

Code : 1G641

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)**II B.Tech. II Semester Regular Examinations, June 2014****STRENGTH OF MATERIAL- II***(Civil Engineering)***Time: 3 hours****Max Marks: 70***Answer any FIVE of the following
All questions carry equal marks (14 Marks each)*

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1. a) Enumerate the difference between longitudinal stress and circumferential stress in a cylindrical shell subjected to an internal pressure.
- b) A cylindrical shell 3 m long is closed at the ends has an internal diameter of 1 m and a wall thickness of 15 mm. Calculate the circumferential and longitudinal stresses induced and also changes in the dimensions of the shell if it is subjected to an internal pressure of 1.6 MN/m². Take $E = 2.0 \times 10^5 \text{ N/mm}^2$ and Poisson's ratio = 0.3.
2. a) Write the assumptions made in Lamé's theory and derive Lamé's equations when a thick cylinder is subjected to internal and external pressure.
- b) A compound tube is composed of a tube 300mm. internal diameter and 25mm thick shrunk on a tube of 300mm external diameter and 25mm thick. The radial pressure at the junction is 10 N/mm². The compound tube is subjected to an internal fluid pressure of 80N/mm². Find the variation of the hoop stress over the wall of the compound tube.
3. A hollow shaft of diameter ratio 3/8 is to transmit 375kW at 100rpm. The maximum torque being 20% greater than the mean, the shear stress is not to exceed 60N/mm² and twist in a length of 4mtrs is not to exceed 2 degrees. Calculate its external and internal diameters which would satisfy both the above conditions Take $G = 8.0 \times 10^4 \text{ N/mm}^2$.
4. The stiffness of a close-coiled helical spring is 2N/mm of compression under a maximum load of 100N. The maximum shearing stress produced in the wire of the spring 125MPa. The solid length of the spring is given as 50mm. Find (i) diameter of wire (ii) mean diameter of the coils (iii) number of coils required. Take $G = 4.5 \times 10^4 \text{ N/mm}^2$.
5. a) When does unsymmetrical bending takes place?
- b) A short column of external diameter 600mm and internal diameter 400mm carries an eccentric load of 150kN. Find the greatest eccentricity which the load can have without producing tension on the cross-section.
6. A cane hook is of trapezoidal cross-section having inner side 800mm, outer side 300mm and depth 120mm. The radius of curvature of the inner side is 80mm. If a load of 100kN is applied to the hook passing through the centre of curvature, determine the maximum tensile and compressive stresses at the critical cross-section.
7. A masonry retaining wall of trapezoidal section is 10m high and retains earth which is level upto the top. The width at the top is 2 m and at the bottom 8 m and the exposed face is vertical. Find maximum and minimum intensities of normal stress at the base. Take density of earth = 15.7kN/m³ and density of masonry = 23.5kN/m³. Angle of repose of earth = 30°.
8. a) Where do you use beams curved in plan?
- b) A circular beam is loaded uniformly and supported on symmetrically placed Columns. If W is the load per unit length, R, the radius, derive expressions for S.F, B.M and torsional moment at a point P, at an angle ϕ from one support.

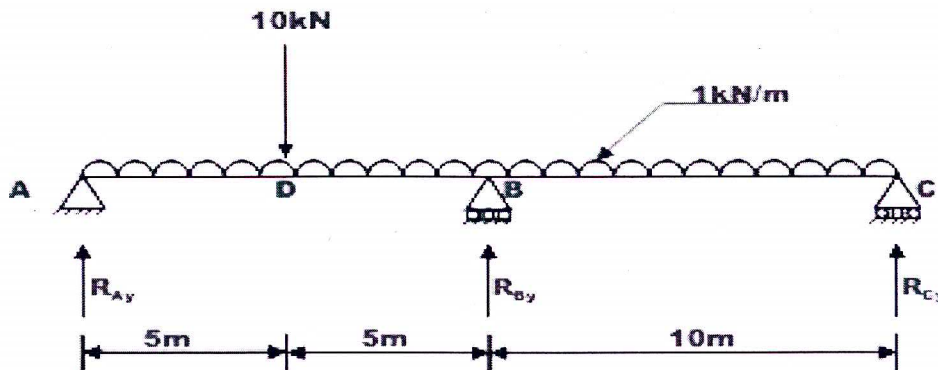
Time: 3 hours

Max Marks: 70

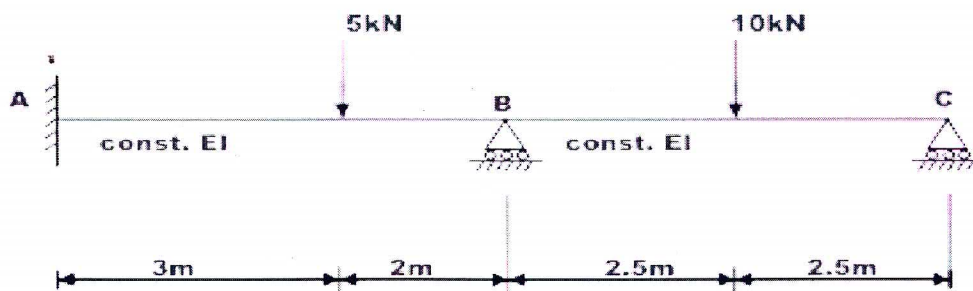
Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

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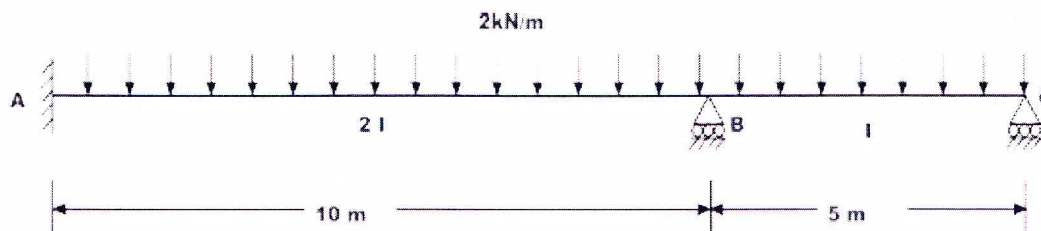
1. A fixed beam of uniform flexural rigidity is subjected to a uniformly distributed load of 50kN/m over entire span. The left support sinks by 0.004m. Use $E=105\text{GPa}$ and the cross section of the beam is 200 mm x 500 mm. Analyze the beam and draw bending moment diagram and shear force diagram. 14M
2. Analyse a continuous beam shown in figure using theorem of three moments. Draw shear force and bending moment diagrams. Assume EI constant. 14M



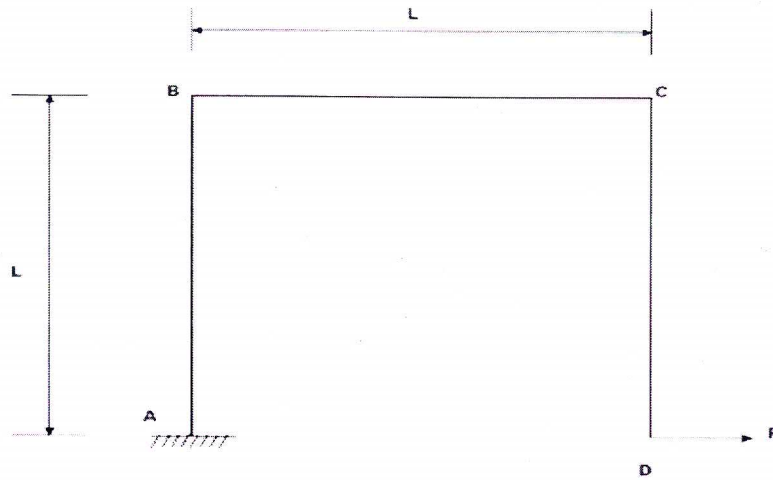
3. Analyse the continuous beam by slope deflection method. Draw SFD and BMD. 14M



4. Analyse the continuous beam by moment distribution method. Draw BMD and SFD. 14M

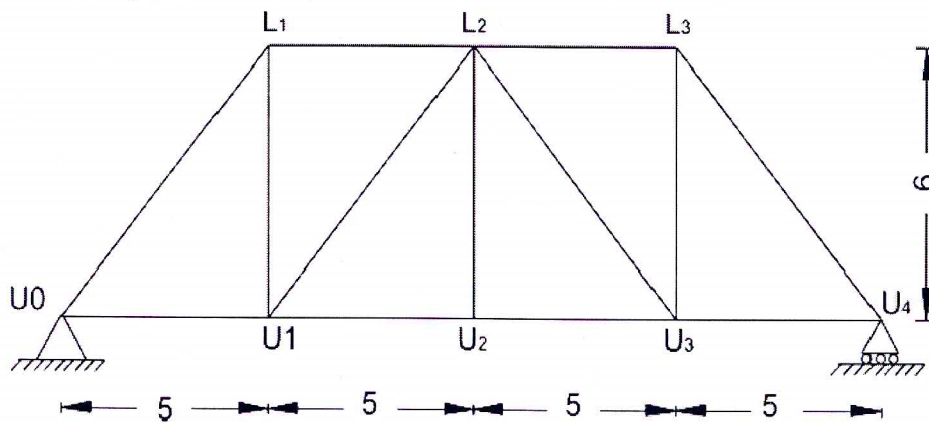


5. Find horizontal displacement at D of the frame shown in figure. Assume the flexural rigidity of the beam is EI to be constant throughout the member. Neglect strain energy due to axial deformation.



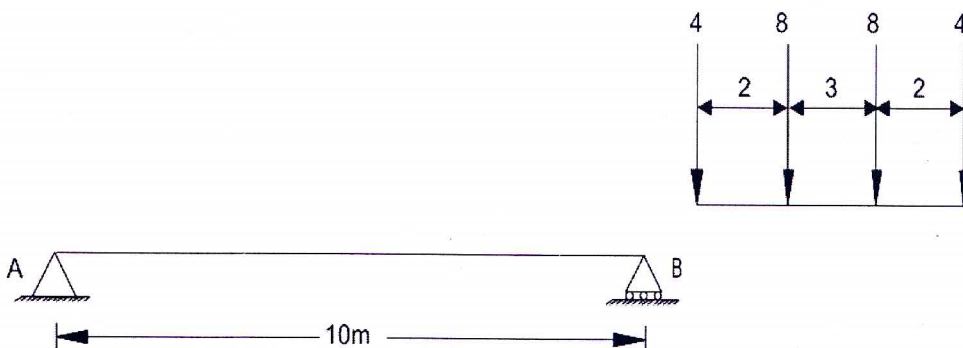
14M

6. Construct the influence line for the force in members U_1L_1, U_1U_2 , of the bridge truss shown in figure.



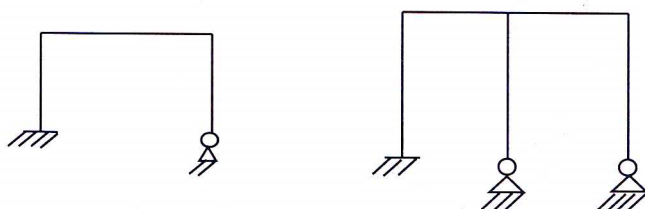
14M

7. Compute maximum end shear for the given beam loaded with moving loads as shown in figure.



14M

8. Determine kinematic and static indeterminacy for the following frames



7 x 2 = 14M

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(AUTONOMOUS)

II B.Tech. II Semester Regular Examinations, June 2014

BUILDING PLANNING AND DRAWING
(CIVIL ENGINEERING)

Time: 3 hours

Max Marks: 70

PART-A

(Answer any THREE questions)

14 x 3 = 42 Marks

1. a) What are building bye-laws and explain? 8M
- b) Briefly explain the following:
 - (i) Floor area ratio (ii) Grouping (iii) Elegance (iv) Economy 6M
2. a) Write the requirements of the following elements of a residential building.
 - (i) Living Room (ii) Kitchen (iii) Bathrooms (iv) Water Closets 8M
- b) Briefly explain the following:
 - (i) Aspect (ii) Prospect (iii) Roominess 6M
3. a) Explain the functional requirements of a school building. 14M
4. a) Find out the critical path, earliest expected, latest and allowable occurrence times for the network shown in fig. 1.

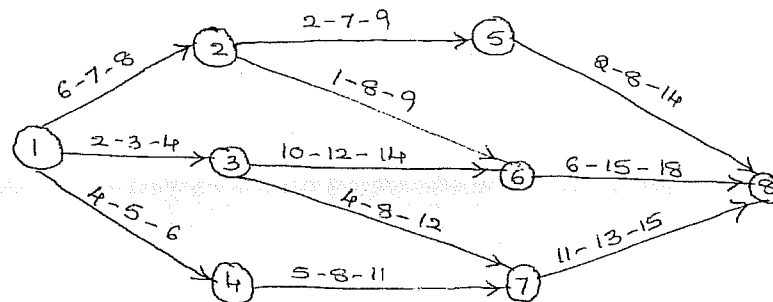


Figure 1

- b) Briefly explain about bar charts and milestone charts. 8M
5. a) What are the differences between CPM and PERT methods? 6M
- b) Explain the following:
 - (i) Set-back (ii) 63 ½ ° rule (iii) Circulation (iv) Flexibility 8M

PART-B

(answer any one question on drawing sheet 1 x 28 = 28 marks)

6. a) Draw to a suitable scale the front elevation of queen post truss indicating all details for a span of 9 m. Assume other data. 18M
- b) Draw plan and elevation of two brick thick Flemish bond. 10M
7. The line diagram of a residential building is shown in fig. 2. Draw the plan of the building providing doors, windows and ventilators of standard sizes at suitable locations. Assume any data required.

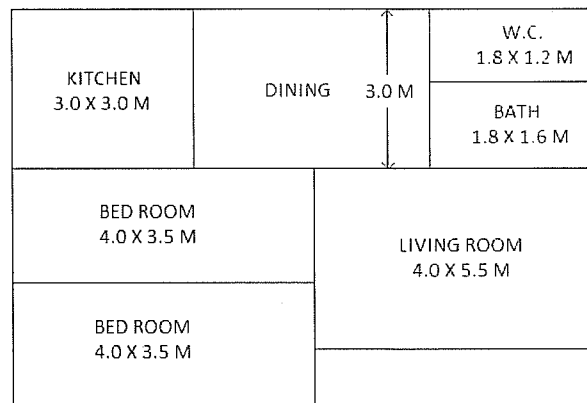


Figure 2

28M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech. II Semester Regular Examinations, June 2014

Environment Science

(Common to Civil, ME & CSE)

Time: 3 hours

Max Marks: 70

*Answer any FIVE of the following
All questions carry equal marks (14 Marks each)*

* * * * *

- | | | |
|-------|--|-----|
| 1. a) | What is the scope and importance of environmental studies? | 7M |
| b) | Explain the multidisciplinary nature of environmental science. | 7M |
| 2. a) | Write an account of the use and over utilization of surface and ground water? | 7M |
| b) | Discuss various non-renewable energy sources? | 7M |
| 3. a) | What are the environmental hazards associated with mineral extraction? | 7M |
| b) | Briefly discuss the equitable use of resources for sustainable development | 7M |
| 4. a) | What are various air pollutants? Discuss their effects on vegetation and human being? | 7M |
| b) | Write a note on urban solid waste management practices? | 7M |
| 5. a) | What is ecosystem? Describe the structure and functions of ecosystem. | 7M |
| b) | Write notes on ecological pyramids? | 7M |
| 6. a) | Write notes on the value of biodiversity? | 7M |
| b) | Describe the various methods of ex-situ conservation of biodiversity? | 7M |
| 7. a) | Write a brief note on nuclear accidents? | 7M |
| b) | Discuss the Environment (Protection) Act and Wild Life (Protection) Act? | 7M |
| 8 | What do you mean by population explosion? What are its effects on environment and other human aspects? | 14M |

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)**II B.Tech. II Semester Regular Examinations, June 2014****Hydraulics and Hydraulic Machinery***(Civil Engineering)***Time: 3 hours****Max Marks: 70***Answer any FIVE of the following**All questions carry equal marks (14 Marks each)*

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1. a) Explain the characteristics of boundary layer along a long thin plate with a neat sketch. 7M
b) Explain the types of drag. 7M
2. a) Derive the conditions of most economical sections for the following :
i) Rectangular channel, ii) Trapezoidal channel 8M
b) A rectangular channel 4.5 m wide and 0.8 m deep has a slope of 1 in 1000 and is lined with good rubble masonry, for which Manning's $n = 0.017$. It is desired to increase discharge to a maximum by changing the channel slope or the form of section. The dimensions of the section may be changed but the channel must contain the same amount of lining. Compute the new dimensions and probable increase in discharge. 6M
3. a) Derive the dynamic equation of gradually varied flow. 7M
b) An overflow spillway has its crest at elevation 136.00 m and horizontal apron at an elevation of 102.00 m on the downstream side. Estimate the tail water elevation required to form a hydraulic jump when the elevation of energy line just upstream of spillway crest is 138.00 m. Assume $C_d = 0.735$ for the spillway. Neglect the energy loss due to flow over the spillway. 7M
4. a) Show that the efficiency of a free jet striking normally on a moving symmetrical curved vane at its center and deflecting through an angle of $(180 - \theta)$, is equal to $(\frac{16}{27} \cos^2 \frac{\theta}{2})$ 7M
b) A wheel having radial blades is of 0.6 m radius at the outer tip of the blades and 0.3 m at the inner tip. Water enters the blade at the outer tip with a velocity of 30 m/s at the angle of 30° to tangent and leaves the blades with a velocity of flow of 4 m/s. The blades have an angle of 40° at entrance and 35° at exit. Find the work done per Newton of water entering the wheel, the speed of the wheel and the efficiency. 7M
5. a) Give complete classification of turbines with examples. 7M
b) A Pelton wheel has to be designed for the following data. Power to be developed = 6000 kW. Net head available = 300 m; Speed = 550 r.p.m.; Ratio of jet diameter to wheel diameter = 1/10; and overall efficiency = 85%. Find the number of jets; diameter of the jet; diameter of the wheel; and the quantity of water required. 7M

6. a) Explain the Performance characteristics curves. 7M
- b) The following data were obtained from the main characteristics of a Kaplan turbine of runner diameter 1 m: $P_u = 30.695$; $Q_u = 109.6$; $N_u = 63.6$. Estimate the runner diameter, the discharge and the speed of a similar runner working under a head of a similar runner working under a head of 30 m and developing 2000 kW. Determine the specific speed of the runner. 7M
7. a) Explain the following pertaining to the centrifugal pump
- Manometric efficiency and mechanical efficiency
 - Minimum starting speed.
 - NPSH
 - Specific speed 8M
- b) A centrifugal pump has the following characteristics; outer diameter of impeller=800 mm; width of impeller vanes at outlet = 90 mm; angle of impeller vanes at outlet= 40° . The impeller runs at 560 r.p.m. and delivers 0.98 cubic meters of water per second under an effective head of 37 m. A 600 kW motor is used to drive the pump. Determine the manometric, mechanical, overall efficiencies of the pump. Assume water enters the impeller vanes radially at inlet. 6M
8. a) Explain the classification of hydropower plants. 8M
- b) Discuss the following terms:
- Load factor, ii) Utilization factor, iii) Capacity factor. 6M

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech. II Semester Regular Examinations, June 2014

Probability & Statistics

(Common to Civil, ME & IT)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following

All questions carry equal marks (14 Marks each)

1. a) Calculate the mean, mode and standard deviation for the following.

x	1	2	3	4	5	6	7	8
f	4	9	16	25	22	15	7	3

- b) The marks obtained by 10 students in Mathematics (X) & Statistics (Y) are given below. Find the coefficient of correlation between X & Y .

X	75	30	60	80	53	35	15	40	38	48
Y	85	45	54	91	58	63	35	43	45	44

2. a) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.
- b) An urn contains 5 white and 5 black balls, 4 balls are drawn from this urn and put into another urn. From this second urn a ball is drawn and is found to be white. What is the probability of drawing a white ball again at the next draw when the first white ball drawn is not replaced?
3. a) A random variable X has the following probability function.

x	0	1	2	3	4	5	6	7
$P(x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

(i) Find k (ii) $P(x \leq 6)$ (iii) If $P(x \leq a) > 0.5$ then find the maximum value of a .

- b) Define probability density function. The diameter of an electric cable, say X , is assumed to be a continuous random variable with p.d.f $f(x) = 6x(1-x)$, $0 \leq x \leq 1$.

(i) Prove that $f(x)$ is a p.d.f (ii) Determine a number b such that $P(x < b) = P(x > b)$.

4. a) A multiple choice test consists of 8 questions with 3 answers to each question (of which only one is correct). A student answers each question by rolling a balanced die and checking the first answer if he gets 1 or 2, the second answer if he gets 3 or 4 and the third answer if he gets 5 or 6. To get a distinction, the student must secure at least 75% correct answers. If there is no negative marking, what is the probability that the student secures a distinction?
- b) Average number of accidents on any day on a national highway is 1.8. Determine the probability that the number of accidents are (i) atleast one (ii) atmost one.

5. A population consists of five numbers 2,3,6,8 and 11. Consider all possible samples of size 2 that can be drawn from the population (i)With replacement (ii) Without replacement

Find (a) The mean of the population.

(b) The standard deviation of the population.

(c) Mean of the sampling distribution of means.

(d) The standard deviation of the sampling distribution of means.

6. a) Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14.
- b) What is the smallest size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with atleast 95% confidence.
7. a) A coin is tossed 900 times and heads appear 490 times. Does this result support the hypothesis that the coin is unbiased?
- b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not upto the standard?
8. Four methods are under development for making discs of a super conduction material. Fifty discs are made by each method and they are checked for super conductivity when cooled with liquid.

	Method I	Mehod II	Mehod III	Mehod IV
Super conductors	31	42	22	25
Failures	19	8	28	25

Test the significant difference between the proportions of conductors at 0.05 level.