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Model Question Paper-1 with effect from 2018-19
(CBCS Scheme)
First/Second Semester B.E.Degree Examination
Elements of Civil Engineering and Mechanics (Common to all Branches)   **18CIV14/24**
Time: 3 hrs   **Max. Marks: 100**
Note: Answer FIVE full questions, choosing one full question from each module

	Module – 1	**Marks**
1a	Briefly explain the role of Civil Engineers in the infrastructure development of country.	8m
b	Explain briefly the scope of Civil Engineering in: a) Water resources engineering b) Geotechnical Engineering.	8m
c	State and explain principle of resolved parts.	4m

OR

2a Determine the resultant of the four forces acting on a body as shown in Fig. Q.2 (a) with respect to point "O".   8m
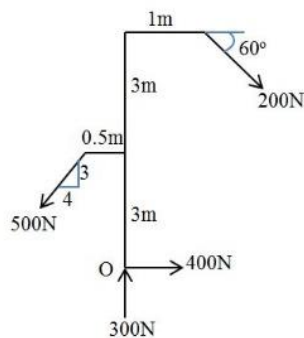

Fig. Q.2 (a)

b A truck is to be pulled along a straight road as shown in Fig. Q.2 (b). i) if the force applied along rope A is 5kN inclined at 30°, what should be the force in the rope B, which is inclined at 20°, so that vehicle moves along the road. ii) if force of 4kN is applied in rope B at what angle rope B should be inclined so that the vehicle is pulled along the road?   8m
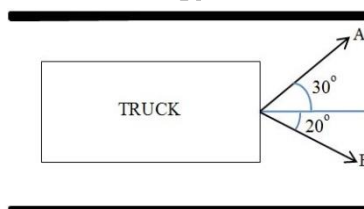

Fig. Q.2 (b)

c What is the moment of a force? What are the various moments encountered in practice? Explain them.   4 m

Module –2

3a What is meant by equilibrium of a rigid body? State the conditions of static equilibrium for coplanar non-concurrent force system?   4m

b Find the reaction at the contact surface for two identical cylinders weighing 1000N each as shown in Fig. Q.3. (b)   8m
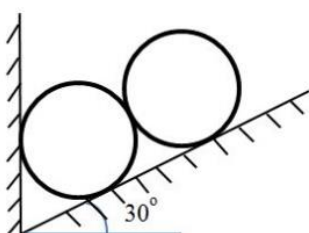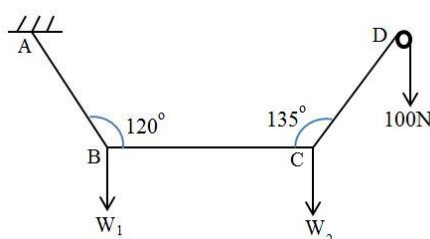

Fig. Q.3. (b).   Fig. Q. 3. (c).

c   In the Fig. Q. 3 (c). The portion BC of the string is horizontal and pulley is frictionless. Determine tension in different parts of the string. Also find W_1 and W_2.   8m

OR

4a   Explain briefly: 1) angle of repose 2) Cone of friction.   4m

b   What is the value of `P` in the system shown in Fig. Q.4 (b) to cause the motion to impend? Assume the Pulley is smooth and the coefficient of friction between the other contact surfaces is 0.2.
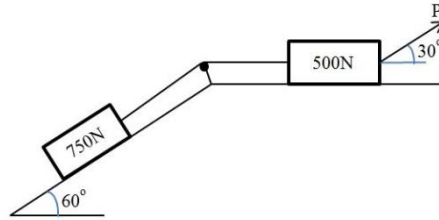
Fig. Q.4 (b)   8m

c   A uniform ladder of length 20m rests against a vertical wall with which it makes an angle of 45°, the coefficient of friction between the ladder and the wall and ground respectively being 1/3 and 1/2. If a man, whose weight is one half that of the ladder ascends the ladder, how high will he be, when the ladder slips?   8m
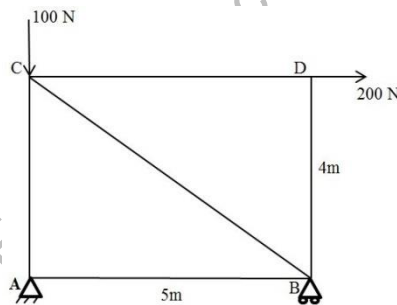
Module –3

5a   With sketch explain different types of supports and mark reaction line.   6m

b   A simply supported beam AB of length 10m carries the uniformly distributed load of intensity 20 kN/m over a length of 4m at a distance 2m from left support and two point loads 50kN and 60kN a distance 2mand 6m from left support respectively calculate the reaction RA and RB.   14m

OR

6a   List the steps followed in the analysis of truss by method of sections.   6m

b   Find the support reactions and member forces for pin jointed plane truss shown in Fig. Q. 6 (b).By method of joints.
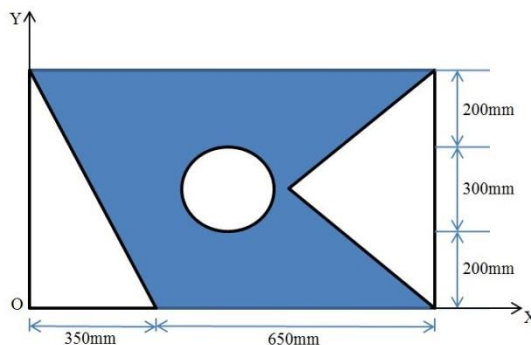

Fig. Q. 6 (b).   14m

Module –4

7a   Derivation of expression for centroid of Rectangle.   6m

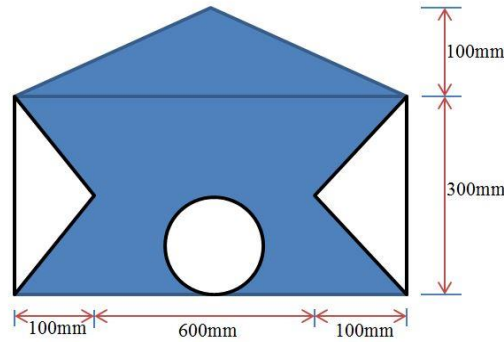b   Locate the centroid of the shaded area shown in the Fig.Q.7 (b).with respect to OX and OY

Fig.Q.7 (b).   14m

OR

8a   State and prove Parallel axis theorem   6m

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b   Determine the second moment of the area about the horizontal centroidal axis as shown in Fig. Q. 8. (b). Also find radius of gyration.

14m

Fig. Q. 8. (b)

Module –5

9a   Define Acceleration, Uniform acceleration, Variable acceleration and Acceleration due to gravity   4 m

b   A particle, starting from rest, moves in a straight line, whose equation of motion is given by $s=5t^3-3t^2+6$. Find the displacement, velocity and acceleration of the particle after 5 seconds.   8m

c   A stone is dropped into well and the splash of sound is heard after 9 seconds. Determine the height of drop from the water surface. Assume velocity of sound to be 330m/sec.   8m

OR

10a   Explain briefly Rectilinear motion and Curvilinear motion.   4m

b   State D'Alembert's principle and mention its applications in Plane Motion.   8m

c   A particle is projected with a velocity of 20m/s in air at angle 'a' with the horizontal. The x and y co-ordinates of a point lying on the trajectory of the particle with respect to point of projection are 20m and 8m respectively. Find the angle of projection of the particle.   8m