

III B. Tech I Semester Supplementary Examinations, May - 2016
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.

For all designs adopt Limit State Method

PART –A

- 1 Design a reinforced concrete footing for a column of section 350×350 mm which is subjected to an axial load of 1000kN and uniaxial moment of 350kN.m at service state. Consider weight of soil = 20kN/m^3 , angle of repose = 30° , allowable bearing capacity of soil = 150kN/m^3 , concrete of grade M20 and steel of grade Fe 415. [28M]

(OR)

- 2 Design a continuous R.C. slab for a class room 6m wide and 12m long. The roof is to be supported on R.C.C. beams spaced at 3.0m intervals. The width of beam should be kept 230mm. The superimposed load is 3kN/m^2 and finishing load expected is 1kN/m^2 . Use M20 concrete and Fe 415 steel. [28M]

PART -B

- 3 a) Justify the Code specification for the limiting neutral axis depth in Limit State Method. [7M]
- b) What is the fundamental assumption in flexural theory? Is it valid at the ultimate state? [7M]
- 4 A rectangular beam is 200mm wide and 500mm deep. It is reinforced with 6 bars of 20mm diameter in compression with an effective cover of 50mm. Determine the area of tension reinforcement needed to make the beam section fully effective. What then would be the moment of resistance? Use M20 concrete and Fe 415 steel. [14M]
- 5 a) The provision of minimum stirrup reinforcement is mandatory in all reinforced concrete beams. Why? [7M]
- b) Discuss the torque-twist relationship for (i) plain concrete, and (ii) reinforced concrete members subjected to pure torsion. [7M]
- 6 Design an axially loaded braced rectangular column for the following data. [14M]
 Ultimate axial load $P_u = 4000$ kN
 Unsupported length $l = 3.25$ m
 Effective lengths $l_{ex} = 3.0$ m and $l_{ey} = 2.5$ m
 Grade of concrete: M20 and grade of steel: Fe 415.
- 7 a) What are the advantages and disadvantages of providing large clear cover to reinforcement in flexural members? [7M]
- b) Describe briefly the load transfer mechanism in a two-column combined footing. [7M]

III B. Tech I Semester Supplementary Examinations, May - 2016

POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answering the question in **Part-A** is compulsory

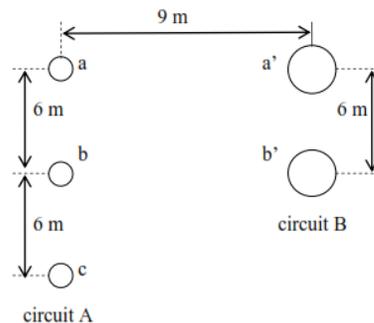
3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) What is the use of double circuit transmission line? [3M]
- b) What is the effect of load power factor on regulation and efficiency of a transmission line? [4M]
- c) What do you understand by long transmission lines? [4M]
- d) What are the factors that cause a travelling wave? [4M]
- e) Define corona. [3M]
- f) Can string efficiency in an A.C. system be 100%? Explain. [4M]

PART -B

- 2 a) Find GMD, GMR for each circuit, inductance for each circuit and total inductance per meter for two circuits that run parallel to each other. One circuit consists of three 0.25 cm radius conductors. The second circuit consists of two 0.5 cm radius conductors as shown in the figure below: [10M]



- b) Find an expression for the flux linkages in parallel current carrying conductors. [6M]
- 3 a) Derive the expressions for regulation and efficiency of a short transmission line. Draw required circuit and phasor diagram. [7M]
- b) Find the following for a single circuit transmission line delivering a load of 50MVA at 110 kV and p.f. 0.8 lagging : [9M]
 - (i) sending end voltage, (ii) sending end current, (iii) sending end power and (iv) efficiency of transmission. Given $A = D = 0.98 \angle 3^\circ$; $B = 110 \angle 75^\circ \text{ ohm}$; $C = 0.0005 \angle 80^\circ \text{ siemen}$.



- 4 A 3-ph overhead line has a total series impedance/ph of $200 \angle 80^\circ$ ohms and a total shunt admittance of $0.0013 \angle 90^\circ$ siemen/ph. The line delivers a load of 80MW at 0.8pf lagging and 220kV between the lines. Determine the sending end line voltage and current by rigorous method. [16M]
- 5 a) Derive reflection and refraction coefficient of transmission line when receiving end is open circuited. [8M]
- b) A cable has a conductor of radius 0.75cm and a sheath inner radius 2.5cm. Find (i) the inductance per meter length, (ii) capacitance per meter length, (iii) surge impedance and (iv) velocity of propagation, if the permittivity of insulation is 4. [8M]
- 6 a) A transmission tower on a level ground gives a minimum clearance of 8 meter for its lowest conductor with a sag of 10 m for a span of 300 m. If the same tower is to be used over a slope of 1 in 15, find the minimum ground clearance obtained for the same span, same conductor and same weather conditions. [9M]
- b) Describe the various methods for reducing corona effect in an overhead transmission line. [7M]
- 7 An overhead line has a conductor of cross-section 2.5cm^2 hard drawn copper and a span length of 150mts. Determine the sag which must be allowed if the tension is not exceeded one-fifth of the ultimate strength of 4175kg/cm^2 a) in still air and b) with a wind pressure of 1.3 kg meter and an ice costing of 1.25 cm. Determine also the vertical sag in the latter case. [16M]

III B. Tech I Semester Supplementary Examinations, May - 2016
DESIGN OF MACHINE MEMBERS – I
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
(Data books may be allowed)

PART -A

- | | | |
|---|--|------|
| 1 | a) Define any four theories of failure. | [4M] |
| | b) Draw S-N Curve and mark all salient points. | [4M] |
| | c) How do you obtain a bolt of uniform strength? | [4M] |
| | d) Write notes on Types of keys. | [3M] |
| | e) Draw split coupling. | [4M] |
| | f) What are the functions of springs? | [3M] |

PART -B

- | | | |
|---|--|------|
| 2 | a) What are the general considerations in the design of machine elements? | [4M] |
| | b) A cast iron pulley transmits 10 KW at 400 rpm. The diameter of the pulley is 1.2meter and it has four straight arms of elliptical cross section. In which the major axis is twice the minor axis. Determine the dimensions of the arm if the allowable bending stress is 15 MPa. | [8M] |
| | c) Explain simple stresses. | [4M] |
| 3 | a) Explain Goodman failure theory. | [3M] |
| | b) A circular bar of 0.5 m length is supported freely at its two ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20 kN and a maximum value of 50 kN. Determine the diameter of bar by taking a factor of safety of 1.5, size factor of 0.85, surface finish factor of 0.9. The material properties of bar is given by: Ultimate strength of 650 MPa, Yield strength of 500 MPa and Endurance strength of 350 MPa. | [8M] |
| | c) Draw S-N curve for mild steel and explain its significance. | [5M] |
| 4 | a) How the strength of transverse fillet weld is evaluated? | [4M] |

- b) A steel plate, 80 mm wide and 10 mm thick, is joined to another steel plate by means of a single transverse and double parallel fillet weld, as shown below Fig. 1. The strength of the welded joint should be equal to the strength of the plate to be joined. The permissible tensile and shear stresses for the weld material and the plates are 100 MPa and 70 MPa respectively. Find the length of each parallel fillet weld. Assume that the tensile force passes through the centre of gravity of three welds. [12M]

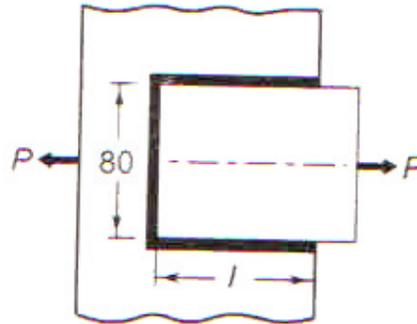


Fig. 1

- 5 a) Briefly explain the procedure to design a shaft based on any two theories of failures. [4M]
 b) It is required to design a knuckle joint to connect circular shafts subjected to an axial force of 50 kN. The rods are coaxial and a small amount of angular movement between their axes is permissible. Design the joint and specify the dimensions of its components. The allowable tensile, compressive and shear stress in the rod and pin material is limited to 80MPa, 100MPa and 40MPa respectively. [12M]
- 6 a) Explain types of couplings. [4M]
 b) A mild steel shaft has to transmit 70 kW at 240 rpm. The allowable shear stress in the shaft material is limited to 45MPa. Design a cast iron flange coupling. The shear stress in the coupling bolt is limited to 30MPa. [12M]
- 7 a) Explain co-axial springs. [4M]
 b) A co-axial spring consists of two helical compression springs, one inside the other. The free length of the outer spring is 25 mm greater than the inner spring. The wire diameter and mean coil diameter of the inner spring are 8 mm and 64 mm respectively. Also the wire diameter and mean coil diameter of the outer spring are 10 mm and 80 mm respectively. The numbers of active coils in inner and outer springs are 10 and 15 respectively. Assume the same material for two springs and the modulus of rigidity of spring material is 81370 N/mm^2 . Calculate [12M]
 (i) The stiffness of the spring the deflection is from 0 to 25 mm
 (ii) The stiffness of the spring the deflection is more than 25 mm.

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III B. Tech I Semester Supplementary Examinations, May - 2016

CONTROL SYSTEMS
(Common to ECE and EIE)

Time: 3 hours

Maximum. Marks: 70

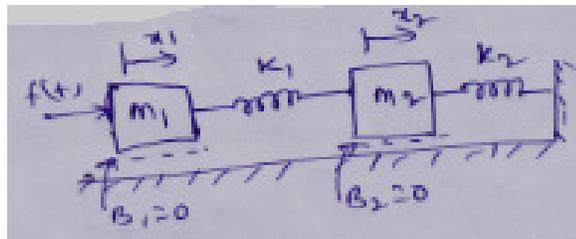
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**
 (Normal and semi & polar graph sheet are the supplied)

PART -A

- 1 a) What are the characteristics of negative feedback? [3M]
- b) Compare the AC and DC servomotor. [4M]
- c) What is the effect on system performance when a proportional controller is introduced in a system? [4M]
- d) What are asymptotes? How will you find the angle of asymptotes? [4M]
- e) What is phase and gain crossover frequency? [3M]
- f) Why compensation is necessary in feedback control system. [4M]

PART -B

- 2 a) Define open loop and closed loop systems. Mention their merits and demerits. [8M]
- b) Draw the free body diagram and write the differential equations describing the dynamics of the system shown in below figure and obtain the transfer function $\frac{X_2(s)}{F(s)}$ [8M]



- 3 a) For the system represented by the given equations find the transfer function x_5/x_1 by the help of signal flow graph technique. [8M]

$$x_2 = a_{12}x_1 + a_{13}x_3 + a_{14}x_4 + a_{15}x_5$$

$$x_3 = a_{23}x_2$$

$$x_4 = a_{34}x_3 + a_{35}x_5$$

$$x_5 = a_{45}x_4 + a_{46}x_6$$

Where x_1 is input variable and x_5 is output variable.

- b) Derive the transfer function of field controlled AC Servo motor. [8M]



- 4 a) What is meant by step input, ramp input and impulse input? How do you represent them graphically? [6M]
- b) The open loop transfer function of a unity feedback system is given by [12M]
- $$G(s) = \frac{K}{s(1+Ts)}$$
- Where K and T are positive constant. By what factor should the amplifier gain K be reduced so that the peak overshoot of unit step input of the system is reduced from 75% to 25%.
- 5 a) Draw the root locus plot for a system having open loop transfer functions is [8M]
- $$G(s) = \frac{K}{S(S+1)(s+5)}$$
- b) Using Routh criterion investigate the stability of a unity feedback control system [8M] whose open loop transfer function is given by.
- $$G(S) = \frac{e^{-sT}}{S(S+2)}$$
- 6 a) Construct Bode plot for the system whose open loop transfer function is given below and determine (i) the gain margin (ii) the phase margin and (iii) the closed loop stability [8M]
- $$G(S)H(S) = \frac{4}{S(1+0.5S)(1+0.08S)}$$
- b) Sketch Nyquist plot whose open loop transfer function is given by [8M]
- $$G(S)H(S) = \frac{KS^2}{S^3 + 4S + 4}$$
- and examine closed loop stability in terms of parameter K.
- 7 a) The open loop transfer function of a unity feedback control system is given by [8M]
- $$G(S) = \frac{K}{S(1+0.2S)}$$
- design a suitable compensator such that the system will have $K_v=10$ and P.M = 50° .
- b) The transfer function of a control system is given by [8M]
- $$\frac{Y(S)}{U(S)} = \frac{S+2}{S^3 + 9S^2 + 26S + 24}$$
- check for controllability and observability.

III B. Tech I Semester Supplementary Examinations, May - 2016

PRINCIPLES OF PROGRAMMING LANGUAGES

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

- | | | |
|---|--|------|
| 1 | a) Explain about parsing. | [3M] |
| | b) Write any two design issues for arithmetic expressions. | [3M] |
| | c) Explain about generic methods. | [4M] |
| | d) Differentiate between procedural languages and object oriented languages. | [4M] |
| | e) Write short notes on lambda calculus. | [4M] |
| | f) Explain about multi paradigm languages. | [4M] |

PART -B

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|---|---|------|
| 2 | a) Explain in detail about language evaluation criteria. | [4M] |
| | b) Explain about lexical analysis. | [8M] |
| | c) Write short notes on context free grammar. | [4M] |
| 3 | a) Explain various primitive data types with suitable examples. | [6M] |
| | b) Discuss about type-checking. | [6M] |
| | c) Explain about control structures. | [4M] |
| 4 | a) Explain how subprogram names are passed as parameters. | [8M] |
| | b) Define sub program. What are the distinct categories of Subprograms? | [8M] |
| 5 | a) Discuss the design issues of Exception Handling. | [8M] |
| | b) Explain in detail abstract data types in java with examples. | [8M] |
| 6 | a) Explain the principles of ML. | [8M] |
| | b) Explain about fundamentals of FPL. | [8M] |
| 7 | a) Explain about Logic programming. | [8M] |
| | b) Explain the Basic elements of Prolog. | [8M] |

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Code No: **R31013**

R10

Set No. 1

III B. Tech I Semester Supplementary Examinations, May - 2016

CONCRETE TECHNOLOGY

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

- 1 a) Explain the laboratory tests of cement. [8]
b) Write about accelerators, retarders and plasticizers. [7]
- 2 a) Write a short note on grading and surface area of aggregate. [8]
b) Write about Alkali-Aggregate reaction and explain how we can control. [7]
- 3 a) What are the various factors influencing the workability? [8]
b) Explain about segregation and bleeding. [7]
- 4 a) Write the relation between compression and tensile strength. [8]
b) Describe the importance of curing and explain different types of curing. [7]
- 5 a) What is the importance of non-destructive tests? [8]
b) What are the factors affecting the strength of concrete? [7]
- 6 a) What are the factors affecting modulus of elasticity? [8]
b) Explain in detail the classification of shrinkage. [7]
- 7 Design a concrete mix of M25 grade. Take standard deviation of 5MPa. The specific gravities of coarse aggregate and fine aggregate are 2.75 and 2.60 respectively. The bulk density of coarse aggregate is 1610kg/cu.m and fineness modulus of fine aggregate is 2.72. Design the concrete mix using IS code method. Assume any missing data suitably. [15]
- 8 Explain the following: [15]
i) No-fines concrete
ii) High performance concrete
iii) Self consolidating concrete
iv) Fiber reinforced concrete.

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Code No: **R31033**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May - 2016

DYNAMICS OF MACHINERY
(Common to ME, AME & Mining Engg)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Explain the effect of precession motion on the stability of moving vehicles such as motor cycle? [5]
- b) The rotor of a marine turbine has a moment of inertia of 750kg.m^2 and rotates at 3000rpm clockwise when viewed from aft. If the ship pitches with angular simple harmonic motion having a periodic time of 16 seconds and an amplitude of 0.1 radian, find the [10]
 - (i) maximum angular velocity of the rotor axis
 - (ii) maximum value of the gyroscopic couple.
- 2 a) What is meant by friction circle? Deduce an expression for the radius of friction circle in terms of the radius of the journal and angle of friction. [8]
- b) A pivot bearing of a shaft consists of a frustum of a cone. The diameters of the frustum are 200 mm and 400 mm, and its semi-cone angle is 60° . The shaft carries a load of 40 kN and rotates at 240 rpm. The coefficient of friction is 0.02. Assuming the intensity of pressure to be uniform, determine [7]
 - i) The magnitude of pressure, and
 - ii) The power lost in friction.
- 3 a) Explain about Prony and Rope brake dynamometers in brief. [5]
- b) An effective diameter of the cone clutch is 75 mm. The semi-angle of the cone is 18° . Find the torque required to produce slipping of the clutch if an axial force applied is 200 N. This clutch is employed to connect an electric motor running uniformly at 100 r.p.m with a flywheel which is initially stationary. The flywheel has a mass of 13.5 kg and its radius of gyration is 150 mm. Calculate the time required for the flywheel to attain full speed, and also the energy lost in the slipping of the clutch. Take coefficient of friction as 0.3. [10]
- 4 a) Given the indicator diagrams for the two ends of a reciprocating steam engine, explain step by step, how you would proceed to draw the crank effort diagram for one revolution of the engine. [8]
- b) An engine flywheel has mass of 6.5 tonnes, and the radius of gyration is 2 m. If the maximum and minimum speeds are 120 rpm and 118 rpm respectively, find the maximum fluctuation of energy. [7]



- 5 a) Discuss the merits and demerits of spring controlled and gravity controlled governors. [7]
- b) Porter governor has equal arms each 250mm long and pivoted on the axis of rotation. Each ball has a mass of 5Kg and the mass of the central load on the sleeve is 25kg. The radius of rotation of the ball is 150mm when the governor begins to lift and 200mm when the governor is at maximum speed. Find the maximum and minimum speeds and range of speed of the governor. [8]
- 6 a) Explain the role of reference plane in balancing masses of rotation in different planes. [7]
- b) A,B,C and D are from masses carried by a rotating shaft at radii 100mm, 150mm, 150mm and 200mm respectively. The planes in which masses rotate are spaced at 500mm apart and the magnitude of the masses, B, C, and D are 9kg, 5kg and 4kg respectively. Find the required mass A and the relative angular settings of the 4 masses so that the shaft shall be in complete balance. [8]
- 7 Explain terms i) Variations in tractive effort, ii) Swaying couple and iii) Hammer blow as applied to locomotive balancing. Derive expressions for these for two cylinders uncoupled locomotive balancing. [15]
- 8 a) Explain vibrations of beams with concentrated and distributed loads. [7]
- b) Derive an equation for the natural frequency of free transverse vibration of a shaft loaded with a number of concentrated loads, by energy method. [8]

Code No: **R31043**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May - 2016

LINEAR IC APPLICATIONS

(Common to ECE, EIE, BME and ECompE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

- 1 a) Define CMRR and write the output voltage interms of CMRR. [8]
b) For a differential amplifier, two sets of inputs are applied. The first set is $V_1=50 \mu\text{V}$ and $V_2=-50 \mu\text{V}$ and second set is $V_1=1050 \mu\text{V}$ and $V_2=950 \mu\text{V}$. If the CMRR is 100, calculate the percentage difference in the output voltage obtained for the 2 sets of the input signals. If CMRR is improved to 10,000, calculate the percentage difference in the output voltage obtained for the 2 sets of the input voltage. [7]
- 2 a) Explain the dominant pole compensation technique. [7]
b) Explain the Miller effect compensation technique. [8]
- 3 Explain about
(i) voltage to current (V to I) converter with grounded load [7]
(ii) current to voltage (I to V) converter with grounded load. [8]
- 4 Draw the circuit diagram of a bistable multivibrators using Op-amp and explain its operation [15]
- 5 What are the merits of active filter employing Op-amps? Draw the schematic of a band pass filter and explain the working. [15]
- 6 Derive the expressions for
(i) Lock in range [7]
(ii) Capture range. [8]
- 7 a) Explain the working of a dual slope A/D converter. [7]
b) Enlist the advantages and disadvantages of dual slope ADC. [8]
- 8 a) What is the meaning of switch? Explain the different types of Switches.
b) Explain the applications of Analog switches.

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Code No: **R31053**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May - 2016

ADVANCED DATA STRUCTURES

(Common to CSE & IT)

Time: 3 hours

Max. Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

- 1 a) Explain multiplication and division methods to compute hash function. [10]
b) Write a brief note on rehashing methods. [5]
- 2 a) Give the representation of AVL trees. [5]
b) Explain how an AVL tree can be used to sort a sequence of n elements in $O(n \log n)$ time. [10]
- 3 a) What is the significance of priorities? Explain how do you arrange elements in a priority queue? [9]
b) Write an algorithm to create heaps. [6]
- 4 What is the need of an adjacency matrix? How it differs from an adjacency lists? Explain them briefly. [15]
- 5 Write and explain the Prim's and Kruskal's algorithms with an example. [15]
- 6 Write an algorithm for merge sort and also explain with an example how many passes are required to sort n elements. [15]
- 7 What is a trie? Give the structure of it. Explain the patricia trie with its structure, representation and basic operations. [15]
- 8 a) Discuss various UNIX commands for creating, opening and reading the contents from a file. [8]
b) Write the differences between logical files and physical files in UNIX. [7]

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