 Write and explain Prandtl-Meyer relation for compressible flow.
2 How is Rayleigh flow different from Fanno flow?
3 Show that at maximum entropy point on Rayleigh curve M=1.
4 Define semi-cone angle what is its significance.
5 What is the function of pre-whirl in compressor?
6 Explain surging and chocking in compressor.
7 Draw and explain pressure and velocity variations for two row velocity compounded turbine.
8 Differentiate between optimum pressure ratio and maximum pressure ratio in gas turbine.
9 List out the merits and demerits of solid propellant over liquid propellant.
10 Differentiate jet propulsion and rocket propulsion.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 The pressure, temperature and mach.no at the entry of flow passage are 2.6bar, 30^0C and 1.5 respectively. If the exit Mach .No is 4.0 determine for adiabatic flow of perfect gas
   i) Stagnation temperature ii) Temperature and velocity of gas at exit iii) The flow rate /square meter of inlet cross section.

12 The Mach number at the exit of a combustion chamber is 0.9.The ratio of stagnation temperatures at exit and entry is 3.74. If the pressure and temperature of gas at exit are 2.5 bar and 1273K determine 1)Mach number, pressure and temperature of gas at entry 2) Heat supplied per kg of gas 3) maximum heat that can be supplied

13 The inlet conditions of a centrifugal compressor are1bar 30^0c running at10000 Rpm. It delivers a free air stream of 1.5m/s. The compression ratio is 5 .The velocity of flow is 50m/s and is constant Assume that the blades are radial at outlet .The slip factor is 0.92.Calculate a) the temperature of air at outlet b) The power required c) the impeller diameter d) blade angle at inlet e) the diffuser inlet angle .Assume isentropic efficiency as 0.9.

14 An axial –flow compressor having 10stages works with 50% degree of reaction. It compresses air with pressure ratio of 5 .The inlet conditions of air are 27^0c and 100kPa.The air enters the compressor with a velocity of 110m/s .The mean speed of rotor blade is 220m/s .The isentropic efficiency of the compressor is 85%.calculate the work input per kg of air and blade angles.

15 The nozzle of a de-laval turbine delivers 1kg/s of steam at a speed of 800m/s to a ring of moving blades having a speed of 200m/s .The exit angle of the nozzle is 18^0. If the blade velocity coefficient is 0.75 and the exit angle of moving blades is 25^0 Calculate a)inlet angle of moving and fixed blades b) Energy lost in blades per second c) Power developed d) axial thrust on turbine rotor

16 A gas turbine unit receives air at 100kPa and 300K and compresses it adiabatically to 620kpa with efficiency of compressor 88% .The fuel has heating value of 44180kJ/kg and fuel/air ratio is 0.017 kg fuel/kg of air .The turbine internal efficiency is 90% .Calculate the compressor work, turbine work and thermal efficiency.

17 (a) Define (i) thrust power, (ii) propulsive power, (iii) propulsive and overall efficiency of jet engine
   (b) The effective jet velocity from a rocket is 2600m/s .The forward flight velocity is 1300m/s and the propellent consumption is 75kg/s. Calculate (a) Thrust
   (b) Thrust power (c) Propulsive efficiency

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FACULTY OF ENGINEERING

B.E.VII – Semester (CBCS) (Main & Backlog) Examination, March / April 2021

Subject: Tool Design

Time: 2 Hours   Max.Marks: 70

PART-A

Answer any five questions.   **(5x2=10 Marks)**

1. What are the good characteristics of cutting tool materials?
2. Explain tool signature in metal cutting.
3. What is called economics of machining? Explain
4. What are the factors affecting machinability in metal cutting?
5. State design consideration of a single point cutting tool.
6. Explain about fool proofing in tool design.
7. Explain the tool wear mechanism of cutting tool.
8. Draw merchant's force diagram.
9. State the design requirements for press tools.
10. Explain briefly the center of pressure of blanking in tool design.

PART – B

Answer any four questions.   **(4x15=60 Marks)**

11. a) Distinguish between orthogonal & oblique cutting.
    b) Discuss the mechanism of chip formation.

12. a) Explain the sources of heat and heat distribution in metal cutting.
    b) Define machinability index and discuss how it is useful for machinist.

13. a) Explain with neat sketch the design of press tool dies.
    b) Discuss of economics of machining on optimal cutting speed to maximize production rate.

14. a) Explain the method of calculating bending allowance in bending process.
    b) Explain the principles of locating and clamping devices.

15. a) Explain 3-2-1 principle of locating devices with sketches.
    b) Differentiate between jigs and fixtures.

16. a) Classify the press tools and explain any one press tool with neat sketch.
    b) Sketch and explain the design considerations for deep drawing process of dies.

17. Write short notes on:
    a) Design of rotary milling cutter
    b) Forging die design

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FACULTY OF ENGINEERING
BE VII semester (CBCS) (A.E.)(Main & Backlog) Examination, March/April 2021
Subject: Automotive Air Conditioning

Time: 2 hours   Max. Marks: 70

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1 Explain the terms relative humidity and humidity ratio.
2 What is the necessity of mixing of two air streams in an air conditioning system?
3 Define apparatus dew point temperature and indicate it on psychometric chart.
4 What is all fresh air system?
5 What is the effect of decrease in evaporator pressure on performance of VCR system?
6 What is the use of compressor in Vapour compression refrigeration system?
7 List the advantages of NH_3 as a refrigerant.
8 What do you understand by the terms ODP and GWP?
9 Name the different types of ducts used in air conditioning system.
10 What methods are used to detect the leakage of refrigerant from the VCR systems?

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 The humidity ratio of atmosphere air at 28°C dry bulb temperature and 760 mm mercury
   is 0.016 kg/kg of dry air. Calculate the following
   (a) Partial Pressure of vapour
   (b) Relative Humidity
   (c) Dew point Temperature and
   (d) Enthalpy.

12 An air-conditioning auditorium is to be maintained at 27°C DBT and 60% RH. The ambient
   condition is at 40°C DBT and 30°C WBT. The total sensible heat load is 1.00.000 kJ/h and total
   latent heat load is 40,000 kJ/h 60% of the return air is recirculated and mixed with makeup air
   after the cooling coil. The condition of air leaving the cooling coil is 18°C.
   Determine the followings
   i) Room sensible heat factor   ii) The condition of air entering the auditorium
   iii) Apparatus dew point   iv) By-Pass factor of cooling coil

13 a) Draw the layout of an air conditioning system for an automobile and explain the
      function of each component.
   b) What factors influence the power requirement of a compressor? Explain with reasons.

14 a) What are the important factors to be considered while selecting a brine for particular
      application?
   b) With a suitable sketch explain the working of automotive heating system.

15 a) Why the ducts are used in air conditioning system? Explain the materials used for
      duct design.
   b) What do you understand by preventive maintenance? Explain with an example.

16 a) Derive an expression for adiabatic mixing of two air streams in terms of enthalpy and
      specific humidity.
   b) With a suitable sketch explain the summer air conditioning system.

17 Answer any two of the following
   a) Designation of refrigerants
   b) Automatic temperature control system
   c) Air conditioning service and maintenance

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FACULTY OF ENGINEERING

BE VII- Semester (CBCS)(CSE) (Main& Backlog) Examination, March/April 2021

Subject : Compiler Construction

Time: 2 Hours   Max. Marks: 70

PART – A

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

1. What is Porting.

2. Give the definition for Regular Expression.

3. Check whether the Grammar isAmbiguous or not

   E→E+E|E*E|id

4. Write the rules to construct follow set

5. What are the common conflict that arise during shift reduce parsing.

6. Give the format of a YACC file.

7. What is type checking ?Give its types.

8. What are the parameter passing techniques in a programming language.

9. Construct DAG for a+a*(b-c)+(b-c)*d

10. What is Dead Code Elimination.

PART – B

Note: Answer any Four Questions   **(4x15 = 60Marks)**

11. Explain the various phases of compilation with an example.

12. Is the grammar LL(1) or not. prove

    S→ (L) | a

    L→L, S | S

13. Explain the construction of SLR parse table for the following grammar

    E→E+T|T

    T→T*F|F

    F→(E) |id

14. a) Discuss briefly about symbol table organization.

    b) Differentiate between fully-static runtime and stack based runtime environments.

15. Explain principal sources of optimization with examples.

16. a) Write in detail about data flow analysis.

    b) Explain with example about conversion from Regular expression to DFA.

17. Write about
    a) Parser Generator-YACC
    b) S-Attributed and L-Attributed Grammar.

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FACULTY OF ENGINEERING

B.E. (I.T) VII – Semester (CBCS) (Main & Backlog) Examination, March/April 2021
Subject: VLSI Design

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

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1 What is Moore's Law?
2 Explain Bubble pushing
3 Implement a three input NOR gate using CMOS logic
4 Implement Two to One multiplexer using TG logic
5 Mention about stick diagram rules
6 What are lamda based design rule?
7 Draw IT DRAM cell and explain its read / write operation
8 Explain about cell based concepts
9 Explain about pass characteristics of MOSFET
10 Draw RC model of FET.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 a) Draw and explain the electrical characteristics of n MOSFET.
   b) Design a 4x1 MUX using Transmission Gate logic.

12 Draw the stick diagrams, layouts for 2 input NAND, NOR gates.

13 Explain the CMOS process flow in the fabrication process.

14 a) Explain about dynamic logic gate and charge sharing.
   b) Explain about domino logic.

15 a) Draw a 2 input XOR-XNOR logic gate using DCVS logic.
   b) Explain dc characteristics of CMOS inverter.

16 a) Explain Read and Write operation of 6T's RAM cell.
   b) Write Verilog code for master slave D – Flip-Flop.

17 a) Explain about multiple rung ladder network.
   b) Explain about capacitances in MOSFET.

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FACULTY OF ENGINEERING

B. E. 4/4 (Civil) I – Semester (Backlog) Examination, March/April 2021

Subject: Structural Engineering Design & Detailing – II (Steel)

Time: 2 hours   Max. Marks: 75

PART – A

Answer any seven questions.   **(7x5=35 Marks)**

1. Explain the simple post critical method for finding the shear strength of a plate element.
2. Write the importance of intermediate stiffeners in a plate girder.
3. Explain the difference between Bearing stiffener and other vertical stiffeners.
4. Show the forces acting on the gantry girder by means of a sketch.
5. Explain the condition to be considered for finding maximum bending moment in the design of gantry girder.
6. Draw a neat sketch of a rocker bearing and Mark the parts.
7. Classify the steel bridges according to the location of the floor.
8. Draw a typical cross section of a through type plate girder bridge showing details.
9. List out the functions of bracings in bridges.
10. Explain what do you mean by EUDL.

PART – B

Answer any two questions.   **(2x20=40 Marks)**

11. Design a simply supported welded plate girder 25m in span carrying an udl of 50kN/m exclusive of self weight. The beam is laterally supported throughout. Design the cross section of the girder without intermediate stiffeners. Design the welded connection between the flange and the web. End bearing stiffeners need not be designed. Use Fe410 grade of steel. Use limit state design.

12. Design intermediate vertical stiffeners and bearing stiffener for a plate girder whose size of web is 1800 x 22mm and size of flange 500 x 24mm. The girder carries a factored udl of 40 KN/m including self weight over an effective span of 22m. Use Fe410 grade steel and adopt limit state method of design.

13. Design a gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane for the following data.89+
Crane capacity = 200 kN, self weight of the crane girder excluding trolley = 200kN, self weight of the trolley, electric motor, hook etc. = 40 kN. Appropriate minimum approach of the crane hook to the gantry girder = 1.2m. Wheel base = 3.5m, c/c distance between gantry rails = 16m, c/c distance between columns = 8m, self weight of the rail section = 300 N/m, steel is of grade Fe410.

14. The effective span of a plate girder deck type bridge for a single meter guage track is 24m. The dead load, live load and impact load reaction is 750 kN. The vertical reaction due to overturning effect of wind at each of the girder is 115 kN. Design a suitable bearing.

15. Design a central cross section of a deck type plate girder bridge for a span of 16m (broad guage main line). Also design the stiffeners and connections. Draw neat sketches of design details.

16. A through type railway bridge consists of pratt truss of height 7m, it consists of 6 panel of 5m each over a span of 30m. Take EUDL equal to 2727 kN per track, draw ILD for top chord member. Draw neat sketch showing design details of the member.

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FACULTY OF ENGINEERING

B.E 4/4 (EEE) I-Semester (Backlog) Examinations, March/April 2021

Subject: Power System Operation & Control

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

PART – A

Note: Answer any Seven Questions   **(7x3 = 21Marks)**

1 What are the assumptions made in Fast Decoupled load flow studies.
2 Define Incremental fuel rate and draw incremental cost curve
3 Explain the necessity of maintaining a constant frequency in power system operation.
4 What is an infinite bus? What is the maximum power transfer limit for steady state stability.
5 What are the advantages of FACTS CONTROLLERS.
6 Write the Jacobian matrix for the system consisting of n-no. of buses (all load bus).
7 What is penalty factor, Give its formula.
8 What is change in frequency in terms of Regulation.
9 Draw circuit diagram of TCR.
10 Give any one application of Equal area criterion.

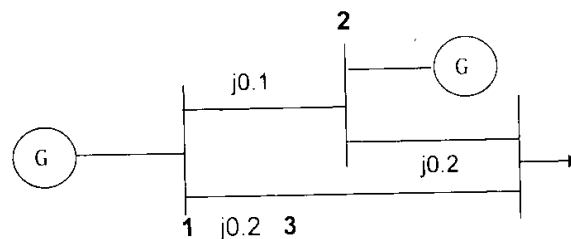## PART – B
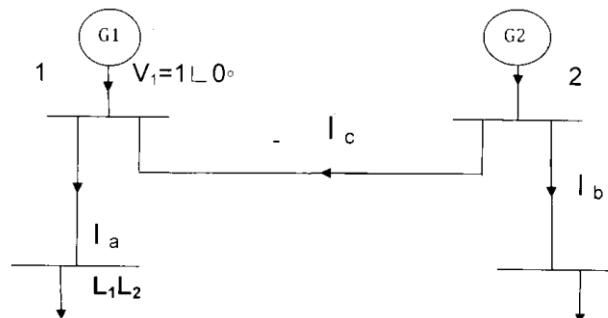
Note: Answer any Three Questions   **(3x18 = 54 Marks)**

11 a) Draw flow chart for Gauss Siedel method of load flow solution with relevant
     equations considering PV buses
   b) Obtain voltages at bus 2 and 3 at the end of first iteration The line impedances marked in
     the figure are in PU.

Bus No	GENERATION		LOAD		Voltage IVI	Reactive power limit		Remarks
	P	Q	P	Q		Qmin	Qmax	
1.	---	----	----	----	1.0	---	---	slack
2.	5.32	----	----	----	1.1	0	5.32	PV
3.	---	----	3.64	0.53	----	---	---	PQ

12 Compute the loss Co-efficients for the network shown using the given data

$I_a = 1.0 - j0.15$ pu $Z_a = 0.02 + j0.15$ pu
$I_b = 0.5 - j0.10$ pu $Z_b = 0.03 + j0.15$ pu
$I_c = 0.2 - j0.05$ pu $Z_c = 0.02 + j0.25$ pu

13 A Two bus system is shown in fig. Below. If 100 MW is transmitted from plant1 to the load, a loss of 10MW is Incurred. System incremental cost is 30 Rs/MWhr. Find P_{G1} & P_{G2} and power received by load if
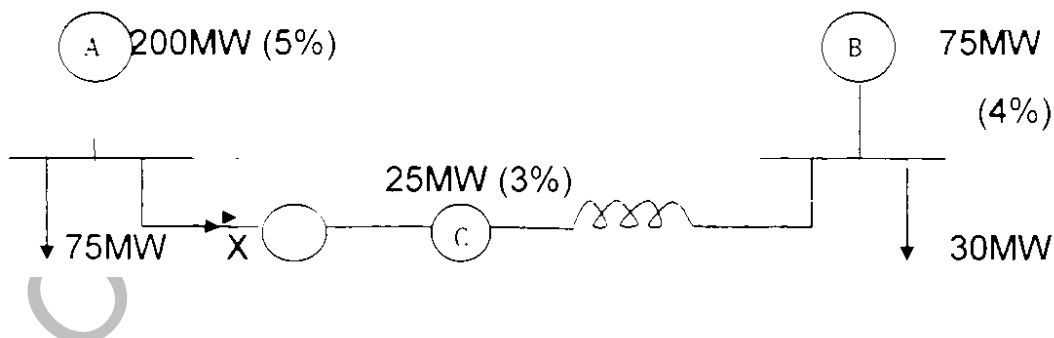
$$\frac{\partial F_1}{\partial PG_1} = 0.02\ P_{G1} + 16 \qquad \text{Rs/MWhr}$$

$$\frac{\partial F_2}{\partial PG_2} = 0.04 P_{G2} + 20 \qquad \text{Rs/MWhr}$$

Fig: Single Line Diagram

14 Two Generators rated 200MW and 400MW are operating in parallel with droop characteristics of 4% and 5% respectively. At 50Hz, they share the load of 600MW in ratio of their ratings by suitably setting the speed changes. If load reduces to 500MW, how will it be shared? What is system frequency?

15 Two Generating stations A & B have full load capacities of 200MW and 75MW respectively. The interconnector of the two stations has an Induction motor/ Synchronous generator(plant C) of full load capacity of 25MW. Percentage changes of speeds A, B & C are 5, 4, 3 respectively. The loads on bus bars A, B are 75MW & 30 MW respectively. Determine the load taken by section C and indicate the direction in which the energy is flowing.

16 a) What are the factors affecting transient stability.
   b) Using Equal area criteria, derive an expression for critical clearing angle for a system having a generator feeding a large system through double circuit line.

17 Explain the working of STATCOM with neat diagram.

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FACULTY OF ENGINEERING
B.E. 4/4 (EIE) I – Semester (Backlog) Examination, March / April 2021

Subject : Analytical Instrumentation

Time : 2 hours   Max. Marks : 75

PART – A

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

1. What is the principle of absorption instruments?
2. Define PH.
3. What are sample handling techniques?
4. What is Globar?
5. What is the difference between colorimeter and spectrophotometer?
6. Explain the principle of NMR.
7. What is selective ion electrode?
8. What are basics of gas chromatography?
9. Write a short note on conductivity meter.
10. Write a short note on para-magnetic oxygen analyzer.

PART – B

Answer any three questions.   **(3 x 18 = 54 Marks)**

11. a) Describe the sources of errors and calibration of spectrophotometer.
    b) What are Limitations of Beer Lambert's law?

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

13. Explain the principle of NMR spectroscopy. What are different types of NMR?

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

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

16. a) Explain the mass spectrometers with suitable diagram.
    b) Discuss about amino acid analyzers.

17. Write short notes on the following
    a) Industrial gas Analyzers
    b) Water pollution monitoring instruments

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FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I – Semester (Backlog) Examination, March/April 2021

Subject: Microwave Engineering

Time: 2 hours   Max. Marks: 75

PART – A

Answer any seven questions.   **(7x3 = 21 Marks)**

1 Define Phase Velocity and Group Velocity. Sketch their variation with respect to frequency.
2 Arrange the following waveguides in increasing order of their size
   (a) S-Band   (b) L-Band   (c) X-Band   (d) C-Band
3 Write the S matrix of H Plane Tee junction.
4 Explain Faraday Rotation in ferrites.
5 What are renterant cavities? Explain its significance.
6 What is Beam loading in 2 cavity klystron?
7 What do you understand by electronic tuning of reflex klystron?
8 Which is the most favourable mode in magnetron to sustain oscillations? Why?
9 What is Gunn Effect?
10 Draw the equivalent circuit of varactor diode and state its application.

PART – B

Answer any three questions.   **(3x18 = 54 Marks)**

11 Derive the field expression for TM mode propagating between parallel planes.

12 a) Derive the expression for cut-off frequency for EM wave propagating through rectangular waveguide.
   b) A rectangular waveguide has a = 4 cm, b = 3 cm as its sectional dimensions. Find all the modes that shall propagate at 500MHz.

13 a) State the properties of S matrix
   b) Derive the S matrix of Magic Tee junction.

14 a) What are the HF limitations of conventional tubes? How are they overcome?
   b) Compare TWT and Klystron amplifiers.

15 Explain the construction and operation of PIN diode. Draw its equivalent circuit and state its application.

16 Explain the construction and operation of 8 cavity magnetron and derive the Hull cut-off Magnetic field equation.

17 Write short notes on any two of the following
   a) Micro strip Antenna
   b) Attenuator
   c) Circulator

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FACULTY OF ENGINEERING

B.E. 4/4 (A.E) I – Semester (Backlog) Examination, March/April 2021

Subject: Automotive Pollution and Control

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

PART – A

Answer any seven questions.   **(7x3 = 21 Marks)**

1. State the need of pollution control.

2. What is meant by emission and pollution from an automobile?

3. Explain the mechanism of HC and CO formation.

4. What is crank case blow by?

5. What are the various chemicals used in Orsat Apparatus?

6. How can the smoke intensity can be measured?

7. What is meant by CVS system? What for it is used?

8. What is the reason behind black smoke formation in CI engine?

9. What is the Bharat and euro norms of standard of pollution?

10. What are the pollutants to be treated before sending the exhaust gases into environment from an automobile?

PART – B

Answer any three questions.   **(3x18 = 54 Marks)**

11. Discuss the effects of various regulated and unregulated pollutants on human health and environment.

12. Explain in detail about the effect of engine load and spark timing on UBHC formation in SI engines.

13. With an appropriate illustration explain the effect of engine speed, combustion time and Cetane number on nitric oxide formation in diesel engine.

14. Define smoke and discuss different factors which effect smoke formation in C.I. Engines.

15. What is meant by PCV systems? What for it is used in IC engines? Explain with suitable sketch.

16. Explain the construction and working and limitations of chemiluminescent detector. What for it is used?

17. With a suitable diagram explain the followings.

    a) Gas Chromatograph

    b) Exhaust gas recirculation

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FACULTY OF ENGINEERING
BE 4/4 (I.T.) I-Semester (New)(Backlog) Examination, March/April 2021
Subject: Middleware Technologies

Time: 2 hours   Max. Marks: 75

PART – A

Answer any seven questions.   **(7x3=21 Marks)**

1 Define the term client / server with its building blocks.
2 How does the client find its server in RPC?
3 List the services of EJB container.
4 What is the difference between stateful and stateless EJB?
5 What are the barriers to effective EAI?
6 Why is language mapping a necessary part of CORBA?
7 What are different activation modes in remoting?
8 What is assembly in .NET framework?
9 What is the use of the Django framework?
10 Write the advantages of using the Django framework.

PART – B

Answer any three questions.   **(3x18=54 Marks)**

11 (a) Explain the messaging and queuing middleware.
   (b) Explain the servlets API in detail.

12 (a) Explain EJB3 architecture in detail.
   (b) Explain the lifecycle of a stateful session bean in brief.

13 (a) Explain about the different types of EAI integration models.
   (b) Explain the CORBA architecture and list the responsibilities of ORB.

14 Explain Remoting with a suitable example.

15 Explain Django architecture in detail.

16 Explain different types of servers with examples.

17 Write short notes on the following:
   (a) Cookies
   (b) .NET base class libraries

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