Hall Ticket Number :										

R-17

Code: 7G641

II B.Tech. II Semester Regular & Supplementary Examinations November 2020

Advanced Strength of Materials

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

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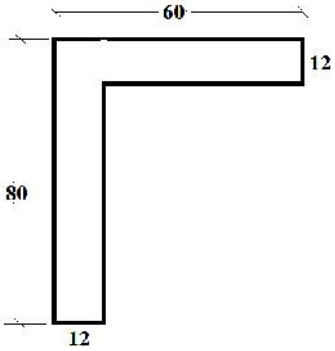
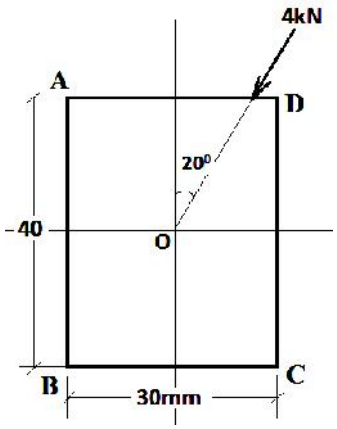
			Marks	CO	Blooms Level
1.	a)	State the assumptions made in the theory of thin cylinders.	4M	1	L1
	b)	A cylindrical shell, 0.8m in diameter and 3m long is having 10mm wall thickness. If the shell is subjected to an internal pressure of 2.5 N/mm^2, determine (i) change in diameter (ii) change in length and (iii) change in volume. Take E = 200 GPa and Poisson's ratio = 0.25.	10M	1	L3
2.	a)	A thick cylinder of 0.5 m external diameter and 0.4 m internal diameter is subjected simultaneously to internal and external pressures. If the internal pressure is 25 KN/m^2 and the hoop stress at the inside of the cylinder is 45MN/m^2 (tensile), determine the intensity of the external pressure.	7M	1	L3
	b)	The cylinder of a hydraulic press has an internal diameter of 0.3m and is to be designed to withstand a pressure of 10 KN/m^2 without the material being stressed over 20 KN/m^2. Determine the thickness of the metal and the hoop stress on the outer side of the cylinder.	7M	1	L3
3.	a)	List out the assumptions made in the torsion theory.	4M	2	L1
	b)	Derive the torsion equation, $\frac{T}{J} = \frac{C\theta}{L} = \frac{\tau}{r}$ for a circular shaft.	10M	2	L2
4.		A shaft has to transmit a torque of 30kNm. The maximum shear stress is not to exceed 100 MPa and the angle of twist is not to exceed 1^o/metre length. Take C=80GPa. Design the shaft according to the given specifications if it is a (i) Solid circular shaft and (ii) Hollow circular shaft of internal diameter 90% of the external diameter.	14M	2	L3
5.	a)	List out the assumptions made by Euler's theory?	4M	3	L1
	b)	Compare the ratio of the strength of solid steel column to that of the hollow steel column of the same cross-sectional area. The internal diameter of the hollow column is 3/4th of the external diameter. The columns have the same length and are pinned at both ends. Use Euler's theory.	10M	3	L3
6.	a)	Define the core or kernel of the section. Find the core of rectangular section.	4M	4	L1
	b)	A short hollow cylindrical column carries a compressive farce of 400 kN. The external diameter of the column is 200 mm and the internal diameter is 120mm. Find the maximum permissible eccentricity of the load, if the allowable stresses are 60 N/mm^2 in compression and 25 N/mm^2 in tension.	10M	4	L3

7. The figure shows an unequal angle of dimensions 80mm x 60mm and 12mm thick. Determine: (i) Position of Principal axes and (ii) Magnitude of the Principal moments of inertia for the given angle.



14M 5 L3

8. Calculate the stresses at the corners of the rectangular section of a simply supported beam of span 4m which carries a load of 4kN at the mid-span. The load line is inclined at an angle of 20^0 to the vertical longitudinal plane as shown in the figure and passes through the centroid of the section. The dimensions of the section are shown in the figure.



14M 5 L3

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Hall Ticket Number :										

R-17

Code: 7G642

II B.Tech. II Semester Regular & Supplementary Examinations November 2020

Building Planning & Drawing

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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PART-A

Answer *any Three* questions from the following (3 x 14 = 42 Marks)

			Marks	CO	Blooms Level
1.	a)	What are the building bye laws? Explain them briefly	7M	CO1	L1
	b)	Write short notes on Floor Area Ratio (FAR), how it is related to height of the building. Explain.	7M	CO1	L1 ,L4
2.		Explain different factors that affect the site selection for a residential building.	14M	CO1	L2 ,L4
3.	a)	What are the factors to be considered by planner prior to planning of a residential building? Explain one of them in detail.	7M	CO2	L1,L2
	b)	Explain the standard requirements of the following in a residential building. i) Bed Room ii) Drawing cum Dining Room	7M	CO2	L2
4.		Explain CPM and PERT network plan?	14M	CO3	L4
5.		From the utility data for a network are given below. Determine the total, free, independent and interfering floats and identify the critical path.			

Activity	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration(in days)	2	8	10	6	3	3	7	5	2	8

14M CO3 L3 ,L4

PART-B

Answer *any one question from the following* units (1 x 28 = 28 Marks)

6. Draw the King Post Truss of 6.00 m clear span with all required elements like Purlins, rafters and battens. The cross sectional details are as follows.

King post: 10cm × 10cm -1.8 m Height

Principal Rafter: l2cm ×l0cm -3.5m long

Common Rafter: 10cm ×6cm - 80cm spacing

Eave Board: 10cm × 8cm Cleats: 8cm × 8cm - 15cm long

Purlins: 12cm × 8cm Battens: 4cm × 4cm

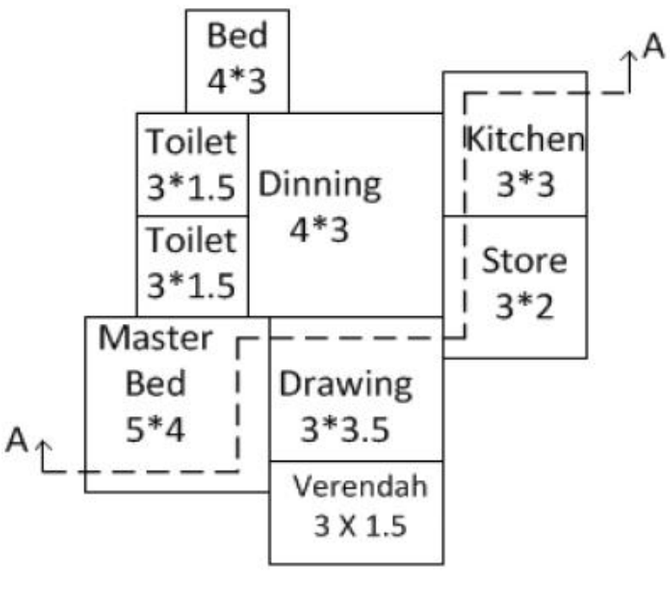
Assume cross section of any other connection elements if required. 28M CO4 L3

OR

7. The line diagram for a plan of a residential building is provided below:

Draw a neat diagram of the plan and section A-A of the same

Assume all data required as per the standard dimensions.



28M CO5 L3

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Hall Ticket Number :										

R-17

Code: 7GC41

II B.Tech. II Semester Regular & Supplementary Examinations November 2020

Environmental Science

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *any five questions from the following* (5 x 14 = 70 Marks)

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			Marks
1.	a)	Define environmental studies. Why it is called a multidisciplinary subject?	7M
	b)	Discuss the scope and importance of environmental studies.	7M
2.	a)	Discuss the impact on environment by the extraction of minerals.	7M
	b)	Briefly explain the role of individual on the conservation of natural resources.	7M
3.	a)	Explain the structure of an ecosystem.	7M
	b)	Discuss the food chains and the food webs.	7M
4.	a)	Explain the consumptive and productive value of biodiversity.	7M
	b)	Discuss the In-situ conservation of biodiversity.	7M
5.	a)	Explain the causes, ill effects and remedial measures of air pollution.	7M
	b)	Write notes on soil pollution.	7M
6.	a)	Define environmental pollution? Explain thermal pollution.	7M
	b)	Discuss the causes, ill effects and remedial measures of Nuclear hazards.	7M
7.	a)	Explain the conservation of water by rain water harvesting technique.	7M
	b)	Give the salient features of Air Act.	7M
8.	a)	Write notes on Acid rains.	7M
	b)	Explain the Family Welfare programme.	7M

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Hall Ticket Number :										

R-17

Code: 7G643

II B.Tech. II Semester Regular & Supplementary Examinations November 2020

Hydraulics and Hydraulic Machinery

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
1.		For the velocity profile for laminar boundary layer flows given as $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$. Find an expression for boundary layer thickness (δ), shear stress (τ_0) and coefficient of drag (C_D) in terms of Reynolds number.	14M	1	L2
2.		A man weighing 880 N descends to the ground from an aeroplane with the help of a parachute against the resistance of air. The velocity with which the parachute, which is hemispherical in shape, comes down is 20m/s. Find the diameter of the parachute. Assume C_D = 0.50 and specific weight of air is 12.26N/m^3.	14M	1	L3
3.	a)	Explain about various water surface profiles occurring in different channels.	7M	2	L1
	b)	The depth of the flow of water at a certain section of a rectangular channel 3 m wide is 0.25 m. The discharge through the channel is 1.8 cumecs. Determine whether hydraulic jump will occur and if so find the height and loss of energy.	7M	2	L3
4.	a)	Prove that the force exerted by a jet of water on a fixed semicircular plate in the direction of the jet when the jet strikes at the center of the semicircular plate is two times the force exerted by the jet on an fixed vertical plate.	7M	3	L2
	b)	Water is following through a pipe at the end of which a nozzle is fitted. The diameter of the nozzle is 100 mm and the head of water at the center of the nozzle is 100 m. find the force exerted by the jet of water on a fixed vertical plate. The coefficient of velocity is given as 0.95.	7M	3	L3
5.	a)	Show that the force exerted by the jet of water on an inclined fixed plate in the direction of the jet is given by $F_x = \rho a v^2 \sin^2\theta$, where a = area of the jet, v=velocity of the jet and θ = inclination of the plate with the jet.	7M	3	L2
	b)	A jet of diameter 50 mm strikes a fixed plate in such a way that the angle between the plate and jet is 30^0. The force extracted in the direction of the jet is 141.5 N. determine the rate of flow of water.	7M	3	L3
6.	a)	Define the terms unit power, unit speed, and unit discharges with reference to a hydraulic turbine.	7M	4	L1
	b)	A Pelton wheel is working under a head of 500 m produce 13,000 kw at 429rpm. If the efficiency of the wheel is 85%, determine (i) Discharge of the turbine (ii) Diameter of the wheel (iii) Diameter of nozzle	7M	4	L3
7.	a)	Write a short note on draft tube.	7M	4	L1
	b)	What is a surge tank and a forebay and what are their function? Describe with neat sketches different types of surge tank.	7M	4	L1
8.	a)	What are the different types of hydropower plants? Describe each one briefly.	7M	6	L1
	b)	Show that capacity factor is equal to the product of the load factor and the utilization factor.	7M	6	L4

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Hall Ticket Number :										

R-17

Code: 7GC42

II B.Tech. II Semester Regular & Supplementary Examinations November 2020

Probability and Statistics

(Common to Civil Engineering, ME & CSE)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

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Marks

1. a) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Find the probability that (i) both are white (ii) first is red and second is white. 7M

   b) The diameter of an electric cable say X is assumed to be a continuous random variable with Probability density function

   $f(x) = 6x(1-x)$; $0 \le x \le 1$.

   Find mean and variance. 7M

2. a) State and prove Baye's theorem. 7M

   b) The cumulative distribution function of a continuous random variable X is given by

$$F(x) = \begin{cases} 0, & x < 0 \\ x^2, & 0 \le x < 1/2 \\ 1 - \frac{3}{25}(3-x)^2, & (1/2) \le x < 3 \\ 1, & x \ge 3 \end{cases}$$ 7M

   Find the pdf of x and evaluate $P((1/3) \le X < 4)$.

3. a) In a large consignment of electric bulbs 10% are defective. A random sample of 20 is taken for inspection. Find the probability that

   (i) All are good bulbs.

   (ii) At most there are three defective bulbs.

   (iii) Exactly there are three defective bulbs. 7M

   b) The weekly wages of 1000 workmen are normally distributed around a mean of Rs.70 with a standard deviation of Rs.5. Estimate the number of workers whose weekly wages will be (i) Between Rs.69 and Rs.72 (ii) Less than Rs.69 (iii)More than Rs.72. 7M

4. a) Fit a Poisson distribution for the following data and calculate the expected frequencies

x	0	1	2	3	4	5
f(x)	142	156	69	27	5	1

   7M

   b) Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys? Assume equal probabilities for boys and girls. 7M

5. a) A population consists of the four numbers 3, 7, 11, 15. Consider all possible samples of size 2 which can be drawn with replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 7M

   b) The standard deviation of the life-times of television tubes manufactured by a company is estimated as 100 hours. Find how large a sample must be taken in order to be 99% confident that the error in the estimated mean life-time will not exceed 20 hours 7M

6. a) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence.200men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same at 5%level. 7M

   b) Two random samples gave the following data

	size	mean	Variance
Sample I	8	9.6	1.2
Sample II	11	16.5	2.5

   Is the difference between means significant? 7M

7. The following data give the number of air-craft accidents that occurred during the various days of a week

Day	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	15	29	13	12	16	15

   Test whether the accidents are uniformly distributed over the week. 14M

8. Two random samples drawn from two normal populations have the variable values as below:

Sample1	19	17	16	28	22	23	19	24	26			
Sample2	28	32	40	37	30	35	40	28	41	45	30	36

   Obtain the estimate of the variance of the population and test whether the two populations have the same variance. 14M

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Hall Ticket Number :										

R-17

Code: 7G644

II B.Tech. II Semester Regular & Supplementary Examinations November 2020

Structural Analysis-I

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

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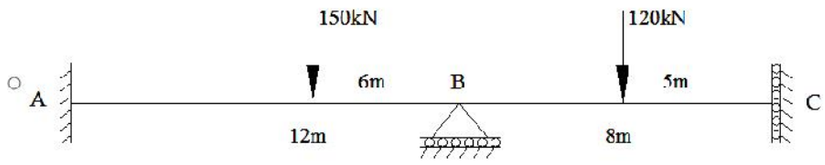
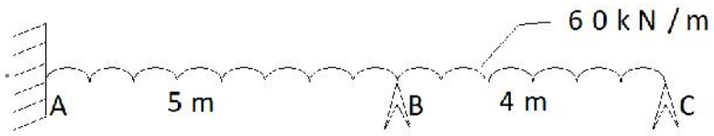
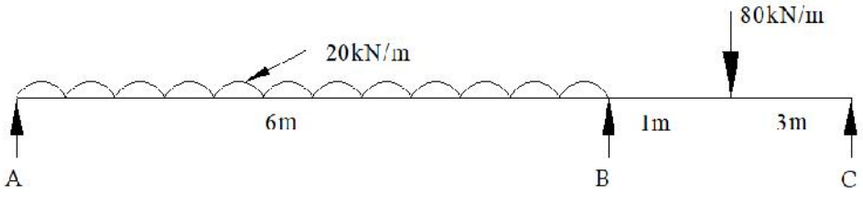
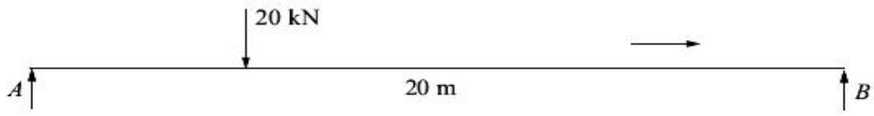
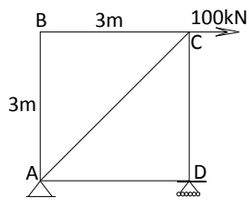
			Marks	CO	Blooms Level
1.		Derive the deflection equation for a fixed beam subjected to central point load? Also construct the shear force and bending moment diagram for concentrated point load of 10kN, span of the beam is 5m?	14M	CO1	L4 &L6
2.	a)	Distinguish between indeterminate structures and determinate structures? With examples	4M	CO1	L2
	b)	What is the value of end moments of a fixed beam if the end settles by a fixed amount of (120/EI)?	10M	CO1	L3
3.		Analyse and interpret the results of continuous beam subjected to loading as shown in figure? Also construct the BMD and SFD for the same 	14M	CO2	L4 &L6
4.		Using slope deflection method, analyse the continuous beam and draw the bending moment diagram. The support B sinks by 5mm. E= $2(10)^5$N/mm^2 and I=400x10^6mm^4. 	14M	CO3	L4
5.		A continuous beam ABC consists of two spans AB and BC of lengths 6m and 4m. The span AB carries a UDL of 20 K/m, while the span BC carries a point load of 80kN at 3 meters from c. Draw the shear force diagram and bending moment diagram using moment distribution method. 	14M	CO3	L4 &L6
6.		A simply supported beam of 15metre span is subjected to uniform live load of 100kN/m (longer than the span) of span 20m. Determine the maximum value of positive as well as negative shear force at left quarter span.	14M	CO4	L4 &L6
7.		A single rolling load of 20 kN rolls over a simply supported girder of 20 metre span. Construct the diagrams for the maximum shear force and maximum bending moment in the girder. 	14M	CO1	L3
8.		Determine the forces in all the members of the redundant pin jointed frame shown in Fig. The area of the cross section of the diagonals is twice that the other members. 	14M	CO5	L3

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