Code : 1GC42

R-11/R-13

II B.Tech. II Semester Supplementary Examinations December 2015
Probability and Statistics
(*Common to CE, ME & IT*)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
****

1. a) Calculate mean, median and mode of the following data related to weight of 120 articles.

Weight(in gm)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of articles	14	17	22	26	23	18

7M

   b) Psychological tests of intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio (I.R.) and engineering ratio (E.R.). Calculate the co-efficient of correlation.

Student	A	B	C	D	E	F	G	H	I	J
I.R.	105	104	102	101	100	99	98	96	93	92
E.R.	101	103	100	98	95	96	104	92	97	94

7M

2. a) Box I contains 10 white and 3 black balls, while Box II contains 3 white and 5 black balls. Two balls are drawn at random from Box I and placed in box II. Then 1 ball is drawn at random from Box II. What is the probability that it is a white ball?   7M

   b) In a factory which manufactures bolts, machines A, B and C manufacture respectively 25%, 35% and 40% of the bolts of their output 5, 4 and 2 percent are respectively defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability it is manufactured by the machine B.   7M

3. a) For the discrete probability distribution

x	0	1	2	3	4	5	6	7
f	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

   Determine **(i)** k **(ii)** mean **(iii)** variance.   7M

   b) The density function of a random variable X is

   $f(x) = \begin{cases} e^{-x} & \text{if } x > 0 \\ 0 & \text{otherwise} \end{cases}$

   Find $E(X)$, $E(X^2)$ and $Var(X)$.   7M

4. a) Show that the mean and standard deviation of a Poisson distribution are equal.   7M

   b) In a test on 2000 electric bulbs, it was found that the life of particular make was normally distributed with an average life of 2040 hours and S.D. of 60 hours. Estimate the number of bulbs likely to burn for **(i)** more than 2150 hours, **(ii)** less than 1950 hours and **(iii)** more than 1920 hours and but less than 2160 hours.   7M

5. A Sample size of 2 are taken from the population 1, 2, 3, 4, 5 and 6 without replacement. Find **(i)** the mean of the population **(ii)** the standard deviation of the population **(iii)** the mean of the sampling distribution of means **(iv)** the standard deviation of the sampling distribution of means.   14M

6. a) In a study of an automobile insurance a random sample of 80 body repair costs had a mean of Rs. 472.35 and the standard deviation of 62.35. If $\bar{x}$ is used as a point estimate to the true average repair costs, with that confidence we can assert that the maximum error does not exceed Rs. 10/-?   7M

    b) A random sample of size 100 is taken from a population with   = 5.1. Given that the sample mean is $\bar{x}$ = 21.6, construct a 95% confidence interval for the population mean.   7M

7. a) A random sample of size 25 from a normal population has the mean 47.5 and the standard deviation 8.4. Does this information support or refute the claim that the mean of the population is $\mu = 42.5$?   7M

    b) The means of simple samples of sizes 1000 and 2000 are 67.5 and 68.0 cm. respectively. Can the samples be regarded as drawn from the same population of S.D. 2.5 cm.   7M

8. Fit a Poisson distribution to the following data and test the goodness of fit at 0.05 level of significance

x	0	1	2	3	4	5	6	7	
f	305	306	210	80	28	9	2	1	14M

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Code : 1G644

R-11/R-13

II B.Tech. II Semester Supplementary Examinations December 2015

Building Planning and Drawing

(Civil Engineering)

Max. Marks: 70   **Time: 03 Hours**

PART-A

(Answer any THREE questions 14 x 3 = 42 Marks)

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1. a) Write a short notes on
        i)   Building byelaws for lightening and ventilation
        ii) Building byelaws for offsets   8M

    b) What is the difference between floor area and carpet area? Explain.   6M

2. a) What are the requirements for the following rooms in planning of residential building?
        i)   Dining room
        ii) Drawing room   8M

    b) Explain about detached and duplex type houses?   6M

3.   Explain about planning of educational institutions and office buildings?   14M

4. a) Explain in brief the difference between PERT and CPM networks. Explain the circumstances under which one is preferred over the other?   7M

    b) The network for a certain project is shown in fig.1 .Determine the expected time for each of the path. Which path is critical?
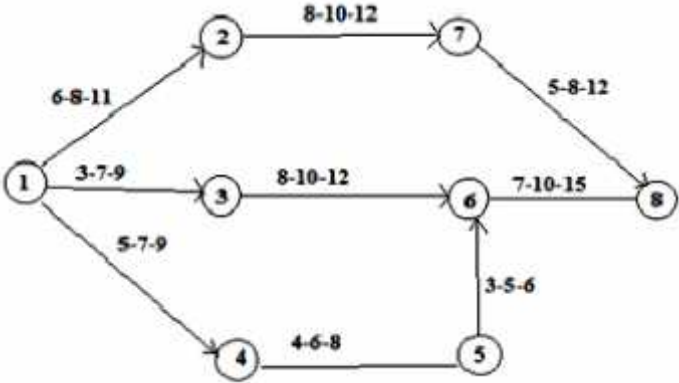

Fig.1   7M

5. a) Write a short notes on requirements of
        i)   lightening and ventilation
        ii) circulation   8M

    b) Define the plan of a building and what are the factors affecting the planning of a residential building?   6M

PART-B

**(Answer any ONE question on drawing sheet 1 x 28 = 28 Marks)**

6. a) Draw to a suitable scale a king post truss for a clear span of 6000mm showing all the details and dimensions. 14M

   b) Draw the conventional signs of
      i) wood
      ii) ashlar masonry
      iii) plaster
      iv) reinforced concrete 14M

7. The line plan of a residential building is as shown in fig.2.

   Specifications: Depth of foundation is 1000mm below the GL; 1:3:6 cement concrete bed 300mm thick and 1200mm wide is provided as the bottom most layer for all the main walls. It is 200mm thick under the verandah. At a depth of 600mm first class brick masonry in cement mortar 1:6 is provided on the concrete base with suitable footings below GL. The basement wall is 400mm thick and 600mm high above the ground level including the plinth slab,100mm high.RCC:100mm thick with a weather coat of 100mm thick. Basement: 400mm thick and 600mm high. provide doors, windows, ventilators as per standard dimensions

   Draw :
      i) A neat fully dimensioned plan
      ii) Sectional elevation along AA
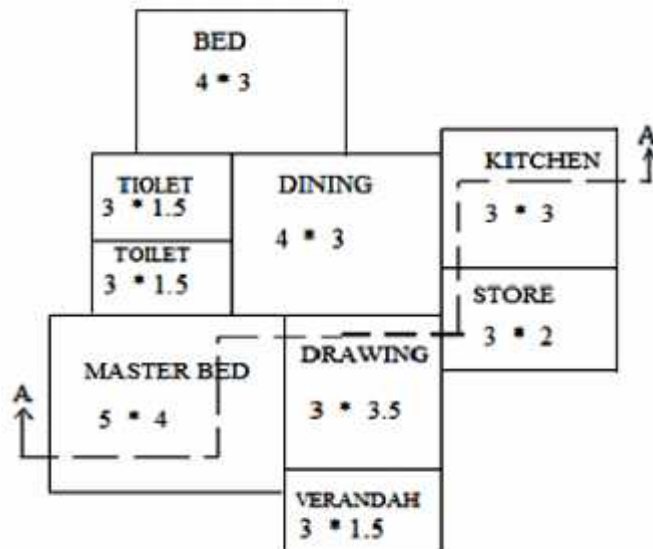
All Dimensions are in meters

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Code : 1GC43

R-11/R-13

II B.Tech. II Semester Supplementary Examinations December 2015
Environmental Science
(Common to Civil, ME & CSE)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
****

1.	a)	Describe the multidisciplinary nature of environmental studies.	7M
	b)	Discuss in detail about the different layers of the atmosphere.	7M
2.	a)	Define renewable and non-renewable resources.	6M
	b)	Discuss in detail about uses and over exploitation of forest resources.	8M
3.	a)	Discuss the soil erosion and desertification.	8M
	b)	Explain briefly about equitable use of natural resources for sustainable life style.	6M
4.	a)	What are various methods of control to reduce water pollution?	6M
	b)	Explain about any two pollution case studies.	8M
5		Define ecosystem. Explain about various components of an ecosystem.	14M
6.	a)	India is one of the mega diversity nations. Explain.	7M
	b)	Distinguish between the endemic and endangered species.	7M
7.		Write a short note on.	
		a) Global warming.	5M
		b) Ozone layer depletion.	5M
		c) Acid rain	4M
8.	a)	Write a brief note on environment and human health.	7M
	b)	Explain the necessity of value education.	7M

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Code : 1G642

R-11/R-13

II B.Tech. II Semester Supplementary Examinations December 2015
Hydraulics and Hydraulic Machinery
(Civil Engineering)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
****

1. a) What are the characteristics of boundary layer formation aver a flat plate?   6M

    b) Find the ratios of displacement thickness to momentum thickness and momentum thickness to energy thickness for the velocity distribution in the boundary layer given by $\frac{U}{u} = 2\frac{y}{\delta} - (\frac{y}{\delta})^2$.   8M

2. a) Explain the terms specific energy, critical depth and critical velocity.   6M

    b) In a rectangular open channel of 5m width the flow rate is $12m^3$/sec and depth of flow is 1m. Determine the critical depth and the alternate depth   8M

3. a) Explain the hydraulic jump. Derive an expression for the downstream depth of hydraulic jump.   7M

    b) Define specific energy and draw the specific energy diagram. Explain how it is useful for the open channel flow.   7M

4. a) Show that the force exerted by a jet of water on moving inclined plate in the direction of   jet is given by $F_x = $ a $(v-u)^2 \sin$.   6M

    b) A jet of water of diameter 7.5cm strikes a curved plate at its centre with a velocity of 20m/sec. the curved plate is moving with a velocity of 8m/sec in the direction of jet. The jet is deflected through an angle of 165^0 assuming the plate is smooth. Find **(i)** force exerted on the plate in the direction of jet, **(ii)** power of the jet and efficiency of the jet.   8M

5. a) Obtain an expression for the work done by water on the runner of a Pelton wheel. Hence, derive an expression for maximum efficiency of the Pelton wheel.   6M

    b) A Pelton wheel has mean bucket speed of 10m/sec with a jet of water flowing at the rate of 70lit/sec under a head of 30m. The bucket deflects the jet through an angle of 160^0. Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Co-efficient of velocity as 0.98.   8M

6. a) Derive the expression for specific speed and unit speed.   6M

    b) A turbine is operated under a head of 25m at 200rpm. The discharge is $9m^3$/sec. if the efficiency is 90%, Determine the performance of the turbine under a head of 20m.   8M

7. a) Explain about the operating characteristics of centrifugal pump.   7M

    b) A centrifugal pump is to discharge $0.118m^3$/sec at a speed of 1450rpm against a head of 25m. The impeller diameter is 25mm, its width at outlet is 50mm and at outer manometric efficiency is 75%. Determine the vane angle at outer periphery of the impeller.   7M

8. a) Explain how hydropower plants are classified.   7M

    b) Define the terms load factor, utilization factor and capacity factor.   7M

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Code : 1G643

II B.Tech. II Semester Supplementary Examinations December 2015
Structural Analysis–I
(Civil Engineering)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
****

1.   A beam of uniform cross section and 6 m span is fixed at the ends. It carries a udl of 10 kN / m throughout the span in addition to a concentrated moment of 10 kN-m at 1 m from the left hand support. Draw SFD and BMD giving salient values.   14M

2.   Analyze the beam shown in fig. 1 using Clapeyron's theorem of three moments and draw the bending moment and shear force diagrams. Assume uniform EI.
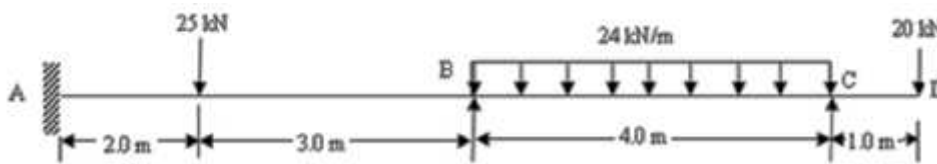
Figure 2

3.   Analyse the beam shown in fig.2 by slope-deflection method and draw BMD. EI is constant.
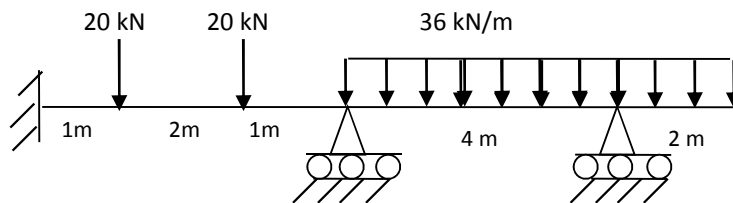
4.   Analyse the continuous beam shown in fig.3 by moment distribution method and draw BMD if the hinge support sinks by 10 mm. Take EI = 6 x 109 kN-mm2 for all spans.
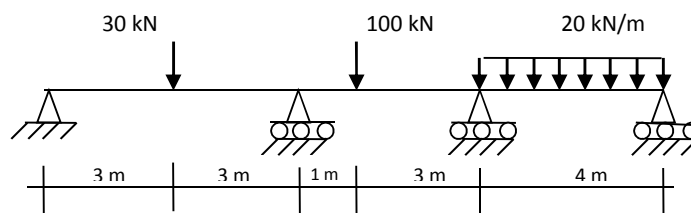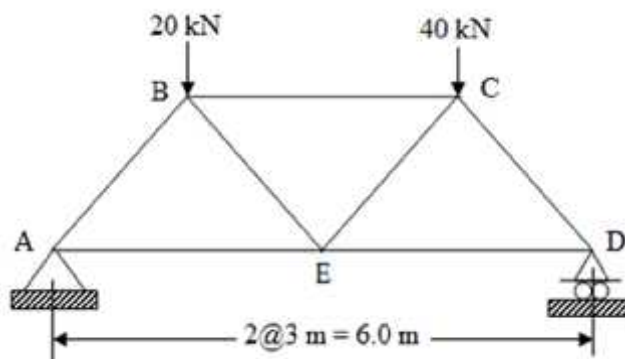

fig.3

5. a) State Castigliano's first theorem.   2M

   b) For the truss loaded as shown in fig. 4 find the horizontal displacement of the joint ''D'.   Assume AE=3x105 kN.

6. a) A system of 5 concentrated loads 100 kN, 100 kN, 200 kN, 200 kN and 160 kN separated by distances 3m, 4m, 4.5m and 3m respectively are traversing a simply supported girder of 30 m span from right to left with 100 kN load as leading load. Determine the maximum BM at the quarter span. 8M

b) Write the position of loading to get maximum BM and SF at a particular section when udl shorter than span is traversing a simply supported girder. 6M

7. a) What is counter barcing? 2M

b) A Pratt truss consists of 10 panels of 5 m each. If the height of the truss is 5 m draw the influence line diagram for the diagonal of 4th panel. 12M

8. a) Explain the terms Static and Kinematic indeterminacies with examples. 6M

b) Calculate the static and kinematic indeterminacies of the truss shown in fig. 5 which is supported on two hinge supports at the ends.

Figure 1

8M

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Code : 1G641

R-11/R-13
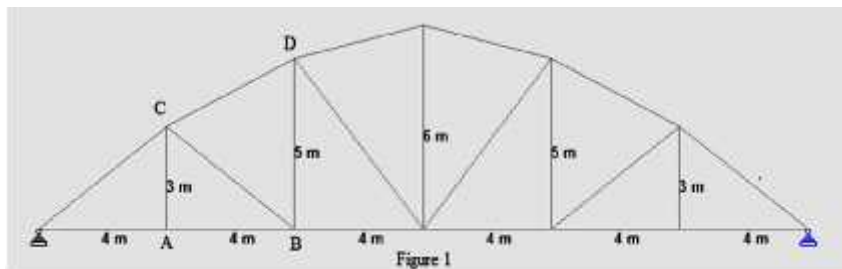
II B.Tech. II Semester Supplementary Examinations December 2015
Strength of Materials-II
(Civil Engineering)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
Missing data may be assumed suitably wherever necessary
****

1. a) A boiler is subjected to an internal pressure of 2N/mm². The thickness of the plate is 20mm and allowable tensile stress is 120N/mm². Efficiency of the Longitudinal joint is 90% and that of circumferential joint is 40%. Find out the maximum permissible diameter of the shell.   7M

   b) A cylindrical shell is 3m long, 1.5m internal diameter and 20mm metal thickness. Calculate the intensity of maximum shear stress induced and also the change in dimensions of the shell if it is subjected to an internal pressure of 2N/mm². Take E = 2x10⁵ N/mm² and μ = 0.30.   7M

2. a) Derive the Lame's equations for thick cylindrical shells with necessary assumptions.   8M

   b) A thick spherical shell of 200mm external diameter and 20mm wall thickness is subjected to an internal fluid pressure of 100N/mm². Find the distribution of radial and hoop stresses across the wall of the shell?   6M

3. Derive the equation $\dfrac{T}{J} = \dfrac{f_s}{R} = \dfrac{C_n}{l}$ for circular shafts stating necessary assumptions.   14M

4. a) Discuss in detail about laminated springs.   6M

   b) Design a close coiled helical spring to have the following properties:
   (i) Stiffness = 6N/mm
   (ii) Solid length = 120mm
   (iii) Maximum permissible shear stress = 60N/mm²
   (iv) Maximum load = 250N
   (v) Modulus of rigidity = 10N/mm²   8M

5. Write the assumptions made in the Euler's theory and derive the expression for Euler's crippling load when both ends of the column are fixed.   14M

6. a) A short cast iron column is of hollow section of uniform thickness, the external diameter being 250mm and the internal diameter 150mm. A vertical compressive load acts at an eccentricity of 50mm from the axis of the column. If the maximum permissible stress is 90N/mm² in compression, calculate the greatest allowable load?   7M

   b) Define core of a section. Find the core of rectangular and circular sections?   7M

7   A beam of rectangular section 90mm x 120mm deep as shown in figure 1 is subjected to a bending moment of 1000N.m, the trace of the plane of loading being at right angles to one of the diagonals. Locate the Neutral axis of the section and determine the maximum bending stress induced in the section.
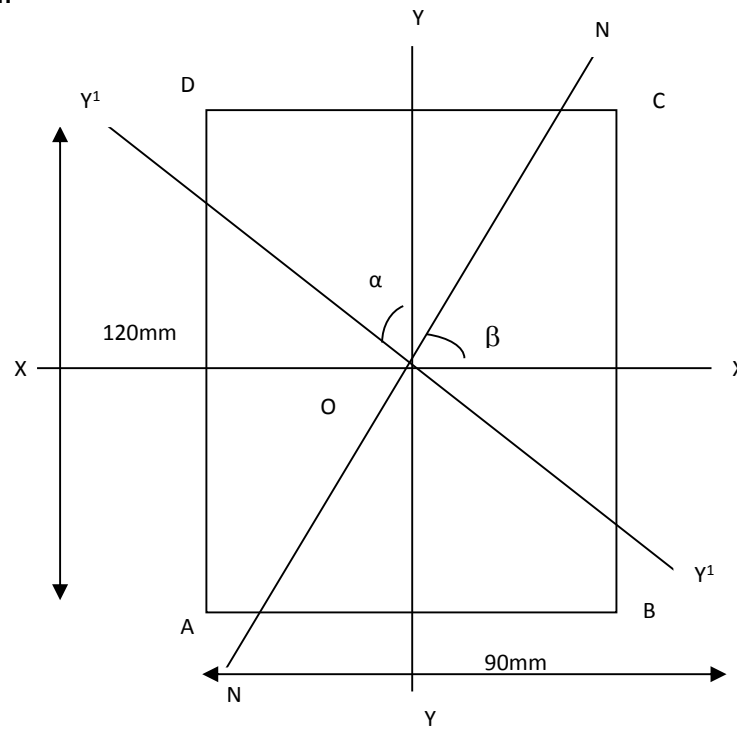

Figure.1   14M

8.   Find the bending moment at mid span of a semicircular beam of diameter 8m loaded at the mid span with a concentrated load of 80KN. The beam is fixed at both supports. Find the maximum bending moment and maximum torque in the beam.   14M

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