FACULTY OF ENGINEEERING
B.E. (Civil) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective - V
Advanced Steel 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 is the difference between bearing stiffeners and load carrying stiffeners?

2 Define the parameters of plate girders with a neat sketch.

3 Sketch the different types of gantry girders.

4 What are the specifications of gantry girders?

5 What are different types of bearings?

6 Define the parameters of sliding plate bearings.

7 Distinguish between the deck and through type bridge.

8 List the various types of stiffeners used in plate girders.

9 Write a brief note on the component parts of a truss bridge.

10 Differentiate between box girder bridges and I – beam bringes.

PART – B

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

11 Design a welded plate girder of 20 m span using the tension field action for the following factored forces.
Maximum Moment, M_z = 5000 kNm
Maximum shear force = 900 kN
The girder is laterally restrained, connections need not be designed.

12 Check a gantry girder section designed for fatigue strength for the following data:

Crane capacity	250 kN
Self-weight the crane girder excluding trolley	250 kN
Self –weight of the trolley, electric motor, hook, etc.	50 KN
Approximate minimum approach of the crane hook to the gantry girder	1.20 m
Wheel base	3.5 m
C/C distance between gantry rails	16 m
C/C distance between columns (span of gantry girder)	8 m
Self – weight of rail section	300 N/m
Diameter of crane wheels	150 mm
The crane operates for 225 days per year	
The working hours 9 am to 5 pm	
Maximum number of trips per hour 3	
Design life 50 years	

13. Design an elastomeric pad bearing to support a tee beam girder of a bridge using the following data:

Maximum dead load reaction per bearing = 300kN
Maximum live load reaction per bearing = 700kN
Longitudinal force due to friction per bearing = 45kN
Effective span of the girder = 16m
Estimated rotation at bearing of the girder due to dead and live loads =0.002 radians
Concrete for Tee beam and bed block =M 20 Grade
Total estimated shear strain due to creep, shrinkage and temperature = 6×10^{-4}.

14. Write the design principles of plate girders?

15. Design a welded plate girders for a simply supported bridge deck beam with an effective span of 20 m to support the following loads:
    Dead load including self-weight = 20 kN/M
    Imposed load = 10 kN/M
    Two moving loads = 150 kN each spaced 2 m apart.
    Assume the top compressive flange of the plate girder is restrained laterally and Prevented from rotating. Use mild steel with f_y = 250 N/mm^2.Design as an unstiffened plate girder with thick webs.

16. Explain the types of stiffeners in detail?

17. Pratt truss girder through bridge is provided for single broad gauge track. The effective span of bridge is 50m. The cross-girders are spaced 5m apart. The stringers are spaced 2m between centre lines. 0.6kN per metre stock tails and 0.4 kN per meter check rails are provided. Sleepers are spaced at 0.45m from centre to centre and are of size 2.8m x 0.25m x 0.25m. Weight of timber may be assumed as 7.50 kN per cubic metre. The main girders are provided at a spacing of 7m between their centre lines. Design the central top chord member and bottom chord member and the vertical and diagonal of central panel. The bridge is to carry standard main line loading.

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FACULTY OF ENGINEEERING
B.E. (Civil) VII - Semester (AICTE) (Main) Examination, March / April 2022
Subject: Professional Elective – V
Retrofitting and Rehabilitation of structures

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 Distinguish between repair and rehabilitation.
2 What is the effect of deterioration of structures?
3 Explain the carbonation of concrete in detail.
4 Explain the mechanism of damage and its prevention techniques.
5 Explain in detail Windsor probe test.
6 Differentiate between Non Destructive and partial Destructive tests? List any two NDT techniques.
7 What are the various crack repair methods?
8 Explain in detail about polymer impregnation technique.
9 What is meant by jacketing?
10 Explain in detail about strengthening methods of substructures.

PART – B

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

11 Define Repair, renovation, restoration, rehabilitation and retrofitting? Explain in detail the difference between them & where it is used?

12 (a) Explain the mechanism of corrosion? name the corrosion inhibitors and promoters?
   (b) Discuss in detail the factors effecting corrosion. What are its effects?

13 (a) Enlist different tests to be performed to carry out Non Destructive testing of structures and explain any one in detail?
   (b) Explain the step by step procedure to be followed to assess damage in structures and to carry out rehabilitation work?

14 (a) Explain the types and applications of polymer concrete?
   (b) Explain the process of epoxy injection? Also explain the routing and scaling with neat sketches?

15 (a) Explain the method of preventing corrosion in the structure?
   (b) Explain the procedure of guniting, grouting and shotcreteing?

16 Under what conditions strengthening of columns are required? Explain how columns are strengthened by section enlargement technique with the help of neat sketch?

17 (a) Explain the strengthening and stiffening of beams?
   (b) Discuss method of underpinning in detail?

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FACULTY OF ENGINEEERING

B.E. (Civil) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Geographic Information Systems and Remote Sensing

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 the terms sensor and satellite.

2   Define Georeferencing.

3   Write the spatial resolution of any four Indian Satellites.

4   Differentiate between polar orbit and geosynchronous orbit.

5   Define Resolution and list out types of resolution.

6   What are the different components of GIS?

7   Name the projections that minimize distortion in shape and distance.

8   What are attributes?

9   What are 4 distortions for a planar map?

10 What is fluvial geomorphology?

PART – B

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

11 a) Explain the elements of Remote Sensing with a neat sketch.
   b) Explain about EMR's interaction with earth's surface.

12 a) Short notes on Remote sensing observation platforms and Push Broom Scanning.
   b) Explain the spectral properties of water body.

13 What is resolution of a sensor? Describe all sensor resolutions.

14 a) Describe the coordinate geometry in GIS.
   b) Discuss different data input methods used in GIS with neat sketch.

15 What are DEMs? What is the relationship between a discrete altitude matrix and a TIN model?

16 a) What do you understand by geospatial analysis? Why is it required? Mention six basic geospatial analysis techniques
   b) Discuss the computational analysis methods in GIS

17. Give the role of remote sensing and GIS in watershed characteristics.

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FACULTY OF ENGINEERING
B.E.(EEE) VII Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – II
Electrical Machine 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 material used for heating devices?
2. Compare soft and hard magnetic materials based on hysteresis loop.
3. What do you mean by gap contraction factor for slots and ducts?
4. Define Thermal resistance.
5. What are the effects of armature reaction in DC machines?
6. What are the factors to be considered for selection of number of armature slots in DC machines?
7. Mention the overall dimensions for single phase core type transformer with help of neat schematic diagram.
8. Explain the limiting factor for the diameter of synchronous machine.
9. Mention the advantages of digital computers to design the electrical machines.
10. Explain the general procedure for optimization of electrical machines.

PART – B

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

11. (a) Explain high conductivity materials, give examples and compare them.
    (b) Explain the insulating materials used for wires.

12. (a) Explain the determination of Zig – Zag leakage flux.
    (b) A 110 MVA, 8 pole water wheel generator has core of length 2 m and a diameter of 7 m. The stator slots (open) have a width of 20 mm, the slot pitch being 60 mm and air gap length at the centre of pole is 28 mm. There are 40 radial ventilating ducts each 6 mm wide. The total mmf per pole is 30000 A. The mmf required for the air gap is 90% of the total mmf per pole. Estimate the average flux density in the air gap if the field form factor is 0.8.

13. (a) Explain the various types of enclosures used for rotating machines.
    (b) A 1000 amps shunts consists of 6 strips of nickel-alloy connected in parallel each having a cross- section of 25 **x** 3 mm^2. The normal voltage drop is 100 mV. The alloy used has the following data : resistivity = 0.46 X 10^{-8} Ω-m, specific heat 420 J/kg $^{\circ}$C. specific gravity = 5222 kg/m^3, rate of heat dissipation = 100 W/m^2 $^{\circ}$C.
    Determine the maximum temperature rise and the time taken to reach 92% of maximum value.

14. (a) Explain the procedure for selection of number of poles in DC machines.
    (b) A shunt field coil has to develop an mmf of 9000 A. The voltage drop in the coil is 40 V, and the resistivity of round wire used is 0.021 Ω/m and mm^2 . The depth of the winding is 35 mm and the length of mean turn is 1.4 m. Design a coil so that the power dissipated is 700 W/m^2 of the total coil surface (i.e. outer, inner, top and bottom). Take the diameter of insulated wire 0.2 mm greater than that of bare wire.

15. (a) Derive the output equation of AC machine from basis.
    (b) A 75 kW, 440V, 50 Hz, three phase, 6 pole induction motor has a star connected stator winding accommodated is 54 slots with a 5 conductors / slot. If slip ring voltage, an open circuit is to be about 200V at no load find suitable rotor winding. Calculate number of rotor slots, number conductors / slot, coil span, number of slots per pole. P.F = 0. and the efficiency is 0.9.

16. Explain the different approaches of computer aided design of electrical machines with help of neat flow charts.

17. (a) Calculate net iron area and diameter of circumscribing circle for a 200 KVA, 6600/440 V, 50Hz, 3 phase core type transformer. The following data may be assumed: emf per turn = 10 V, maximum flux density = 1.3 Wb/m^2, current density = 2.5 A/mm^2, window space factor = 0.3, stacking factor = 0.9.and Net iron area = 0.6 d^2 where d is the diameter of circumscribing circle.
    (b) Explain the solid core materials used for magnetic circuits.

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FACULTY OF ENGINEERING

B. E. (EIE) VII – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Professional Elective – II

Piping & Instrumentation Diagrams

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. Identify the full form of the standard IPS_E_PR?
2. What does the tag DPIC-203 indicate in P & I diagrams?
3. What abbreviations are suggested for denoting types of power supplies in P&I diagrams?
4. What is the full form of KKS numbering system? What is its significance?
5. What is SMART P&ID?
6. Draw the process diagrams for (a) Valves with actuators (b) Pumps
   (c) Heat Exchangers (d) Compressors.
7. What is the minimum information to be shown in piping and instrumentation drawings?
8. What do the following abbreviations indicate:
   (a) AS   (b) ES   (c) HS
9. What is the full form of OSHA?
10. What is the design criteria for Utility flow diagrams? Explain briefly?

PART – B

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

11 Discuss about Process safety management and ERP as listed out in government regulations?

12 List out the various types of contracts between Licensor and contractor in preparing P&I diagrams?

13 What steps have been established for the purpose of minimizing the revisions and avoiding unnecessary works, in preparing the P&I Diagrams? Explain in detail?

14 Discuss about the design criteria for preparation of P&I diagrams for assembly piping of pumps?

15 (a) What are the basic terms and conditions for approval of P&I diagrams?

   (b) Draw all the piping and connection shapes used in P&I diagrams?

16 Enumerate in detail all the general rules of Drafting in P&ID?

17 (a) What are Process Flow diagrams and Block Flow diagrams?

   (b) Discuss about Assembly piping of pumps, steam out, drain and vent for vessels?

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FACULTY OF ENGINEERING
B.E. (ECE) VII - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Industrial Administration and Financial Management

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. State the types of Business Organization.
2. List out the merits and demerits of Functional layout.
3. Define the term 'Performance rating Factor'.
4. What do you understand by standard time? How you will calculate it?
5. What are the principles of SQC?
6. What is meant by ISO?
7. State the standard form of Linear Programming and its assumptions.
8. Differentiate between CPM and PERT.
9. Mention the salient factors to be considered for preparing a Capital Budgeting in any manufacturing industry.
10. Explain nature of Financial Management.

PART – B

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

11. (a) Explain various factors affecting Layout.

    (b) What is the importance of Organization structure? Explain the merits of Line and Staff Organization structure over Line or Military type of organization structure.

12. (a) State the principles of Motion Economy related to arrangement of the Work place.

    (b) An operator works for eight hours a day. A work sampling study shows that he was idle 15% of the day and that he worked the remainder of the day at an average performance index of 110%. The record shows that he turned out 420 pieces of acceptable quality during the day. Find the standard time per piece. Assume 15% allowances.

13. (a) Explain the operating characteristics curve used in Inspection.

    (b) Explain principles of PPC and its functions.

14. (a) Derive the simple EOQ and state their assumptions.

    (b) Find the minimum value of $Z = 4x_1 + 2x_2$ by graphical method subject to the constraints:

    $$x_1 + 2x_2 \geq 2 \quad 3x_1 + x_2 \geq 3 \quad 4x_1 + 3x_2 \geq 6 \text{ and } \quad x_1, x_2 \geq 0.$$

..2

15. The following table gives a list of activities and their duration.

Activity	1 – 2	2 – 5	1 – 3	1 – 4	3 – 5	4 – 6	5 – 6
Duration in days	8	10	4	6	6	8	4

You required to:

1. Draw the network diagram.

2. Find EST, EFT. LST. LFT and float of each activity.

3. Identify critical path.

4. Calculate project completion time.

16. (a) What is meant by depreciation state the causes of it and mention any four methods of calculating depreciation fund.

(b) Explain duties of purchase manager.

17. Write short notes on the following.

1. Techniques of capital budgeting

2. Functions of Management

3. Quality control by chart and sampling

4. Performance appraisal

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

Subject: Prestressed Concrete

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 is the basic principle of pre stressed concrete?
2. What is pressure line? Explain its significance.
3. How do you calculate loss due to friction?
4. Distinguish between concentric and eccentric tendons.
5. Define the term 'Tendon' and 'Anchorage'
6. Explain the ways by which shear resistance of structural concrete members can be improved.
7. What do you understand by shear tension failure?
8. Define cracking moment.
9. What is the codal provision for the shear design of prestressed concrete?
10. State limitations of deflections.

PART – B

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

11. a) Explain any two methods of post-tensioning system with neat a sketch.
    b) Why is the high strength of concrete and high grade of steel required for prestressed concrete?

12. A prestressed concrete pile 250mm square, contains 60 pre tensioned wires, each of 3mm diameter, uniformly distributed over the section. The wires are initially tensioned on the prestresssing bed with a total force of 500kN. Calculate the final stress in concrete and the percentage loss of stress in steel after all losses, given the following data:
    E_s = 210kN/mm2 & E_c = 32kN/mm2
    Shortening due to creep = 30 x 10-6 mm/mm per N/mm2 of stress
    Total shrinkage = 200 x 10-6 per unit length
    Relaxation of steel stress = 5 per cent of initial stress
    Prestressing force, P = 400kN.

13. a) A beam is of simply supported span 8 m. The size of the beam is 350 mm × 700 mm. A prestressing force of 1000 kN was applied. The cable is parabolic with an eccentricity of 100 mm at the centre and zero at the supports. It is subjected to a UDL of 25 kN/m. Compute the extreme stresses at midspan.
    b) Differentiate shear compression failure and shear tension failure.

14. a) What are the codal provisions for design of shear?
    b) Explain in detail basic concept of shear design. Draw a neat sketch of cracked section.

15 A pre stressed concrete beam of rectangular section 300mm wide by 600mm deep, spans over 12m. The beam is pre stressed by a straight cable carrying an effective force of 550kN at an eccentricity of 80mm. The modulus of elasticity of concrete is 50kN/m2. Compute the deflection at centre of span under prestress and self-weight.

16 a) Write short notes on long term and short-term deflection.
   b) Describe Magnels method for end block design

17 Write short notes on any TWO of the following:
   a) Materials used in PSC.
   b) Load balancing concept.
   c) Guyon method.

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

Subject: Industrial Administration and Financial Management

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. State the types of organization structure.

2. State the objectives of method study.

3. What are various wage payment plans?

4. What are the objectives of SQC?

5. Differentiate between EBS and EOQ.

6. How is linear programming techniques used in industrial administration?

7. Define the term depreciation and state the causes of it.

8. What are the elements of costs?

9. Write few differences between CPM and PERT.

10. What is Time Value of Money? Explain briefly.

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

11. a) Discuss the principle factors in selecting a location for an industry.
    b) Explain various types of plant layouts.

12. a) Explain various types of principles of motion economy.
    b) Explain stop watch procedure for collecting time study data.

13. A Lathe is purchased for Rs.1,00,000 /- and its salvage value after its life is 20 years is estimated to be Rs. 20,000 /- . Determine the straight line method (I) the rate of depreciation (II) its book value after 12 years.

14. Draw the network diagram and find the critical path for the following data.

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration (in days)	5	3	2	6	4	3

15. a) Describe ABC classification of materials.
    b) Derive an equation for economics order quantity.

16. a) What are the duties of Purchase department?
    b) Explain briefly the process of capital budgeting.

17. Write short notes on:
    a) Job evaluation and merit rating
    b) Factors affecting capital gearing.

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

Subject: Production and Operations Management

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 mass production?
2. State any two principles of plant layout?
3. What are the objectives of work Measurement?
4. List out the various qualitative forecasting models.
5. List out various symbols used in method study.
6. Given the data 25, 35, 40, 65 and 55, find the forecast for the sixth period using simple average and 3 period moving average?
7. What is aggregate planning?
8. What is the difference between event and activity?
9. What is master production scheduling?
10. Define the following : i) Total float   ii) Free float

PART – B

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

11. (a) Define plant layout and discuss about process layout in detail with a neat sketch.
    (b) Describe the factors that affect the selection of a site for plant layout.

12. (a) Define method study. Explain in detail the various steps involved in method study.
    (b) Define standard time of an operation. List its various uses.

13. Determine trend values by method of least squares. Also estimate the annual sales for 1993.

Years	1988	1989	1990	1991	1992
Sales in Lacs of Rs.	45	56	78	46	75

14. (a) Discuss the principles of motion economy.
    (b) Differentiate between MRP I and MRP II.

15. (a) Explain the predetermined time study approach to work measurement.
    (b) Explain the terms:
        (i) Mean Squared error (MSE) (ii) Mean Absolute Percentage error (MAPE).

16. A project has the following times schedule:

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8	8-9
Time in months	2	2	1	4	8	5	3	1	5	4	3

Construct the network and compute
   i)   Critical path and its duration
   ii) Float for each activity

17. Write short notes on:
   (i) Features of ERP packages
   (ii) Common errors in drawing networks
   (iii) Cost slope in crashing

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