DADI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Permanently Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

Recognized by UGC 2(F) and 12(B)

An ISO 9001:2008, 14001:2004 & OHSAS 18001:2007 Certified Institute

NH–16, Anakapalle, Visakhapatnam–531002, Andhra Pradesh

DEPARTMENT OF CIVIL ENGINEERING

COURSE FILE

Name of the Course: Design and Drawing of reinforced concrete structures

Class and Branch : III B.Tech, Civil

Department: Civil Engineering **Academic Year:** 2018-2019

Prepared by Course Instructor
Name : Mrs. V. A. Manga
Designation : Assistant Professor
Signature :
Date :

Reviewed by Course Co-ordinator
Name :
Designation :
Signature :
Date :

Reviewed by Module Co-ordinator
Name :
Designation :
Signature :
Date :

Reviewed by Program Co-ordinator
Name :
Signature :
Date:

Reviewed by HOD
Name :
Signature :
Date:

Approved by Academic Convenor
Name :
Signature :
Date :

1. Vision and Mission of the Institute and Department

Vision of the Institute

To evolve into a Premier Technical Institution with Value based Education to nurture Competitive
Technologists to Build New World.

Mission of the Institute

To Promote Personality Development, Academic Excellence, Creative Technology, Disciplined Career, Human Service, Ethical Values & Indian Culture for enlightenment of the Global Society.

Vision of the Department

To impart knowledge and excellence in Civil Engineering with innovative perspectives to the student community and make them strong Engineers ethically for building a strong nation.

Mission of the Department

- To promote innovative ideas with original thinking in the minds of budding Engineers to face the future challenges.
- To provide knowledge base and consultancy services to the community in all areas of Civil Engineering.
- To produce Civil Engineers of high caliber with advanced technical skills and ethical values to serve the society and the nation.
- To make the Department as a centre of excellence in the field of Civil Engineering and allied research activities.

2. Syllabus of the Course

III Year B.Tech CE - I Semester		L	T	P	C
		4	2	0	3
Design and drawing of reinforced concrete structures					

UNIT –I Introduction: Working stress method Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, elastic theory, design constants, modular ratio, neutral axis depth and moment of resistance, balanced, under-reinforced and over-reinforced sections, working stress method of design of singly and doubly reinforced beams. Limit State Design: Concepts of limit state design – Basic statistical principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance.

UNIT –II Design for Flexure: Limit state analysis and design of singly reinforced sections- effective depth- Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections- Minimum depth for a given capacityLimiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T&L)- Effective width of flange –Behavior- Analysis and Design.

UNIT – III Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.Limit state design for serviceability: Deflection, cracking and code provision, Design of formwork for beams and slabs.

UNIT – IV Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

UNIT –V Footings: Different types of footings – Design of isolated and combined footings - rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

UNIT – VI Slabs: Classification of slabs, design of one - way slabs, two - way slabs, and continuous slabs using IS Coefficients (conventional), design of waist-slab staircase.

NOTE: All the designs to be taught in Limit State Method Following plates should be prepared by the students.

1. Reinforcement detailing of T-beams, L-beams and continuous beams.
2. Reinforcement detailing of columns and isolated footings.
3. Detailing of one-way, two-way and continuous slabs and waist-slab staircase.

Text Books

1. Limit State Design, A. K. Jain

2. Design of Reinforced concrete Structures, N. Subrahmanyian
3. Reinforced Concrete Structures, S. Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.

References

1. R C C Design, B.C Punmia, A. K. Jain and A. K Jain. Lakshmi Publications
2. Reinforced Concrete Structures, N. Krishna Raju & R. N. Pranesh, New Age Publications.

IS Codes:

1) IS -456-2000 Code of practice for Reinforced Concrete Structures (Permitted to use in examination hall)

2) IS – 875

3) SP-16

3. Additional Reference Books, Journals, websites and E-links

Reference Books:

Reinforced concrete structures by MR Dheerendra babu (Falcon publications)

4.**Websites and E-links:**

1. https://nptel.ac.in/courses/105/105/105105105/
2. https://freevideolectures.com/course/2686/design-of-reinforced-concrete-structures

3. https://www.quora.com/How-can-one-learn-design-of-reinforced-concrete-structures-online

4.https://www.researchgate.net/publication/274457039_A_Teaching_Aid_Website_for_Reinforced_Concrete_Design_Courses

5. Course Handout

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

Part – A

(Course Description,Course Objectives, Course Outcomes,Course Articulation Matrix)

PROGRAM : B.Tech, Civil
CLASS and Semester :III B.Tech., I-Sem., Civil Engineering
ACADEMIC YEAR : 2018-2019
COURSE NAME & CODE : Design and drawing of reinforced concrete structures
L-T-P STRUCTURE : 4-2-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Miss V A Manga
COURSE COORDINATOR : Miss V A Manga
PRE-REQUISITE : Design and drawing of reinforced concrete structures

COURSE DESCRIPTION : This course familiarize Students with different types of design philosophies

COURSE OBJECTIVES

The student will be able to

- Work on different types of design philosophies
- Carryout analysis and design of flexural members and detailing
- Design structures subjected to shear, bond and torsion
- Design different type of compression members and footings

COURSE OUTCOMES(COs)

After going through this course the student will be able to

- To understand the types of design philosophies
- To design T beam and L beam for flexure
- Design and Detailing of Simply supported and Continuous beams for shear, torsion and bond
- Design and Detailing of one way and two way slab using Limit state method.
- Design short and long column under axial loads, uniaxial and biaxial bending.
- Design of footings subjected axial loads, uniaxial and biaxial bending.

COURSE ARTICULATION MATRIX (Correlation between Cos&POs,PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	1	1	-

CO2	2	2	2	-	-	-	-	-	-	-	-	2	2	-
CO3	2	2	3	-	-	-	-	-	-	-	-	2	3	-
CO4	1	1	-	-	-	-	-	-	-	-	-	1	2	-

1:Slight(Low) 2:Moderate(Medium) 3:Substantial(High) - :None

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DEPARTMENT OF CIVIL ENGINEERING

Part –B

COURSE DELIVERY PLAN

Name of the Course: Design & drawing of reinforced concrete structures **Class & Branch :** III B.Tech I Sem

Academic Year **:** 2018-2019 **Regulation** : R13

Faculty Name **:** Miss V A Manga **Designation** **:** Assistant Professor

S.No	Topic	No. of periods required	Teaching Learning Method	Proposed date of completion	Actual date of completion	HOD Review
	UNIT – 1 INTRODUCTION					
1.	Introduction to RCS	1	TLM2			
2.	Properties of concrete	1	TLM2			
3.	Advantages & Disadvantages of steel	1	TLM2			
4.	Types of steel and loads	1	TLM2			
5.	Methods of RCS	1	TLM2			
6.	Assumptions of WSM	1	TLM2			
7.	Types of sections in a beam	1	TLM2			
8.	Analysis of SRB by WSM	1	TLM2			
9.	Analysis of SRB by WSM	1	TLM2			
10	Explanation of types of sections	1	TLM2			
11	Steps in analysis of beam-WSM	1	TLM2			

12	Problems on analysis of beam-WSM	1	TLM4			
13	Problems on analysis of beam-WSM	1	TLM4			
14	Problems on analysis of beam-WSM	1	TLM4			
15	Stepwise procedure in design of beam	1	TLM2			
16	Problems on design of beam-WSM	1	TLM4			
17	Problems on design of beam-WSM	1	TLM4			
18	Problems on design of beam-WSM	1	TLM4			
19	Limit state design principles	1	TLM2			
20	Reinforcement details in beams	1	TLM2			
21	Stress block parameters	1	TLM2			
22	Depth of NA and lever arm	1	TLM2			
23	Derivation of MR-WSM	1	TLM2			
	UNIT- 2 DESIGN FOR FLEXURE					
24	Stepwise procedure in analysis of beam	1	TLM2			
25	Problems on analysis of beam-LSM	1	TLM4			
26	Problems on analysis of beam-LSM	1	TLM4			
27	Stepwise procedure in design of beam-LSM	1	TLM2			
28	Problems on design of beam-LSM	1	TLM4			
29	Problems on design of beam-LSM	1	TLM4			
30	Problems on design of DRB-LSM	1	TLM2			
31	DRB Design principles	1	TLM2			
32	Stepwise procedure in analysis of beam	1	TLM2			
33	Problems on analysis of beam	1	TLM4			
34	Stepwise procedure in design of beam	1	TLM2			
35	Problems on design of DRB	1	TLM4			
36	Problems on design of DRB	1	TLM4			
37	Problems on design of DRB	1	TLM4			
38	Flanged beams design procedure	1	TLM2			

39	Analysis of flanged beams	1	TLM2			
40	Analysis of flanged beams	1	TLM2			
41	Stepwise procedure in analysis of flanged beam	1	TLM2			
42	Problems on analysis of flanged beam	1	TLM4			
43	Problems on analysis of flanged beam	1	TLM4			
44	Stepwise procedure in design of flanged beam	1	TLM2			
45	Problems on design of flanged beam	1	TLM4			
46	Problems on design of flanged beam	1	TLM4			
47	Problems on design of flanged beam	1	TLM4			
	UNIT – 3 DESIGN FOR SHEAR,TORSION AND BOND					
48	Principles of shear reinforcement	1	TLM2			
49	Stepwise procedure in design of shear reinforcement	1	TLM2			
50	Stepwise procedure in design of shear reinforcement	1	TLM2			
51	Problems on shear reinforcement	1	TLM4			
52	Problems on shear reinforcement	1	TLM4			
53	Problems on shear reinforcement	1	TLM4			
54	Problems on shear reinforcement	1	TLM4			
55	Design principles of bond stress	1	TLM2			
56	Types of bonds,hooks and bends	1	TLM2			
57	Curtailment of tension reinforcement	1	TLM2			
58	Problems on development length	1	TLM4			
59	Stepwise procedure in design of continuos beams	1	TLM2			
60	Stepwise procedure in design of continuos beams	1	TLM2			
61	Problems on design of continuos beams	1	TLM4			
62	Problems on design of continuos beams	1	TLM4			
63	Drawing sheet on design of continuos beam	1	TLM2			
64	Doubts clarification on unit 3	1	TLM2			

Total No. of classes Required to complete the syllabus: 64

Course Instructor Course Coordinator Module Co-Ordinator Program Co-Ordinator HOD

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DEPARTMENT OF CIVILENGINEERING

Part –C

Name of the Course: Design & drawing of reinforced concrete structure **Class& Branch :** III B.Tech I Sem

Academic Year : 2018-2019 **Regulation** : R13

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM5**	Activity based Learning
TLM2	LCD Projector	**TLM6**	Flipped//Blended Learning
TLM3	Tutorial (Problem Solving)	**TLM7**	Experiential Learning
TLM4	Participatory Learning	**TLM8**	Project Based Learning

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1			
I Mid Examinations			
II Phase of Instructions			
IIMid Examinations			
Preparation and Practicals			
Semester End Examinations			

EVALUATION PROCESS:

Evaluation Task	COs	Marks
First Mid Examination	1,2,3	M1=15
First Online Examination	1,2,3	OL1=10
First Assignment	1,2,3	A1=5
First Mid Marks Total(X1)=M1+OL1+A1	1,2,3	X1=30
SecondMid Examination	4,5,6	M2=15
Second Online Examination	4,5,6	OL2=10
Second Assignment	4,5,6	A2=5
Second Mid Marks Total (X2)=M2+OL2+A2	4,5,6	X2=30
Cumulative Internal Examination Marks(X): (80% of Highest + 80% of Low	1,2,3,4,5,6	X=30
Semester End Examinations	1,2,3,4,5,6	Y=70
Total Marks: X+Y	1,2,3,4,5,6	100

Course Instructor **Course Coordinator** **Module Co-Ordinator** **Program Co-Ordinator** **HOD**

6. PEOs and PO's

Program Educational Objectives

Program Educational Objectives of the UG Civil Engineering are:

PEO1: Provide Engineering design solutions for the real world problems in Structures, Environmental, Geotechnical,
Constructional planning and techniques, Water resources, Remote Sensing and Transportation Engineering
domains of Civil Engineering.

PEO2: They will succeed and excel in their chosen professional practice/research and enroll/pursue higher education
in the reputed Institutions of India and Abroad from the field of Civil Engineering.

PEO3: Make ethical decisions and demonstrate a commitment to the profession bodies and society.

PEO4: Acquire a position that values adaptability and innovation in their profession.

PEO5: Demonstrate leadership, both in their chosen profession and in other social responsibilities.

Programme Outcomes

The Program Outcomes of UG Civil Engineering are:

PO 1: Engineering knowledge: Apply the knowledge of Mathematics, Science, Engineering Fundamentals, and an Engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of Mathematics, Natural Sciences, and Engineering Sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, along with cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern Engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The Engineer and society: Apply reasoning based on the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the Engineering and Management principles and apply these to one's own work, as a member and leader in a team, and to manage projects in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

POs & PSO REFERENCE:

PO1	Engineering Knowledge	PO7	Environment& Sustainability	PSO1	
PO2	Problem Analysis	PO8	Ethics	PSO2	
PO3	Design & Development	PO9	Individual & Team Work		
PO4	Investigations	PO10	Communication Skills		
PO5	Modern Tools	PO11	Project Mgt. & Finance		
PO6	Engineer & Society	PO12	Life Long Learning		

Program Specific outcomes

PSO1: To enhance the employability skills by making the students good in codes of practice, materials, techniques and Softwares.

PSO 2: To develop and design sustainable and smart infrastructure considering the global environmental challenges.

PSO 3: The graduates will be able to work effectively as an individual or in a team having acquired leadership skills and manage projects in multidisciplinary environments.

7. List of the Students of the Class with Roll Numbers

III B.TECH I SEM CIVIL

S.NO	HT NO	NAME
1	16U41A0101	BANDARU SANKAR
2	16U41A0102	CHANDRA AMUKTHA
3	16U41A0104	GANNU PYDI RAJESH
4	16U41A0106	KORIBILLI ANIL KUMAR
5	16U41A0107	KOTNI NARESH
6	16U41A0108	PALLA PARAMESWARI
7	16U41A0109	POTHALA ARUN KUMAR
8	16U41A0110	POTNURU SAI KUMAR
9	16U41A0111	SONU KUMAR URAW
10	16U41A0112	SURISETTY NAGAPHANEENDRA
11	16U41A0113	VIYYAPU BHASKAR RAO
12	16U41A0114	PEDADA RAJ MAHESH
13	16U41A0115	SIDDA SIRISHA
14	16U41A0116	PENTAKOTA GEETHANJALI
15	17U45A0101	ALLA BABA AJAY
16	17U45A0102	BADAMPUDI RAVICHINNA
17	17U45A0103	BALIREDDI HEMANTH KUMAR
18	17U45A0104	BODDETI NAVEENA LAKSHMI
19	17U45A0105	BOTLA TARUN
20	17U45A0106	BOTTA SIVA VENKATA SAI
21	17U45A0107	CHAKKALA DURGAPRASAD
22	17U45A0108	CHUKKALA JAGADISH SAIRAM
23	17U45A0109	DEKKA RAMCHANDU

24	17U45A0110	DEVI POLAMARASETTY
25	17U45A0111	GEDUTHURI RAMYA
26	17U45A0112	GODDU ASIRINAIDU
27	17U45A0113	GUDE NANDI PRIYA
28	17U45A0114	GUNNABATTULA GAYATRI
29	17U45A0115	JAGARAPU YASWANTH
30	17U45A0116	JERRIPOTHULA SRAVANI
31	17U45A0117	JOMMALA VANI
32	17U45A0118	KAKARA KARTHIK
33	17U45A0119	KANDREGULA SAMPATH KUMAR
34	17U45A0120	KANDULA RAVI TEJA
35	17U45A0121	KONKUPUDI SANKAR SAI
36	17U45A0122	KOPPISETTY RAJESH
37	17U45A0123	KOSANAM ROHINI SAILAXMI
38	17U45A0124	LALAM ANANTHA BABU
39	17U45A0125	MADDALA ANURADHA LAKSHMI
40	17U45A0126	MADDALA CHAKRAVARTHI
41	17U45A0127	MADIBOYINA MADHURI
42	17U45A0128	MAGARAPU SANTOSH KUMAR
43	17U45A0129	MANDAPAKA KISHORE
44	17U45A0130	MANNI GOVINDA KRISHNA
45	17U45A0131	MANTHINI VENKATA RAMANA
46	17U45A0132	MATHALA PRAVEEN KUMAR
47	17U45A0133	MEDISETTI BHANU PRASAD
48	17U45A0134	MUDAPAKA NAVEEN
49	17U45A0135	PALLA LAKSHMI HARIKA

50	17U45A0136	PEELA BALA SAI
51	17U45A0137	PETLA YAMINI SWETHA
52	17U45A0138	PIRADI NOOKARAJU
53	17U45A0139	POLIMERA SURYANARAYANA
54	17U45A0140	PONNAGANTI SATEESH
55	17U45A0141	SALAPU DURGA PRASAD
56	17U45A0142	SALAPU JAGADEESH
57	17U45A0143	SARAGADAM GAYATHRI
58	17U45A0144	SATHIVADA SITARAM
59	17U45A0145	SILAPARASETTI VENKATESH
60	17U45A0146	SURISETTI JAGADEESH
61	17U45A0147	SURISETTY JYOTHI
62	17U45A0148	TADI BHANU SEKHAR
63	17U45A0149	THONDA GANESH
64	17U45A0151	SILAPARASETTI JAGADEESH

8. Class Time Table and Individual Time Table

TIMINGS / DAY	09:00am-09.50am	09.50am to 10.40am	10.40am to 11.00am	11:00am-11:50am	11:50am-12:40pm	12.40pm to 1.30 pm	1:30pm-02:20pm	02:20pm-03:10pm	03:10pm 04:00pm
MON	DDRCS	DDRCS	**BREAK**	EG	TE-II	Lunch	MS	TS(DSS)	Library
TUE	EG	DDRCS		TS(TE)	SA-II		CT LAB/TE LAB		
WED	TE-II	EG		MS	CRT(S)		TE LAB/EG LAB		
THU	SA-II	TE-II		MS	EG		DDRCS		SA-II
FRI	TS(SA)	TS(SA)		DDRCS	CRT(S)		EG LAB/CT LAB		
SAT	SA-II	TE-II		CRT(M)	SA-II		EG		MS

Mrs.Kuppili Manoharini

Day / Time	9:00 AM to 10:00 AM	10:00 AM to 10:50 AM	Break	11:00 AM to 11:50 AM	11:50 AM to 12:40 PM	Lunch	01:30 PM to 2:20 PM	2:20 PM to 3:10 PM	3:10 PM to 4:00 PM
Mon	DDRCS	DDRCS			SUR-II				
Tue	SUR-II	DDRCS		SOM-I			EE	WFA-SUR LAB	
Wed	EE	RCS(BC)		SUR-II			TS	RCS(BC)	
Thu	SUR-II			SOM-I			DDRCS	DDRCS	
Fri	SOM-I			DDRCS	EE				SOM-I
Sat	SOM-I	EE		SUR-II			SUR-II LAB		

9. Tutorial Questions (Unit wise)

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DEPARTMENT OF CIVIL ENGINEERING

PROGRAM : B.Tech CE
CLASSAND SEMESTER : III B.Tech., I-Sem., CE
ACADEMIC YEAR : 2018-2019
COURSE NAME & CODE : Design & drawing of reinforced concrete structures
COURSE INSTRUCTOR : Ms.V.A.Manga

Tutorial –1

1) Draw and derive singly reinforced beam and doubly reinforced with stress strain curves
2) A RC beam of rectangular section is required to resist a service moment of 120 KN-m. Design a suitable dimensions and reinforcement for the balanced section of the ebam. Assume M 20 grade concrete and Fe 415 grade steel.

Tutorial –2

1) A rectangular beam 25cm x 50 cm deep is reinforced with 2-14 mm bars in compression zone and 4-25mm bars in tension zone, each at an effective cover of 40mm.Determine the forces in compression, force of tension, cracking moment and moment of resistance assume M20 concrete and Fe 415 grade steel
2) An L beam has the flange width of 900 mm, with the thickness of slab 100 mm. The web below is 250 × 500 mm. Determine the areas of steel required for it to carry a limiting moment of 600 kNm. Assume *fck* = 15 N/mm2 and grade 415 steel. Sketch the details of reinforcement.

Tutorial –3

1) A simply supported R.C.C beam 250mm wide and 450mm deep (effective) is reinforced with a4-18mm dia bars. design the shear reinforcement if M20 grade concrete and fe 415 steel is used and beam is subjected to a sheer force of 150KN at service state.
2) A rectangular section of a simply supported beam is 250 × 420 mm in section with effective cover of 40 mm to the center of reinforcement. It has 4 Nos. of 12 mm bars continued to the supports. Find the shear capacity at the support if the shear reinforcement consists of double vertical stirrup of 8 mm diameter at 200 mm spacing. Assume *fy* = 250 N/mm2, and *fck* = 20 N/mm2

Tutorial –4

1) Design an R.C.C. slab of size 5 m x 6 m, simply supported on all four edges with corners held down. The slab is carrying a load of 4 kN/m2 including floor finish etc. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement also.
2) Design a slab supported on all edges over a room of size 4 m x 5.5 m. Two adjacent edges of the slab are discontinuous. The slab shall be used as class room floor and a floor finish with cement concrete of 20 mm thick is provided over the slab. The slab is supported on masonry walls 230 mm thick. Use M20 grade of concrete and HYSD steel bars of grade Fe 415.

Tutorial –5

1) Design a short circular column 6m long to carry an axial load of 250kN if both ends of the column are fully restrained using i) Lateral ties and ii) helical steel.
2) Design an axially loaded tied column with an unsupported length of 4 m. the column is fixed at one end and pinned at the other end. The column has to carry

a factored load of 1600 kN. Use M25 grade of concrete and Fe 500 grade steel. Sketch the reinforcement details.

Tutorial –6

1) A rectangular column 450 mm x 600 mm transverse a dead load of 950 kN and a live load of 1350 kN without any moment. The safe bearing capacity of soil is 140 kN/m2. Use M20 grade of concrete and HYSD steel bars of grade Fe 415. Design the rectangular footing to support the column.
2) Design a short circular column 6m long to carry an axial load of 250 KN if both ends of the column are fully restrained using a) Lateral ties b) Helical steel

10. Assignment Questions (Unit wise)

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DEPARTMENT OF CIVIL ENGINEERING

Program : III B.Tech I-Sem, Civil Engineering

Academic Year : 2018-2019

Course Name & Code : Design & drawing of reinforced concrete structures
Course Instructor : Ms.V.A.Manga, Assistant Professor

UNIT-I
Introduction to Working stress method& Limit sate Design

1) Explain the uses of various types of cement and its applications.
2) Design a RC rectangular beam simply supported over an effective span of 6m to support an imposed load of 24 KN/m iclusive of self wt. Use M25 and Fe 415.Provide width of beam equal to half of the depth. Use working stress method.
3) What are the assumption to be made for limit state and working stress method.

UNIT-II
Design for flexure

1) Design a rectangular beam 230mmX600mm over an effective span of 5m,the super imposed load on the beam in 50KN/M. effective cover to rein force is taken as 50mm use fe415,M20 concrete.
2) A rectangular beam 25cm x 50 cm deep is reinforced with 2-14 mm bars in compression zone and 4-25mm bars in tension zone, each at an effective cover of 40mm.Determine the forces in compression, force of tension, cracking moment and moment of resistance assume M20 concrete and Fe 415 grade steel.
3) A doubly reinforced beam of width 250mm and 500mm effective depth is reinforced with 2 bars of 20mm diameter in compression and 6 bars of 20mm diameter in tension zone. Find the ultimate moment of resistance of thebeam section.Effective cover is 40mm for both the sides. Use M25 grade and Fe 415.

UNIT-III
Design for Shear,Torsion and Bond

1) A rectangular section of a simply supported beam is 250 × 420 mm in section with effective cover of 40 mm to the center of reinforcement. It has 4 Nos. of 12 mm bars continued to the supports. Find the shear capacity at the support if the shear reinforcement consists of double vertical stirrup of 8 mm diameter at 200 mm spacing. Assume f_y = 250 N/mm2, and f_{ck} = 20 N/mm2
2) A rectangular beam of size 300x600 mm is subjected to a factored sagging bending moment of 60 KN M, factored shear force of 45 KN and factored torsional moment 20 KN M. Design the reinforcement at the section using limit state method . use M20 and Fe415 steel.
3) Calculate the development length required for a bar having dia 16 mm .
   A) In compression M20 grade concrete and Fe 415 steel
   B) In compression M20 grade concrete and Fe 250 steel
   C) In tension M25 grade concrete and Fe 415 steel
   D) In tension M25 grade concrete and Fe 250 steel

UNIT-IV
Slabs

1) Design a simply supported slab to cover a hall with internal dimensions 4.0 m × 6.0 m. The slab is supported on masonry walls 230 mm thick. Assume a live load of 3 kN/m2 and finish load of 1 kN/m2. Use M20 concrete and Fe415 steel. Assume that the slab corners are prevented from lifting up.

2) Design an R.C.C. slab of size 5 m x 6 m, simply supported on all four edges with corners held down. The slab is carrying a load of 4 kN/m2 including floor finish etc. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement also.

3) Design a continuous RC slab for a hall 6.5 m and 13.5 m long. The slab is supported on RCC beams each 240 mm wide which are monolithic. The ends of the slab are supported on walls, 230 mm wide. Design the slab for a live load of 2.5 kN/m2. Assume the weight of roof finishing equal to 1.5 kN/m2. Use M20 grade of concrete and Fe 415 steel.

UNIT-V
Design of compression members

1) Design a short circular column 6m long to carry an axial load of 250kN if both ends of the
   column are fully restrained using i) Lateral ties and ii) helical steel
2) An R.C.C. short column of size 400 mm x 500 mm is carrying a factored load of 3000 kN. Design the column assuming emin < 0.05 D. Use M25 concrete and Fe 415 steel.
3) Design a circular column of 4 m height is effectively held in position at one end and pinned at other end. The diameter of the column is 400 mm. Calculate the reinforcement if it is required to carry a factored axial load of 1600 kN. Use M30 mix and Fe 500 grade steel.

UNIT-VI
Footings

1) Design the footing for a reinforced concrete column 225 x 450 mm carrying an axial load of 1075 kN. The bearing capacity of the soil is 100 kN/m2. Use M20 concrete and Fe500 grade steel as reinforcement.

2) Design an isolated rectangular footing for an axial load of 1500 kN transmitted by the column. The cross section of the column is 230 mm x 450 mm. The SBC of soil is 180 kN/m2. Adopt M20 grade concrete and Fe 415 grade steel.

3) Design a square footing of uniform thickness for an axially loaded column of 450 mm x 450 mm size. The safe bearing capacity of soil is 190 kN/m2. Load on column is 850 kN. Use M20 concrete and Fe 415 steel.

11. Quiz Questions/Objective type Questions (Unit wise)

DADI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Permanently Affiliated to JNTUK, Kakinada)

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NH–16, Anakapalle, Visakhapatnam–531002, Andhra Pradesh

DEPARTMENT OF CIVIL ENGINEERING

PROGRAM : B.Tech CE
CLASSAND SEMESTER :III B.Tech., I-Sem., CE
ACADEMIC YEAR : 2018-2019
COURSE NAME & CODE : Design and drawing of reinforced concrete structures
COURSE INSTRUCTOR : Ms.V.A.Manga

Date:

Quiz Questions/Objective type Questions

UNIT-I

INTRODUCTION TO WORKING STRESS METHOD & LIMIT STATE DESIGN

1) The shear reinforcement in R.C.C. is provided to resist

(A) Vertical shear
(B) Horizontal shear
(C) Diagonal compression
(D) **Diagonal tension**

2) For R.C.C. member of beam submerged under sea water, the cover should be more than the specified value by

(A) 10 mm
(B) **40 mm**
(C) 20 mm
(D) 60 mm

3) While designing R.C.C. piles as a column, it is considered as

(A) Hinged at both ends
(B) Fixed at both ends
(C) **Fixed at one end and hinged at other end**
(D) Restrained throughout

4) In R.C.C. columns with spiral reinforce meant minimum number of longitude bars in contact with the spiral shall be less than

(A) 3
(B) 4
(C) 5
(D) **6**

5) In a R.C.C. bridge the maximum size of reinforce ment shall not exceed

(A) 75 mm
(B) 60 mm
(C) **45 mm**
(D) 25 mm

6) Design of R.C.C. cantilever beams is based on the resultant force at

(A) **Fixed end**
(B) Free end
(C) Mid span
(D) Mid span and fixed support

7) Design of R.C.C. simply supported beams, carrying u.d.l., is based on the resultant BM at

(A) Supports
(B) Mid span
(C) Every section
(D) **Quarter Span**

8) When R.C.C. footing is not to extend in the plot of the neighbouring house, the type of footing preferred is

(A) Cellular raft footing
(B) Inverted flat not footing
(C) Both of the above
(D) **Sharp footing**

9) To take care of reversible shear in an R.C.C. beam, it is advisable to use

(A) Only vertical stirrups
(B) Vertical stirrups in association with cranked reforcement
(C) Only cranked reforcement
(D) **A combination of vertical and inclined stirrups**

10) The maximum unsupported length between end restraints for a R.C. column is

(A) 62 times the least interal dimension
(B) 65 times the least interal dimension
(C) 70 times the least interal dimension
(D) **60 times the least interal dimension**

11) The thickness of the flange of tee beam of a ribbed slab is assumed as

(A) Width of the rib
(B) Depth of the rib

(C) **Thickness of the concrete topping**
(D) Half the thickness of the rib

12) In a singly reinforced beam, the effective depth is measured from its compression edge to
(A) Tensile edge
(B) **Tensile reinforcement**
(C) Natural axis of the beam
(D) Longitudinal central axis

13) On an absolutely rigid foundation base, the pressure will
(A) Be more at the edges of the foundation
(B) Be uniform
(C) **Not be uniform**
(D) By zero at the centre of the foundation

14) Steel been theory is used for
(A) Design of simple steel beams
(B) Steel beams encased in concrete
(C) **Doubly reinforcement beams ignoring compressive stress in concrete**
(D) Beans if shear exceeds four times allowable sheer stress

15) On an absolutely rigid foundation base, the pressure will
(A) Be more at the edges of the foundation
(B) Be uniform
(C) **Not be uniform**
(D) By zero at the centre of the foundation

UNIT-2
DESIGN FOR FLEXURE

1) The failure criteria used for concrete under compression in reinforced concrete beams and columns is
(A) **Maximum principal stress theory**
(B) Maximum principal strain theory
(C) Maximum shear stress theory
(D) Maximum distortion strain energy theory

2) In the suspended span of a double cantilever bridge, the depth of the suspended beam is increased towards its ends for the purpose
(A) **Providing strength**
(B) Deflection control
(C) Aesthetic
(D) Crack prevention

3) An R.C.C. beam of 6 m span is 30 cm wide and has a lever arm of 55 cm. If it carries a U.D.L. of 12 t per m and allowable shear stress is 5 kg/cm2, the beam
(A) Is safe in shear
(B) Is safe with stirrups
(C) Is safe with stirrups and inclined bars
(D) **Needs revision of section**

4) According to I.S. : 456, slabs which span in two directions with corners held down, are assumed to be divided in each direction into middle strips and edge strips such that the width of the middle strip, is
(A) Half of the width of the slab
(B) Two-third of the width of the slab
(C) **Three-fourth of the width of the slab**
(D) Four-fifth of the width of the slab

5) The load stress of a section can be reduced by
(A) Decreasing the lever arm
(B) Increasing the total perimeter of bars
(C) **Replacing larger bars by greater number of small bars**
(D) Replacing smaller bars by greater number of greater bars

6) If is the uniformly distributed load on a circular slab of radius fixed at its ends, the maximum positive radial moment at its centre, is
(A) $3WR^2/16$
(B) $2WR^2/16$
(C) $\mathbf{WR^2/16}$
(D) None of these

7) Pick up the correct statement from the following:
(A) Lateral reinforcement in R.C.C. columns is provided to prevent the longitudinal reinforcement from buckling
(B) Lateral reinforcement prevents the shearing of concrete on diagonal plane
(C) Lateral reinforcement stops breaking away of concrete cover, due to buckling
(D) **All the above**

8) The width of the flange of a L-beam, should be less than
(A) One-sixth of the effective span
(B) Breadth of the rib + four times thickness of the slab
(C) Breadth of the rib + half clear distance between ribs
(D) **Least of the above**

9) A pre-stressed concrete member is preferred because
(A) Its dimensions are not decided from the diagonal tensile stress

(B) Large size of long beams carrying large shear force need not be adopted
(C) Removal of cracks in the members due to shrinkage
(D) **All the above**

10) ordinarily be satisfactory in case of a
(A) Simply supported beam
(B) Continuous beam
(C) **Cantilever beam**
(D) None of these

11) A pile of length carrying a uniformly distributed load per metre length is suspended at two points, the maximum, B.M. at the centre of the pile or at the points of suspension, is
(A) WL/8
(B) $WL^2/24$
(C) **$WL^2/47$**
(D) $WL^2/16$

12) Pick up the incorrect statement from the following: Tensile reinforcement bars of a rectangular beam
(A) Are curtailed if not required to resist the bending moment
(B) Are bent up at suitable places to serve as shear reinforcement
(C) **Are bent down at suitable places to serve as shear reinforcement**
(D) Are maintained at bottom to provide at least local bond stress

13) Steel bars are generally connected together to get greater length than the standard length by providing
(A) Straight bar splice
(B) Hooked splice
(C) Dowel splice
(D) **All the above**

14) The minimum thickness of the cover at the end of a reinforcing bar should not be less than twice the diameter of the bar subject to a minimum of
(A) 10 mm
(B) 15 mm
(C) 20 mm
(D) **25 mm**

15) For M 15 grade concrete (1:2:4) the moment of resistance factor is
(A) 0.87
(B) **8.50**
(C) 7.50
(D) 5.80

UNIT-3
DESIGN FOR SHEAR, TORSION & BOND

1) P Is the pre-stressed force applied to tendon of a rectangular pre-stressed beam whose area ofcross section is and sectional modulus is .The minimum stress on the beam subjected to a maximum bending moment is

(A) f = (P/A) - (Z/M)
(B) f = (A/P) - (M/Z)
(C) **f = (P/A) - (M/Z)**
(D) f = (P/A) - (M/6Z)

2) An R.C.C. lintel is spanning an opening of 2 m span in a brick wall. The height of the roof is 2.9 m above the floor level and that of the opening is 2.1 m above the floor level. The lintel is to be designed for self weight plus

(A) Triangular load of the wall
(B) UDL of wall
(C) **UDL of wall + load from the roof**
(D) Triangular load + load from the roof

3) An R.C.C beam of 25 cm width has a clear span of 5 metres and carries a U.D.L. of 2000 kg/m inclusive of its self weight. If the lever arm of the section is 45 cm., the beam is

(A) **Safe in shear**
(B) Is safe with stirrups
(C) Is safe with stirrups and inclined members
(D) Needs revision of the section

4) The neutral axis of a T-beam exists

(A) Within the flange
(B) At the bottom edge of the slab
(C) Below the slab
(D) **All the above**

5) A pre-cast pile generally used, is

(A) Circular
(B) Square
(C) Octagonal
(D) **Square with corners chamfered**

6) After pre-stressing process is completed, a loss of stress is due to

(A) Shrinkage of concrete
(B) Elastic shortening of concrete
(C) Creep of concrete
(D) **All the above**

7) In the zone of R.C.C. beam where shear stress is less than 5 kg/cm2, nominal reinforcement is provided at a pitch of
(A) One-half lever arm of the section
(B) One-third lever arm of the section
(C) **Lever arm of the section**
(D) One and half lever arm of the section

8) The transverse reinforcements provided at right angles to the main reinforcement
(A) Distribute the load
(B) Resist the temperature stresses
(C) Resist the shrinkage stress
(D) **All the above**

9) High strength concrete is used in pre-stressed member
(A) To overcome high bearing stresses developed at the ends
(B) To overcome bursting stresses at the ends
(C) To provide high bond stresses
(D) **All the above**

10) The modular ratio m of a concrete whose permissible compressive stress is C, may be obtained from the equation.
(A) m = 700/3C
(B) m = 1400/3C
(C) **m = 2800/3C**
(D) m = 3500/3C

11) Side face reinforcement shall be provided in the beam when depth of the web in a beam exceeds
(A) 50 cm
(B) **75 cm**
(C) 100 cm
(D) 120 cm

12) The Young's modulus of elasticity of steel, is
(A) 150 KN/mm2
(B) 200 KN/mm2
(C) 250 KN/mm2
(D) **275 KN/mm2**

13) Spacing of stirrups in a rectangular beam, is
(A) Kept constant throughout the length
(B) Decreased towards the centre of the beam
(C) Increased at the ends
(D) **Increased at the centre of the beam**

14) The allowable tensile stress in mild steel stirrups, reinforced cement concrete, is
(A) **1400 kg/cm2**
(B) 190 kg/cm2
(C) 260 kg/cm2
(D) 230 kg/cm2

15) The advantage of reinforced concrete, is due to
(A) Monolithic character
(B) Fire-resisting and durability
(C) Economy because of less maintenance cost
(D) **All the above**

UNIT-4
SLABS

1) According to I.S. : 456, slabs which span in two directions with corners held down, are assumed tobe divided in each direction into middle strips and edge strips such that the width of the middle strip, is
(A) Half of the width of the slab
(B) Two-third of the width of the slab
(C) **Three-fourth of the width of the slab**
(D) Four-fifth of the width of the slab

2) The maximum ratio of span to depth of a slab simply supported and spanning in one direction, is
(A) 35
(B) 25
(C**) 30**
(D) 20

3) The floor slab of a building is supported on reinforced cement floor beams. The ratio of the end and intermediate spans is kept
(A) 0.7
(B) 0.8
(C) **0.9**
(D) 0.6

4) In case the factor of safety against sliding is less than 1.5, a portion of slab is constructed downwards at the end of the heel slab, which is known as
(A) A key
(B) A cut-off wall
(C) A rib
(D) **All the above**

5) For a ribbed slab
(A) Clear spacing between ribs shall not be greater than 4.5 cm

(B) Width of the rib shall not be less than 7.5 cm
(C) Overall depth of the slab shall not exceed four times the breadth of the rib
(D) **All the above**

6) A very comfortable type of stairs is
(A) Straight
(B) Dog legged
(C) Geometrical
(D) **Open newel**

7) If the ratio of the span to the overall depth does not exceed 10, the stiffness of the beam will ordinarily be satisfactory in case of a
(A) Simply supported beam
(B) Continuous beam
(C) **Cantilever beam**
(D) None of these

8) The minimum thickness of a flat slab is taken
(A) L/32 for end panels without drops
(B) L/36 for end panels without drops
(C) L/36 for interior panels without drop
(D) **All the above**

9) The design of heel slab of a retaining wall is based on the maximum bending moment due to:
(A) Its own weight
(B) Weight of the soil above it
(C) Load of the surcharge, if any
(D) **All the above**

10) In a simply supported slab, alternate bars are curtailed at
(A) 1/4th of the span
(B) 1/5th of the span
(C) 1/6th of the span
(D) **1/7th of the span**

11) R and T are rise and tread of a stair spanning horizontally, the steps are supported by a wall on one side and by a stringer beam on the other side, the steps are designed as beams of width
(A) R + T
(B) T - R
(C)$\sqrt{}$**(R 2 + T2)**
(D) R – T

12) The pitch of the main bars in a simply supported slab, should not exceed its effective depth by
(A) Three times

(B) Four times
(C) Five times
(D) **Six times**

13) Enlarged head of a supporting column of a flat slab is technically known as
(A) Supporting end of the column
(B) Top of the column
(C) **Capital**
(D) Drop panel

14) Thickened part of a flat slab over its supporting column, is technically known as
(A) **Drop panel**
(B) Capital
(C) Column head
(D) None of these

15) The minimum head room over a stair must be
(A) 200 cm
(B) 205 cm
(C) **210 cm**
(D) 230 cm

UNIT-5
DESIGN OPF COMPRESSION MEMBERS

1) If the width of the foundation for two equal columns is restricted, the shape of the footing generally adopted, is
(A) Square
(B) **Rectangular**
(C) Trapezoidal
(D) Triangular

2) Pick up the correct statement from the following:
(A) Lateral reinforcement in R.C.C. columns is provided to prevent the longitudinal reinforcement from buckling
(B) Lateral reinforcement prevents the shearing of concrete on diagonal plane
(C) Lateral reinforcement stops breaking away of concrete cover, due to buckling
(D) **All the above**

3) Columns may be made of plain concrete if their unsupported lengths do not exceed their least lateral dimension
(A) Two times
(B) Three times
(C) **Four times**
(D) Five times

4) The minimum clear cover for R.C.C. columns shall be
(A) Greater of 40 mm or diameter
(B) Smaller of 40 mm or diameter
(C) **Greater of 25 mm or diameter**
(D) Smaller of 25 mm or diameter

5) The spacing of transverse reinforcement of column is decided by the following consideration.
(A) The least lateral dimension of the column
(B) Sixteen times the diameter of the smallest longitudinal reinforcing rods in the column
(C) Forty-eight times the diameter of transverse reinforcement
(D) **All the above**

6) The transverse reinforcements provided at right angles to the main reinforcement
(A) Distribute the load
(B) Resist the temperature stresses
(C) Resist the shrinkage stress
(D) **All the above**

7) Enlarged head of a supporting column of a flat slab is technically known as
(A) Supporting end of the column
(B) Top of the column
(C) **Capital**
(D) Drop panel

8) Bottom bars under the columns are extended into the interior of the footing slab to a distance greater than
(A) 42 diameters from the centre of the column
(B) 42 diameters from the inner edge of the column
(C) **42 diameters from the outer edge of the column**
(D) 24 diameters from the centre of the column

9) An R.C.C. column is treated as short column if its slenderness ratio is less than
(A) 30
(B) 35
(C) 40
(D) **50**

10) The angle of internal friction of soil mass is the angle whose
(A) **Tangent is equal to the rate of the maximum resistance to sliding on any internal inclined** plane to the normal pressure acting on the plane
(B) Sine is equal to the ratio of the maximum resistance to sliding on any internal inclined plane to the normal pressure acting on the plane
(C) Cosine is equal to the ratio of the maximum resistance sliding on any internal inclined plane

to the normal pressure acting on the plane
(D) None of these

11) The steel generally used in R.C.C. work, is
(A) Stainless
(B) **Mild steel**
(C) High carbon steel
(D) High tension steel

12) By over-reinforcing a beam, the moment of resistance can be increased not more than
(A) 10 %
(B) 15 %
(C) 20 %
(D) **25** %

13) The live load to be considered for an accessible roof, is
(A) Nil
(B) 75 kg/m3
(C) **150 kg/m2**
(D) 200 kg/cm2

14) On an absolutely rigid foundation base, the pressure will
(A) Be more at the edges of the foundation
(B) Be uniform
(C) **Not be uniform**
(D) Be zero at the centre of the foundation

15) The diameter of transverse reinforcement of columns should be equal to one-fourth of the diameter of the main steel rods but not less than
(A) 4 mm
(B) 5 mm
(C) 6 mm
(D) **7 mm**

UNIT-6
FOOTING

1) If the width of the foundation for two equal columns is restricted, the shape of the footing generally adopted, is
(A) Square
(B) **Rectangular**
(C) Trapezoidal
(D) Triangular

2) Pick up the correct statement from the following:

(A) Lateral reinforcement in R.C.C. columns is provided to prevent the longitudinal reinforcement from buckling
(B) Lateral reinforcement prevents the shearing of concrete on diagonal plane
(C) Lateral reinforcement stops breaking away of concrete cover, due to buckling
(D) **All the above**

3) For M 15 grade concrete (1:2:4) the moment of resistance factor is
(A) 0.87
(B) **8.50**
(C) 7.50
(D) 5.80

4) The self-weight of the footing, is
(A) **Not considered for calculating the upward pressure on footing**
(B) Also considered for calculating the upward pressure on footing
(C) Not considered for calculating the area of the footing
(D) Both (b) and (c)

5) If the bearing capacity of soil is 10 tonnes/cm2 and the projection of plain concrete footing from walls, is a cm, the depth D of footing is
(A) D = 0.0775 a
(B) **D = 0.775 a**
(C) D = 0.775 a
(D) D = 0.775 a2

6) The transverse reinforcements provided at right angles to the main reinforcement
(A) Distribute the load
(B) Resist the temperature stresses
(C) Resist the shrinkage stress
(D) **All the above**

7) The modular ratio m of a concrete whose permissible compressive stress is C, may be obtained from the equation.
(A) m = 700/3C
(B) m = 1400/3C
(C) **m = 2800/3C**
(D) m = 3500/3C

8) Thickened part of a flat slab over its supporting column, is technically known as
(A) **Drop panel**
(B) Capital
(C) Column head
(D) None of these

9) As per IS : 456, the reinforcement in a column should not be less than
(A) 0.5% and not more than 5% of cross-sectional area
(B) 0.6% and not more than 6% of cross-sectional area
(C) 0.7% and not more than 7% of cross-sectional area
(D) **0.8% and not more than 8% of cross-sectional area**

10) The maximum ratio of span to depth of a slab simply supported and spanning in two directions, is
(A) 25
(B) 30
(C) **35**
(D) 40

11) The breadth of a ribbed slab containing two bars must be between
(A) 6 cm to 7.5 cm
(B) **8 cm to 10 cm**
(C) 10 cm to 12 cm
(D) 12 cm to 15 cm

12) For a number of columns constructed in a rcjw, the type of foundation provided, is
(A) Footing
(B) Raft
(C) Strap
(D) **Strip**

13) As the percentage of steel increases
(A) Depth of neutral axis decreases
(B) **Depth of neutral axis increases**
(C) Lever arm increases
(D) Lever arm decreases

14) In a combined footing if shear stress exceeds 5 kg/cm2, the nominal stirrups provided are:
(A) 6 legged
(B) 8 legged
(C) 10 legged
(D) **12 legged**

15) A raft foundation is provided if its area exceeds the plan area of the building by
(A) 10 %
(B) 20 %
(C) 40 %
(D) **50** %

12. Question Bank (Descriptive Questions with BLOOMS Taxonomy)

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NH–16, Anakapalle, Visakhapatnam–531002, Andhra Pradesh

DEPARTMENT OF CIVIL ENGINEERING

PROGRAM : B.Tech CE
CLASSAND SEMESTER : III B.Tech., I-Sem., CE
ACADEMIC YEAR : 2018-2019
COURSE NAME & CODE : Design and drawing of reinforced concrete structures
COURSE INSTRUCTOR : Ms.V.A.Manga

UNIT-I

CO	Level	Q.No	Questions
1	1,2	1	Draw stress block diagram and evaluate the following expressions for limit state design: a. Neutral Axis depth b. Lever arm c. Moment of resistance d. Clear cover &effective cover e. Depth of the beam width of the beam
1	1	2	What the difference is between singly reinforced & doubly reinforced section.
1	1,4	3	What are the assumptions to be made for limit state and working stress method?
1	1,2	4	Draw and derive singly reinforced beam and doubly reinforced with stress strain curves
1	1	5	What are the methods adopted for structural design.
1	1	6	Show that the limiting depth of neutral axis for a rectangular cross section reinforced with FE415 grade steel in 0.48d.

UNIT-II

CO	Level	Q.No	Questions
2	4	1	Design a rectangular beam 230mmX600mm over an effective span of 5m, the super imposed load on the beam in 50KN/M. effective cover to rein

			force is taken as 50mm use fe415, M20 concrete.
2	4	2	An L beam has the flange width of 900 mm, with the thickness of slab 100 mm. The web below is 250 × 500 mm. Determine the areas of steel required for it to carry a limiting moment of 600 kNm. Assume *fck*= 15 N/mm2 and grade 415 steel. Sketch the details of reinforcement.
2	1	3	Find the moment of resistance of a beam section 250 mm x 500 mm deep is Reinforced with 2- 16 mm bars in tension at an effective cover of 40 mm. Use M20 concrete and Fe 500 grade of steel.
2	4	4	Design a doubly reinforced section for a rectangular beam at mid span having a simply supported effective span of 4.5 m. The superimposed load is 35kN/m and size of beam is limited to 25cm × 40cm overall. Assume suitable section.
2	3	5	A rectangular beam 25cm x 50 cm deep is reinforced with 2-14 mm bars in compression zone and 4-25mm bars in tension zone, each at an effective cover of 40mm.Determine the forces in compression, force of tension, cracking moment and moment of resistance assumeM20 concrete and Fe 415 grade steel M25 concrete and Sail MA410 grade steel.
2	3	6	Design a balanced singly reinforced concrete beam with a span of 5m to carry a dead load of 25-kN/m and working live load of 20 kN/m. Use M20 mix and steel is of Fe 415 grade steel.

UNIT-III

CO	Level	Q.No	Questions
3	1,4	1	A rectangular section of a simply supported beam is 250 × 420 mm in section witheffective cover of 40 mm to the center of reinforcement. It has 4 Nos. of 12 mm barscontinued to the supports. Find the shear capacity at the support if the shearreinforcement consists of double vertical stirrup of 8 mm diameter at 200 mm spacing.Assume *fy*= 250 N/mm2, and *fck*= 20 N/mm2
3	4	2	A simply supported R.C.C. beam 200 mm x 400 mm (effective) is reinforced with4 bars of 22 mm diameter on tension side. The beam is carrying a load of 10 kN/m over a clear span of 8 m. Design the shear reinforcement. Use M 20 concrete andFe 415 steel bars.
3	3	3	Calculate the development length required for a bar having dia 16 mm . i) In compression M20 grade concrete and Fe 415 steel ii) In compression M20 grade concrete and Fe 250 steel iii) In tension M25 grade concrete and Fe 415 steel iv) In tension M25 grade concrete and Fe 250 steel
3	4	4	A rectangular beam of size 300x600 mm is subjected to a factored sagging bending moment of 60 KN M, factored shear force of 45 KN and factored torsional moment 20 KN M. Design the reinforcement at the section using

			limit state method .use M20 and Fe415 steel.
3	4	5	A simply supported R.C.C beam 250mm wide and 450mm deep (effective) is reinforced with a 4-18mm diabars.design the shear reinforcement if M20 grade concrete and fe415 steel is used and beam is subjected to a shear force of 150KN at service state.
3	4	6	An RC beam has an effective depth of 450mm and breadth of 300mm. It contains 5-20mm bars mild steel out of which two bars curtailed at a section where shear forceat service load is 100kN. Design the shear reinforcement if the concrete is M20.

UNIT-IV

CO	Level	Q.No	Questions
4	4	1	Design a short circular column 6m long to carry an axial load of 250kN if both ends of the column are fully restrained using i) Lateral ties and ii) helical steel
4	4	2	An R.C.C. short column of size 400 mm x 500 mm is carrying a factored load of3000 kN. Design the column assuming emin< 0.05 D. Use M25 concrete and Fe 415steel.
4	4	3	Design a circular column of 4 m height is effectively held in position at one end and pinned at other end. The diameter of the column is 400 mm. Calculate the reinforcement if it is required to carry a factored axial load of 1600 kN. Use M30 mix and Fe 500 grade steel.
4	3,4	4	Design a R.C.C. column to carry an axial load of 2000N. The size of the column is restricted to 600 mm square. The effective height of column is 9 m. Use M20concrete and fe415= 190 N/mm2.
4	3	5	Design an axially loaded tied column with an unsupported length of 4 m. the column is fixed at one end and pinned at the other end. The column has to carry a factored load of1600 kN. Use M25 grade of concrete and Fe 500 grade steel. Sketch the reinforcement details.
4	3	6	Design an axially loaded tied column with an unsupported length of 3.7 m. the column is fixed at one end and pinned at the other end. The column has to carry a factored load of 2000KN. Use M25 grade of concrete and Fe 500 grade steel. Sketch the reinforcement details.

UNIT-V

CO	Level	Q.No	Questions
5	4	1	Design a simply supported slab to cover a hall with internal dimensions 4.0 m × 6.0 m.The slab is supported on masonry walls 230 mm thick. Assume a live load of 3 kN/m2and finish load of 1 kN/m2. Use M20 concrete and Fe415 steel. Assume that the slab corners are prevented from

			lifting up.
5	4	2	Design a two-way slab of clear dimensions 4.5 m × 3.6 m with two adjacent edges discontinuous. The slab is subjected to live load of 3.5 kN/m2 and floor finish of 1.5kN/m2. Assume the width of supports is 300 mm. Use M 20 concrete and Fe 415 steel.
5	4	3	Design a reinforced concrete slab for a room of clear dimensions 4 m x 5 m. The slab is supported on walls of width 300 mm. The slab is carrying a live load of 4kN/m2 and floor finish 1 kN/m2. Use M20 concrete and Fe 415 steel. The corners of slab are held down. Sketch the layout of the reinforcement.
5	4	4	Design an R.C.C. slab of size 5 m x 6 m, simply supported on all four edges with corners held down. The slab is carrying a load of 4 kN/m2 including floor finish etc.Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement also.
5	4	5	Design a continuous RC slab for a hall 6.5 m and 13.5 m long. The slab is supported on RCC beams each 240 mm wide which are monolithic. The ends of the slab are supported on walls, 230 mm wide. Design the slab for a live load of 2.5 kN/m2. Assume the weight of roof finishing equal to 1.5 kN/m2. Use M20 grade of concrete and Fe 415steel.
5	4	6	Design a slab supported on all edges over a room of size 4 m x 5.5 m. Two adjacent edges of the slab are discontinuous. The slab shall be used as class room floor and a floor finish with cement concrete of 20 mm thick is provided over the slab. The slab is supported on masonry walls 230 mm thick. Use M20 grade of concrete and HYSD steel bars of grade Fe 415.

UNIT-VI

CO	Level	Q.No	Questions
6	4,5	1	Design the footing for a reinforced concrete column 225 x 450 mm carrying an axialload of 1075 kN. The bearing capacity of the soil is 100 kN/m2. Use M20 concreteand Fe500 grade steel as reinforcement.
6	4	2	Design a combined footing for the two columns of a multistorey building. The columnsof size 400 × 400 mm transmits a working load of 800 kN each and they are spaced at 5m centers. The safe bearing capacity of soil at the site is 200 kN/m2. Adopt M20 gradeconcrete and Fe415 grade reinforcement.
6	4	3	Design an isolated rectangular footing for an axial load of 1500 kN transmitted by thecolumn. The cross section of the column is 230 mm x 450 mm. The SBC of soil is180 kN/m2. Adopt M20 grade concrete and Fe 415 grade steel.
6	4	4	Design a square footing of uniform thickness for an axially loaded column of 450mm x 450 mm size. The safe bearing capacity of soil is 190 kN/m2. Load oncolumn is 850 kN. Use M20 concrete and Fe 415 steel.

6	4	5	A rectangular column 450 mm x 600 mm transverse a dead load of 950 kN and a live loadof 1350 kN without any moment. The safe bearing capacity of soil is 140 kN/m2. UseM20 grade of concrete and HYSD steel bars of grade Fe 415. Design the rectangularfooting to support the column.

CO : Course Outcomes Blooms Taxonomy Levels
L1: Remembering
L2 : Understanding
L3 : Applying
L4 : Analysing
L5 : Evaluating
L6 : Creating

13. Previous University Question papers (Minimum Five)

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

IS: 456 – 2000 & Column interaction diagrams only from SP-16 are to be provided to the student in the Examination hall.

*****

PART –A

1 Design a continuous RC slab for a hall 7m and 14m long. The slab is supported on RCC beams each 300mm wide which are monolithic. The ends of the slab are supported on walls. 300mm wide. Design the slab for a live load of 3 kN/m². Assume the weight of roof finishing equal to 1.0 kN/m². Use M20 concrete and Fe 415 steel.
a) Draw the reinforcement of the slab in plan view.
b) Draw cross section of the slab including beams with reinforcement details.

(OR)

2 The T beam floor consists of 12cm thick R.C. slab monolithic with 30cm wide beams. The beams are spaced at 3.5m center to center and their effective span is 8m. If the superimposed on the slab is 6.5kN/m², design an intermediate beam Use M25 mix and FE 415 grade steel.
a) Longitudinal section showing the reinforcement details.
b) The cross section of the beam at salient points, showing reinforcement details

PART -B

3 A rectangular beam section is 20cm wide and 35 cm deep up to the center of tension steel, which consist of 4-16mm TOR bars. Find the position of the neutral axis, the lever arm, forces of compression and tension, cracking moment and safe moment of resistance of concrete is of M20 mix and steel is of Fe500 grade.

4 The flange of a T beam flange of the beam is 90 cm x 12cm and web below is 30cm x 40cm. It is reinforced with 4-25 mm plus 4-12mm Fe 415 steel bars in tension at an effective cover of 50mm. Determine the shear reinforcement needed for a shear forceof 250kN (i) If the mix is M20 and (ii) if the mix is M25. Take load factor = 1.5.

5 Design a square spread footing to carry a column of 1800kN from a 60 cm square tiedcolumn containing 25mm bars as the longitudinal reinforcement. The bearing capacityof soil is 180 kN/m^2. Consider base of footing as 1m below the ground level. The unitweight of earth is 20 kN/m^3. Use σ_y = 415 N/mm^2 and σ_{ck} = 20 N/mm^2.

6 a) What is the minimum percentage of steel allowed in a RC column. Explain why it is necessary to specify the minimum percentage.

b) A column 230 mm x 350 mm is reinforced with 4 bars 20mm one at each cornereffective cover of 50mm. It is loaded with characteristic load = 340 kN. Factored Moment in the direction of larger dimension Mux = 30 kNm. Factored Moment in the direction of shorter dimension Muy = 18 kNm. About Y axis bisecting the width. Assume concrete grade M 20 and steel grade Fe 415 steel. Check the safety of the column.

7 Write short notes on

i) Reason to design as a under reinforced section

ii) Diagonal tension

iii) Torsion provisions in beams

iv) Uniaxial and Biaxial bending in columns

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

IS:456 – 2000 & Column interaction diagrams only from SP-16 are to be Provided to the student in the Examination hall.

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PART –A

1 The T beam floor consists of 12cm thick R.C. slab monolithic with 30cm widebeams. The beams are spaced at 3.0m center to center and their effective span is 7.5m. If the superimposed on the slab is 6kN/m², design an intermediate beam. Use M20 mix and FE 415 grade steel. Draw to scale
a) Longitudinal section showing the reinforcement details.
b) The cross section of the beam at salient points, showing reinforcement details

(OR)

2 Design a continuous RC slab for a hall 4 m wide and 12 m long supported on floor beams spaced at 3m c/c. Design the slab for a live load of 2.5 kN/m². Use M20concrete and Fe 415 steel**.**
a) Draw the reinforcement of the slab in plan view
b) Draw cross section of the slab including beams with reinforcement details.

PART -B

3 A beam section is 230 mm wide and 400 mm deep is reinforced with tension reinforcement 2000mm² at an effective cover of 30 mm. Determine the ultimate moment of resistance of beam section. Use M20 mix and steel is of Fe 415 gradesteel.

[7M]

4 a)What are the assumptions for the design of a reinforced concrete section for limit state of collapse in bending?
b) Show that the limiting depth of neutral axis for a rectangular cross section reinforced with FE415 grade steel in 0.48d.

[7M]

5 An RC beam has an effective depth of 450mm and breadth of 250mm. It contains 4-25mmbars mild steel out of which two bars are bent up at 30 degrees near the support in tension.Calculate the shear resistance of the bent up bars. What additional stirrups are needed if it has to resist a design shear force of 150 kN. Use M20 mix.

[14M]

6 Design an isolated square column 400mm x 400mm reinforced with 6 - 20mm diameter bars carrying a service load of 1400 kN The bearing capacity of soil is 200 kN/m^2 at a depth of 1.5m below ground. The footing is restricted to 2.0m in one direction Assume M20 grade concrete and Fe 415 grade steel for the footing and M25 concrete and Fe 415 steel for the column.

7 The section of a cantilever beam designed for a span of 4.0m is having dimensions300 x 600mm with 3 numbers 20mm diameter bars in compression and 3 numbers 16mm diameter bars in tension. The beam has been designed for a bending momentof 170kNm (at support) under service loads, of which 65 percent is due to permanent (dead) loads. The loading is uniformly distributed on the span. Assume M20 concrete and Fe 415 steel.
i) Calculate the maximum short-term deflection
ii) The short-term deflection due to live loads alone.

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

IS:456 – 2000 & Column interaction diagrams only from SP-16 are to be Provided to the student in the Examination hall.

*****

PART –A

1 Design a continuous RC slab for a hall 6.5m and 13.5m long. The slab is supported on RCC beams each 240mm wide which are monolithic. The ends of the slab are supported on walls. 300mm wide. Design the slab for a live load of 2 kN/m^2. Assume the weight of roof finishing equal to 1.5 kN/m^2. Use M15 concrete and Fe 415 steel.

i) Draw the reinforcement of the slab in plan view

ii) Draw cross section of the slab including beams with reinforcement details.

(OR)

2 A T beam floor consists of 12cm thick R.C. slab monolithic with 30cm wide beams. The beams are spaced at 4.0m center to center and their effective span is 7.5m. If the superimposed on the slab is 7.0 kN/m^2, design an intermediate. Use M20 mix and TMT 415 grade steel .draw to scale

a) Longitudinal section showing the reinforcement details.

b) The cross section of the beam at salient points, showing reinforcement details

PART -B

3 Design a balanced singly reinforced concrete beam with a span of 5m to carry a dead load of 25-kN/m and working live load of 20 kN/m. Use M20 mix and steel is of Fe 415 grade steel.

4 An L beam has flange of the beam is 90 cm x 12cm and web below is 23cm x 50cm. Determine the area of compression and tension steels needed for the cross section if it is to carry a factored bending moment of 400 kNm. Assume M20 concrete and TMT 500 grade steel**.**

5 Design a short circular column 6m long to carry an axial load of 250kN if both ends of the column are fully restrained using i) Lateral ties and ii) helical steel

6 An RC beam has an effective depth of 300mm and breadth of 150mm. It contains 4- 20mm bars. Determine the shear resistance of the concrete beam if σ_{sv} = 415 N/mm^2 for
i) σ_{ck} = 20 N/mm^2 and ii) σ_{ck} = 30 N/mm^2

7 The section of a cantilever beam designed for a span of 5.0m is having dimensions 300 x 600mm with 3 numbers 28mm diameter bars in compression and 3 numbers 20mm diameter bars in tension. The beam has been designed for a bending moment of 200kNm (at support) under service loads, of which 70 percent is due to permanent (dead) loads. The loading is uniformly distributed on the span. Assume M20 concrete and Fe 415 steel. Calculate the maximum short-term deflection.

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

IS:456 – 2000 & Column interaction diagrams only from SP-16 are to be Provided to the student in the Examination hall.

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PART –A

1 Design an isolated square footing for a column 450mm x 450mm reinforced with 8- 25 mm diameter bars carrying a service load of 2000 kN The bearing capacity of soil is 250 kN/m^2 at a depth of 1.5m below ground. The footing is restricted to 2.0 m in one direction Assume M20 grade concrete and Fe 415 grade steel for the footing and M25 concrete and Fe 415 steel for the column.
Draw to scale:
a) Longitudinal section showing the reinforcement details.
b) The plan showing reinforcement details.

(OR)

2 Design a simply supported roof slab for a room 4.5 m x 6 m measuring from inside. Thickness of the wall is 400 mm. The superimposed load exclusive of the self weight is 2.5 kN/m^2. The slab may be assumed to be simply supported on all four edges with corners held down. Use M20 mix and Fe 415 grade steel.
a) Draw the reinforcement of the slab in plan view
b) Draw cross section of the slab including beams with reinforcement details

PART -B

3 Design a balanced singly reinforced concrete beam with a span of 6m to carry a dead load of 30-kN/m and working live load of 25 kN/m. Use M15 mix and steel is of Fe 415 grade steel.

4 An RC beam has an effective depth of 450mm and breadth of 300mm. It contains 5- 20mm bars mild steel out of which two bars curtailed at a section where shear forceat service load is 100kN. Design the shear reinforcement if the concrete is M20.

5 Design a section of a ring beam 50cm wide and 65cm deep subjected to a bending moment of 120kNm, twisting moment of 7.5-kNm and shear force of 150 kN at ultimate. Use M20 mix and Fe 415 grade steel.

6 Draw axial force moment interaction curve for a rectangular column with 2% steel distributed equally on two faces. Assume a minimum of 12 bars placed at an effective coverof 0.15D.

7 Explain short-term deflection. Explain the difficulty in estimating short term deflection as per IS code procedure when applied moment at service loads is marginally less than the cracking moment Are the nominal detailing requirements of the code adequate for ensuring crack width control? Comment.

14. GATE Questions (Unit wise)

4) The failure criteria used for concrete under compression in reinforced concrete beams and columns is
(A) **Maximum principal stress theory**
(B) Maximum principal strain theory
(C) Maximum shear stress theory
(D) Maximum distortion strain energy theory

5) In the suspended span of a double cantilever bridge, the depth of the suspended beam is increased towards its ends for the purpose
(A) **Providing strength**
(B) Deflection control
(C) Aesthetic
(D) Crack prevention

6) An R.C.C. beam of 6 m span is 30 cm wide and has a lever arm of 55 cm. If it carries a U.D.L. of 12 t per m and allowable shear stress is 5 kg/cm2, the beam
(A) Is safe in shear
(B) Is safe with stirrups
(C) Is safe with stirrups and inclined bars
(D) **Needs revision of section**

4) According to I.S. : 456, slabs which span in two directions with corners held down, are assumed to be divided in each direction into middle strips and edge strips such that the width of the middle strip, is
(A) Half of the width of the slab
(B) Two-third of the width of the slab
(C) **Three-fourth of the width of the slab**
(D) Four-fifth of the width of the slab

5) The load stress of a section can be reduced by
(A) Decreasing the lever arm
(B) Increasing the total perimeter of bars
(C) **Replacing larger bars by greater number of small bars**
(D) Replacing smaller bars by greater number of greater bars

6) If is the uniformly distributed load on a circular slab of radius fixed at its ends, the maximum positive radial moment at its centre, is
(A) $3WR^2/16$
(B) $2WR^2/16$
(C) $\mathbf{WR^2/16}$
(D) None of these

7) Pick up the correct statement from the following:
(A) Lateral reinforcement in R.C.C. columns is provided to prevent the longitudinal reinforcement from buckling
(B) Lateral reinforcement prevents the shearing of concrete on diagonal plane
(C) Lateral reinforcement stops breaking away of concrete cover, due to buckling
(D) **All the above**

8) The width of the flange of a L-beam, should be less than
(A) One-sixth of the effective span
(B) Breadth of the rib + four times thickness of the slab
(C) Breadth of the rib + half clear distance between ribs
(D) **Least of the above**

9) A pre-stressed concrete member is preferred because
(A) Its dimensions are not decided from the diagonal tensile stress
(B) Large size of long beams carrying large shear force need not be adopted
(C) Removal of cracks in the members due to shrinkage
(D) **All the above**

10) ordinarily be satisfactory in case of a
(A) Simply supported beam
(B) Continuous beam
(C) **Cantilever beam**
(D) None of these

15. Campus Placement/Interview Questions(Unit wise)

1) If the width of the foundation for two equal columns is restricted, the shape of the footing generally adopted, is
(A) Square
(B) **Rectangular**
(C) Trapezoidal
(D) Triangular

2) Pick up the correct statement from the following:
(A) Lateral reinforcement in R.C.C. columns is provided to prevent the longitudinal reinforcement from buckling
(B) Lateral reinforcement prevents the shearing of concrete on diagonal plane
(C) Lateral reinforcement stops breaking away of concrete cover, due to buckling
(D) **All the above**

3) Columns may be made of plain concrete if their unsupported lengths do not exceed their least lateral dimension
(A) Two times
(B) Three times
(C) **Four times**
(D) Five times

4) The minimum clear cover for R.C.C. columns shall be
(A) Greater of 40 mm or diameter
(B) Smaller of 40 mm or diameter
(C) **Greater of 25 mm or diameter**
(D) Smaller of 25 mm or diameter

5) The spacing of transverse reinforcement of column is decided by the following consideration.
(A) The least lateral dimension of the column
(B) Sixteen times the diameter of the smallest longitudinal reinforcing rods in the column

(C) Forty-eight times the diameter of transverse reinforcement
(D) **All the above**

6) The transverse reinforcements provided at right angles to the main reinforcement
(A) Distribute the load
(B) Resist the temperature stresses
(C) Resist the shrinkage stress
(D) **All the above**

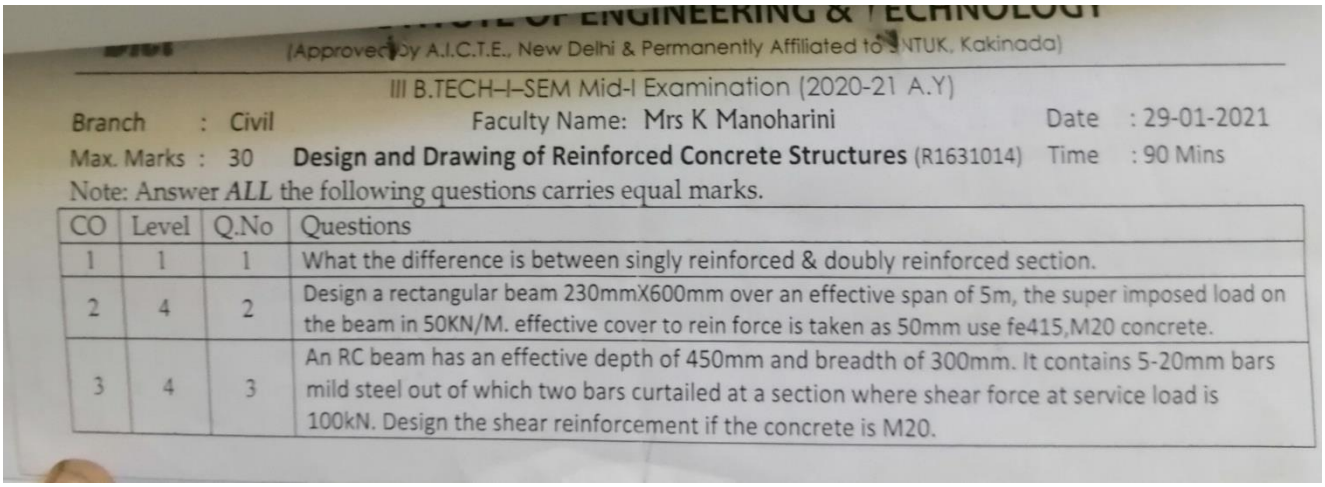
7) Enlarged head of a supporting column of a flat slab is technically known as
(A) Supporting end of the column
(B) Top of the column
(C) **Capital**
(D) Drop panel

8) Bottom bars under the columns are extended into the interior of the footing slab to a distance greater than
(A) 42 diameters from the centre of the column
(B) 42 diameters from the inner edge of the column
(C) **42 diameters from the outer edge of the column**
(D) 24 diameters from the centre of the column

9) An R.C.C. column is treated as short column if its slenderness ratio is less than
(A) 30
(B) 35
(C) 40
(D) **50**

10) The angle of internal friction of soil mass is the angle whose
(A) **Tangent is equal to the rate of the maximum resistance to sliding on any internal inclined** plane to the normal pressure acting on the plane
(B) Sine is equal to the ratio of the maximum resistance to sliding on any internal inclined plane to the normal pressure acting on the plane
(C) Cosine is equal to the ratio of the maximum resistance sliding on any internal inclined plane to the normal pressure acting on the plane
(D) None of these

16A.Internal (Mid) Examinations Question Papers



(Approved by A.I.C.T.E., New Delhi & Permanently Affiliated to JNTUK, Kakinada)

III B.TECH–I–SEM Mid-I Examination (2020-21 A.Y)

Branch : Civil Faculty Name: Mrs K Manoharini Date : 29-01-2021

Max. Marks : 30 **Design and Drawing of Reinforced Concrete Structures** (R1631014) Time : 90 Mins

Note: Answer *ALL* the following questions carries equal marks.

CO	Level	Q.No	Questions
1	1	1	What the difference is between singly reinforced & doubly reinforced section.
2	4	2	Design a rectangular beam 230mmX600mm over an effective span of 5m, the super imposed load on the beam in 50KN/M. effective cover to rein force is taken as 50mm use fe415,M20 concrete.
3	4	3	An RC beam has an effective depth of 450mm and breadth of 300mm. It contains 5-20mm bars mild steel out of which two bars curtailed at a section where shear force at service load is 100kN. Design the shear reinforcement if the concrete is M20.

16 B. First Mid Internal Marks of respective Subject, Mid Marks Analysis and Action

Taken Report

		DDRCS			
S.NO	ROLL NO	M(15)	Q(10)	A(5)	T(30)
1	16U41A0101	12	9	5	26
2	16U41A0102	14	10	5	29
3	16U41A0104	15	10	5	30
4	16U41A0106	14	10	5	29
5	16U41A0107	9	9	5	23
6	16U41A0108	14	10	5	29
7	16U41A0109	13	10	5	28
8	16U41A0110	13	10	5	28
9	16U41A0111	12	9	5	26
10	16U41A0112	14	10	5	29
11	16U41A0113	12	10	5	27
12	16U41A0114	15	10	5	30
13	16U41A0115	13	10	5	28
14	16U41A0116	13	10	5	28

15	17U45A0101	13	10	5	28
16	17U45A0102	13	10	5	28
17	17U45A0103	14	8	4	26
18	17U45A0104	A	A	A	0
19	17U45A0105	14	8	4	26
20	17U45A0106	15	10	5	30
21	17U45A0107	15	10	5	30
22	17U45A0108	14	7	4	25
23	17U45A0109	15	10	5	30
24	17U45A0110	15	10	5	30
25	17U45A0111	15	10	5	30
26	17U45A0112	15	9	4	28
27	17U45A0113	A	A	A	0
28	17U45A0114	A	A	A	0
29	17U45A0115	15	9	5	29
30	17U45A0116	15	10	5	30
31	17U45A0117	13	10	5	28
32	17U45A0118	14	10	5	29
33	17U45A0119	13	10	5	28
34	17U45A0120	15	10	5	30
35	17U45A0121	14	10	5	29
36	17U45A0122	15	10	5	30
37	17U45A0123	A	A	A	0
38	17U45A0124	15	10	5	30

39	17U45A0125	15	8	4	27
40	17U45A0126	15	10	5	30
41	17U45A0127	15	10	5	30
42	17U45A0128	15	10	5	30
43	17U45A0129	15	10	5	30
44	17U45A0130	15	10	5	30
45	17U45A0131	15	10	4	29
46	17U45A0132	A	A	A	0
47	17U45A0133	15	8	4	27
48	17U45A0134	13	10	5	28
49	17U45A0135	12	9	5	26
50	17U45A0136	15	10	5	30
51	17U45A0137	12	10	5	27
52	17U45A0138	15	10	5	30
53	17U45A0139	11	10	5	26
54	17U45A0140	14	10	5	29
55	17U45A0141	15	9	5	29
56	17U45A0142	14	10	5	29
57	17U45A0143	15	10	5	30
58	17U45A0144	13	9	5	27
59	17U45A0145	12	9	5	26
60	17U45A0146	15	10	5	30
61	17U45A0147	15	10	5	30
62	17U45A0148	13	9	5	27

63	17U45A0149	13	10	5	28
64	17U45A0151	14	10	5	29

16C.Second Mid Internal Marks of respective Subject, Mid Marks Analysis and Action
Taken Report

		DDRCS			
S.NO	ROLL NO	M(15)	Q(10)	A(5)	T(30)
1	16U41A0101	12	9	5	26
2	16U41A0102	14	10	5	29
3	16U41A0104	15	10	5	30
4	16U41A0106	14	10	5	29
5	16U41A0107	9	9	5	23
6	16U41A0108	14	10	5	29
7	16U41A0109	13	10	5	28
8	16U41A0110	13	10	5	28
9	16U41A0111	12	9	5	26
10	16U41A0112	14	10	5	29
11	16U41A0113	12	10	5	27
12	16U41A0114	15	10	5	30
13	16U41A0115	13	10	5	28
14	16U41A0116	13	10	5	28
15	17U45A0101	13	10	5	28
16	17U45A0102	13	10	5	28
17	17U45A0103	14	8	4	26
18	17U45A0104	A	A	A	0

19	17U45A0105	14	8	4	26
20	17U45A0106	15	10	5	30
21	17U45A0107	15	10	5	30
22	17U45A0108	14	7	4	25
23	17U45A0109	15	10	5	30
24	17U45A0110	15	10	5	30
25	17U45A0111	15	10	5	30
26	17U45A0112	15	9	4	28
27	17U45A0113	A	A	A	0
28	17U45A0114	A	A	A	0
29	17U45A0115	15	9	5	29
30	17U45A0116	15	10	5	30
31	17U45A0117	13	10	5	28
32	17U45A0118	14	10	5	29
33	17U45A0119	13	10	5	28
34	17U45A0120	15	10	5	30
35	17U45A0121	14	10	5	29
36	17U45A0122	15	10	5	30
37	17U45A0123	A	A	A	0
38	17U45A0124	15	10	5	30
39	17U45A0125	15	8	4	27
40	17U45A0126	15	10	5	30
41	17U45A0127	15	10	5	30
42	17U45A0128	15	10	5	30

43	17U45A0129	15	10	5	30
44	17U45A0130	15	10	5	30
45	17U45A0131	15	10	4	29
46	17U45A0132	A	A	A	0
47	17U45A0133	15	8	4	27
48	17U45A0134	13	10	5	28
49	17U45A0135	12	9	5	26
50	17U45A0136	15	10	5	30
51	17U45A0137	12	10	5	27
52	17U45A0138	15	10	5	30
53	17U45A0139	11	10	5	26
54	17U45A0140	14	10	5	29
55	17U45A0141	15	9	5	29
56	17U45A0142	14	10	5	29
57	17U45A0143	15	10	5	30
58	17U45A0144	13	9	5	27
59	17U45A0145	12	9	5	26
60	17U45A0146	15	10	5	30
61	17U45A0147	15	10	5	30
62	17U45A0148	13	9	5	27
63	17U45A0149	13	10	5	28
64	17U45A0151	14	10	5	29

17. Detailed notes (Unit wise):

- Hand written Notes(on A4 Pages) should be prepared for every subject.

- Each Unit should consist of minimum Ten Pages. The total Hand written Notes must be around 50 to 60 Pages.

- Additional material such as Print outs of PPTs can also be added.

18. Quality measurement Sheets

- Teaching evaluation (Feedback received from IQAC)
- Academic Audit report received from IQAC

19. Attainment of Cos and Pos (as per the suggestion of NBA Co-Ordinator)
(Detailed Procedure used to calculate the attainment of COs and POs)
Note: Separate sheets must be attached

20.Closure Report/Course Review (By the concerned Faculty):

At the End of the course the report should be given by the concerned faculty

PART A:
No. of classes planned using Traditional Teaching Learning Methods(TLM 1):
No. of classes planned using LCD Projector (TLM 2):
No. of classes planned to cover Tutorials (TLM3):
No. of classes planned using Modern Teaching Learning Methods(TLM 4 to TLM 8)

No. of classes planned using TLM 4
No. of classes planned using TLM 5
No. of classes planned using TLM 6
No. of classes planned using TLM 7
No. of classes planned using TLM 8

No. of classes planned to cover Additional Topics(if any):
Total Number of classes planned -

PART B:
No. of classes taught using Traditional Teaching Learning Methods (TLM 1):
No. of classes taught using LCD Projector (TLM 2):
No. of classes taught to cover Tutorials (TLM 3):
No. of classes taught using Modern Teaching Learning Methods
(TLM 4 to TLM 8)

No. of classes taught using TLM 4

No. of classes taught using TLM 5
No. of classes taught using TLM 6
No. of classes taught using TLM 7
No. of classes taught using TLM 8

No. of classes taught to cover Additional Topics (if any):

Total Number of classes actually taken–

PART C:

Total Number of students attended for the First Mid exam – 55

Total Number of students attended for the Second Mid exam

Total Number of students attended for the JNTU External exam -

Total number of students passed the Course -

Pass percentage of the Class -

Total number of students passed the Course in Re Valuation/Recounting-

Course Instructor **Course Coordinator** **Module Co-Ordinator** **Program Co-Ordinator** **HOD**

Academic Convenor **Dean IQAC** **Principal**

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.