

# **ADICHUNCHANAGIRI UNIVERSITY**

## **Subject Name & Code: Building Materials and Construction (18CV34)**

## **Duration: 3 Hours**

Max.Marks: 100

**Instructions** 1. Answer Five Full questions.

**2. Choose one full question from each module.**

MODULE 1

- 1 a) Briefly explain the methods of preservation of stones 10  
b) List the tests conducted on Coarse aggregates. Explain any two test in detail 10

OR



MODULE 2

- 3      a) Define Foundation. List out and explain different types of foundation.      10  
      b) List the methods for estimating bearing capacity. With neat sketch,      10  
          explain plate load test.

OR

- 4 a) Explain different classification of stone masonry with neat sketches 10  
b) Explain different joints in stone masonry. 05  
c) Define 05  
i) King Closer      ii) Queen Closer

MODULE 3

- 5      a) With a neat sketch explain the components of segmental arch                          10  
      b) Define Lintel. What are the different types of lintel used, explain any two types with figure                          10

OR

## **MODULE 4**

- |   |  |    |
|---|--|----|
| 7 | a) Explain brief with neat sketches.   | 10 |
|   | i) Panelled door    ii) Revolving door   |    |
|   | b) Plan a dog-legged staircase for a building in which the vertical distance between the floor is 3m. The stair hall measures 2.8m x 5.8m. | 10 |

## **OR**

- |   |   |    |
|---|---|----|
| 8 | a) State briefly the requirement of a good stair                                | 05 |
|   | b) Explain  | 05 |
|   | i) Louvered window    ii) Corner window   |    |
|   | c) With a neat sketch explain the following terms                               | 10 |
|   | i) Tread   ii) Riser   iii) Landing   iv) Flight   v) Handrail   vi) Newel post |    |

## **MODULE 5**

- |   |   |    |
|---|---|----|
| 9 | a) List the methods of plastering and explain any two.  | 10 |
|   | b) Explain in brief the causes and effects of dampness. | 10 |

## **OR**

- |    |  |    |
|----|--|----|
| 10 | a) List the types of paints. Describe the procedure of painting the steel surfaces | 10 |
|    | b) Briefly explain the method of applying  | 10 |
|    | i) Stucco plastering    ii) Lathe plastering                                       |    |

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# CBCS Scheme

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15CV36

**Third Semester B.E. Degree Examination, June/July 2017**  
**Building Materials and Construction**

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing  
ONE full question from each module.**

**Module-1**

- 1 a. What are the requirements for a good quality building stone? Hence define : backing, corbel and coping of stones. (06 Marks)  
 b. Briefly explain the advantages of cement concrete blocks. (04 Marks)  
 c. List the different tests conducted on bricks. Explain briefly any two of them. (06 Marks)

**OR**

- 2 a. What are the requirements of good mortar? List the typical proportions used for cement mortar in construction industry. (04 Marks)  
 b. Briefly explain the following tests on fine aggregates :  
     i) bulking ii) specific gravity test. (06 Marks)  
 c. Differentiate natural and manufactured coarse aggregate. Briefly explain use and procedure of impact and abrasion test on coarse aggregates. (06 Marks)

**Module-2**

- 3 a. What do you understand by "bearing capacity" of soil. Define : ultimate bearing capacity and safe bearing capacity of soil. (04 Marks)  
 b. Sketch and explain following types of foundations :  
     i)Isolated footing ii) combined footing iii) strap beam footing. (06 Marks)  
 c. With a neat sketch, explain the features of English bond and Flemish bond with respect to brick masonry. List their merits and demerits. (06 Marks)

**OR**

- 4 a. Define : i) Bevelled closer ii) Mitred closer iii) King closer and iv) Queen closer. (04 Marks)  
 b. Explain different classification of stone masonry with neat sketches, wherever necessary. (06 Marks)  
 c. Compare and contrast brick work to stone work. (06 Marks)

**Module-3**

- 5 a. Define lintel. What are the different types of lintels used? (04 Marks)  
 b. With a neat sketch, explain the components of a segmental arch. (06 Marks)  
 c. Write short notes on : Cement flooring and Mosaic flooring. (06 Marks)

**OR**

- 6 a. What are the factors to be considered while selecting a roof covering? (04 Marks)  
 b. Enumerate the advantages and disadvantages of flat roofs over a pitched roof. (06 Marks)  
 c. With neat sketches, write an explanatory note on different types of roof trusses. (06 Marks)

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(04 Marks)

(06 Marks)

(06 Marks)

**Module-4**

- 7 a. List the guide lines to be followed while locating doors and windows.  
b. Draw a neat sketch showing all the components of following types of door :  
i) Fully paneled door ii) revolving door.  
c. With neat sketches, differentiate :  
i) fixed window and pivoted window  
ii) corner window and bay window.

**OR**

- 8 a. Define a stair. With a neat sketch explain the following terms : i) Thread and Riser ii) Flight and landing.  
b. Plan a doglegged stair for a building in which vertical distance between the floors is 3.6m. The stair hall measures 3m × 5m (internal dimensions).  
c. Write explanatory note on : shoring and underpinning formwork.

**Module-5**

- 9 a. What are the objectives of plastering? Explain the requirement of a good plaster. (04 Marks)  
b. Explain the method of applying : Stucco plastering and Lathe plastering. (06 Marks)  
c. Discuss the defects in plastering. (06 Marks)

**OR**

- 10 a. What are the causes of dampness in building? Hence what do you understand by damp proof course. (06 Marks)  
b. Mention the objectives of painting and point out the characteristics of an ideal paint. (06 Marks)  
c. Explain the method of varnishing wood works. (04 Marks)

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## CBCS Scheme

Time: 3 hrs.

Max. Marks: 80

### **Third Semester B.E. Degree Examination, Dec.2016/Jan.2017**

### **Building Materials and Construction**

**Note: Answer any FIVE full questions, choosing one full question from each module.**

**Module-1**

- 1 a. Write the requirements of good building stones. (04 Marks)  
     b. Explain the factors causing deterioration of stonework and preservation of stonework. (06 Marks)  
     c. Briefly explain the tests conducted on bricks. (06 Marks)

**OR**

- 2 a. Write the requirements of good mortar. (04 Marks)  
     b. Briefly explain the tests conducted on fine aggregates.  
         i) Sieve analysis; ii) Specific gravity test. (06 Marks)  
     c. Briefly explain the importance of size, shape and texture on coarse aggregates. (06 Marks)

**Module-2**

- 3 a. Write the essential requirements of good foundation. (04 Marks)  
     b. With neat sketches, explain the following types of foundation:  
         i) Combined footing; ii) Strap footing. (06 Marks)  
     c. With neat sketch, write the features of English bond and Flemish bond. (06 Marks)

**OR**

- 4 a. Briefly explain classification of stone masonry. (06 Marks)  
     b. With neat sketch, explain various joints provided in stone masonry. (06 Marks)  
     c. Write the advantages of cavity walls. (04 Marks)

**Module-3**

- 5 a. Define lintel and write the function of lintel. (04 Marks)  
     b. With neat sketch explain various components of a segmental arch. (06 Marks)  
     c. Write the requirements of good floor and factors affecting selection of flooring material. (06 Marks)

**OR**

- 6 a. Write the requirements of good roof. (04 Marks)  
     b. Write the advantages and disadvantages of flat roof compared to pitched roof. (06 Marks)  
     c. With the help of neat sketch, explain various components of queen post truss. (06 Marks)

**Module-4**

- 7 a. Explain the following doors with neat sketches:  
         i) Partly paneled and glazed door; ii) Revolving door. (06 Marks)  
     b. Explain the following windows with neat sketches:  
         i) Bay window; ii) Corner window. (06 Marks)  
     c. Write the requirements of good stair. (04 Marks)

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(04 Marks)  
(06 Marks)  
(06 Marks)

- 8 a. Briefly explain classification of stairs.  
b. Plan a dog legged stair for a building in which the vertical distance between the floors is 3.6mt. The stair hall measures 2.5m × 5m.  
c. Write short notes on: i) Shoring; ii) Under pinning.

**Module-5**

(06 Marks)  
(06 Marks)  
(04 Marks)

- 9 a. Write the objectives of plastering and requirement of good plaster.  
b. Discuss the defects in plastering.  
c. Briefly explain method of applying stucco plastering.

**OR**

(06 Marks)  
(06 Marks)  
(04 Marks)

- 10 a. Briefly explain the methods of damp proofing.  
b. Explain in brief defects in painting and constituents of a point.  
c. Describe the procedure of painting on new wood work.

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17CIV13/23

**CBCS SCHEME****First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019****Elements of Civil Engineering and Mechanics**

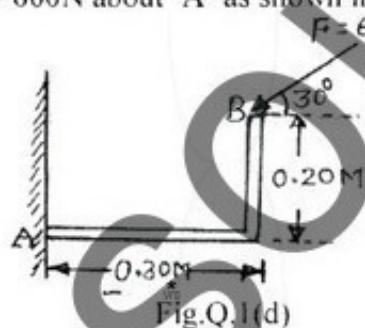
Time: 3 hrs.

Max. Marks: 100

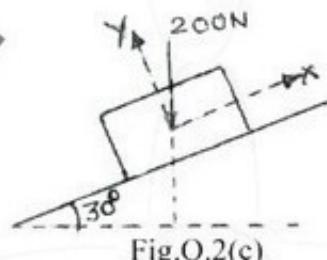
**Note:** Answer any **FIVE** full questions, choosing  
ONE full question from each module.

**Module-1**

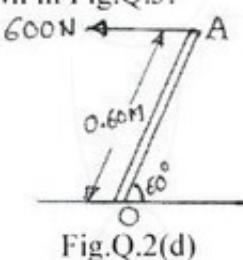
1. a. Explain briefly scope of civil engineering in, i) Structural Engineering ii) Transportation Engineering. (06 Marks)
- b. Explain briefly the impact of infrastructure on the socioeconomic development of country. (06 Marks)
- c. State and explain different elements of force. (04 Marks)
- d. Find the moment of force  $F = 600\text{N}$  about 'A' as shown in Fig.Q.1(d). (04 Marks)

**OR**

2. a. State and explain principle of transmissibility of forces. (04 Marks)
- b. Differentiate between flexible pavement and rigid pavement. (04 Marks)
- c. A block of 200N is kept on the inclined plane and is fixed to the plane. Find the components of weight in the direction along the plane and perpendicular to the plane as indicated in Fig.Q.2(c) (06 Marks)



- d. Replace the horizontal force of 600N acting on the lever by an equivalent system consisting of a force and a couple at 'O' as shown in Fig.Q.3. (06 Marks)



Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg.  $42+8=50$ , will be treated as malpractice.

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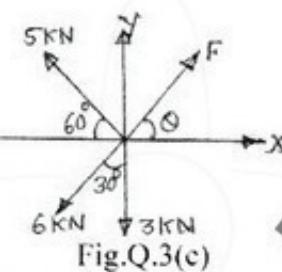
**Module-2**

- 3 a. State and prove law of parallelogram of forces.  
 b. Explain with neat diagram,  
   i) Coefficient of friction  
   ii) Angle of repose  
   iii) Cone of friction.  
 c. The four coplanar concurrent forces acting at a point are as shown in Fig.Q.3(e). One of the force is unknown and its magnitude is as shown by 'F'. The resultant of these forces is 5kN and is acting along x-axis. Determine the force F and its inclination ' $\theta$ ' with x-axis.

(06 Marks)

(06 Marks)

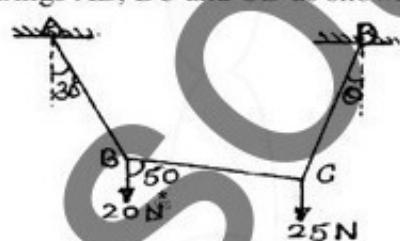
(08 Marks)

**OR**

- 4 a. State and prove Lami's theorem.  
 b. Compute the tensions in the strings AB, BC and CD as shown in Fig.Q.4(b).

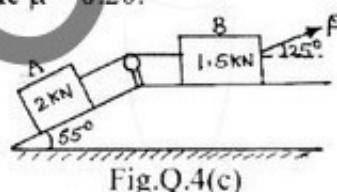
(04 Marks)

(08 Marks)



- c. Two blocks A and B weighing 2kN and 1.5kN are connected by a wire passing over a smooth frictionless pulley as shown in Fig.Q.4(c). Determine the magnitude of force 'P' required to impound motion. Take  $\mu = 0.20$ .

(08 Marks)

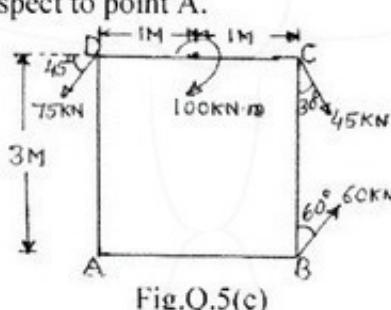
**Module-3**

- 5 a. State and explain Varignon's theorem.  
 b. What are the types of loads and supports a beam may have? Explain briefly with neat sketches.  
 c. Determine the position, magnitude and direction of resultant of the forces acting on a body as shown in Fig.Q.5(c) with respect to point A.

(06 Marks)

(06 Marks)

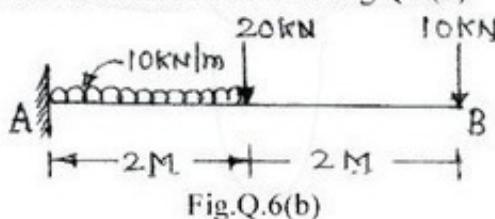
(08 Marks)



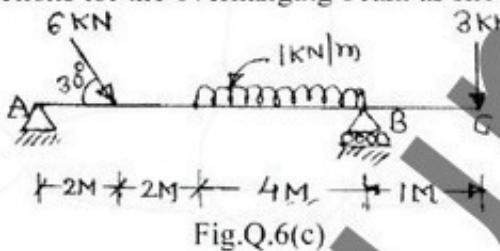
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OR

- 6 a. Define Equillibriant. Explain the conditions of equilibrium of coplanar concurrent force system and coplanar non concurrent force system.  
 b. Find the reactions for a cantilever beam as shown in Fig.Q.6(b)



- c. Determine the support reactions for the overhanging beam as shown in Fig.Q.6(c), (08 Marks)



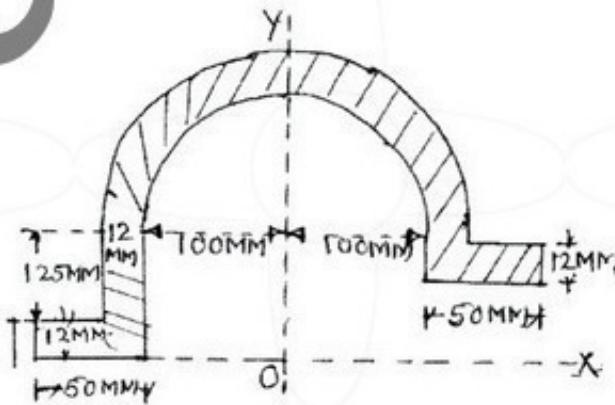
#### Module-4

- 7 a. Determine the centroid of a semicircular lamina of radius 'R' by the method of integration.  
 b. Find the polar moment of inertia of the section as shown in Fig.Q.7(b), about an axis passing through its centroid and find polar radius of gyration.



OR

- 8 a. State and prove parallel axis theorem.  
 b. With reference to the coordinate axes x and y, locate the centroid of the area shown in Fig.Q.8(b).



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**Module-5**

- 9 a. Define the following: i) Kinematics ii) Kinetics iii) Motion iv) Path. (06 Marks)  
b. What is centrifugal force and super elevation? (06 Marks)  
c. A Burglar's car starts at an acceleration of  $2\text{m/sec}^2$ . A police vigilant party came after 5 seconds and continued to chase the Burglar's car with a uniform velocity of  $20\text{m/sec}$ . Find the time taken in which the police van will overtake the car. (08 Marks)

**OR**

- 10 a. Define the following: i) Uniform velocity ii) Rectilinear motion iii) Curvilinear motion iv) Projectile. (04 Marks)  
b. Determine the position at which the ball is thrown up the plane will strike the incline plane as shown in Fig.Q.10(b). The initial velocity is  $30\text{m/sec}$  and angle of projection is  $\tan^{-1}\left(\frac{4}{3}\right)$  with horizontal. (08 Marks)

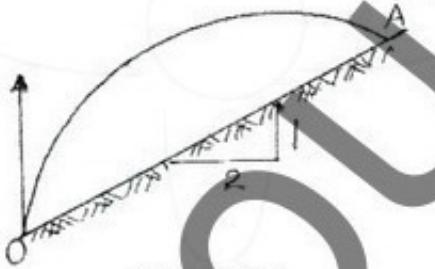


Fig.Q.10(b)

- c. A stone is dropped into a well and a sound of splash is heard after 4 seconds. Find the depth of well if the velocity of sound is  $350\text{ m/sec}$ . (08 Marks)

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**CBGS SCHEME****Third Semester B.E. Degree Examination, June/July 2019  
Building Materials and Construction**

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.***Module-1**

- 1 a. Explain the factors causing deterioration of stonework.  
b. List the tests conducted on Fine aggregates. Explain any two tests in detail. (06 Marks)  
(10 Marks)

**OR**

- 2 a. Write notes on :  
(i) Stabilized Mud Blocks      (ii) Grading of aggregates      (iii) Timber as construction. (06 Marks)  
b. List the tests on coarse Aggregates. Explain (i) Aggregate Impact test      (ii) Aggregate Abrasion test (10 Marks)

**Module-2**

- 3 a. What are the functions of good foundation?  
b. What are the requirements of good building stones?  
c. Briefly explain load bearing walls and cavity walls. (05 Marks)  
(05 Marks)  
(06 Marks)

**OR**

- 4 a. Define safe Bearing capacity. List the methods of improving bearing capacity of soil and explain any two methods. (08 Marks)  
b. Find the dimensions of combined rectangular footing for two columns A and B carrying loads 1000 N and 1500kN respectively. Column A is 500mm × 500mm in size and column B is 600mm × 600mm in size. The centre to centre spacing of columns is 5.0m. The SBC of soil may be taken as 250 kN/m<sup>2</sup>. The footing is not to project more than 250mm beyond the outer edge of smallest column. (08 Marks)

**Module-3**

- 5 a. Draw a neat sketch of an arch and explain various technical terms related to an arch.  
b. List the types of roofs and explain any two with neat sketches. (08 Marks)  
(08 Marks)

**OR**

- 6 a. Define Lintel. Explain different types of lintels with neat sketches.  
b. Briefly explain the functions of Chejja, Canopy and Balcony. (10 Marks)  
(06 Marks)

**Module-4**

- 7 a. What are the factors considered while locating Doors and windows?  
b. State briefly the requirements of a good stair.  
c. Explain with the help of sketches the following terms:  
(i) Nosing      (ii) Handrail      (iii) Landing      (iv) Newel post. (05 Marks)  
(05 Marks)  
(06 Marks)

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OR

- 8 a. Explain in brief with neat sketches:  
(i) Panelled door (ii) Revolving Door (iii) Corner window (iv) Louvered window  
(10 Marks)  
b. Plan a dog-legged staircase for a building in which the vertical distance between the floors is 3.0m. The stair hall measures 2.8m × 5.8m.  
(06 Marks)

**Module-5**

- 9 a. Discuss the defects in plastering.  
b. Explain in brief the causes and effects of dampness.  
(06 Marks)  
(10 Marks)

OR

- 10 a. List the methods of plastering and explain any two.  
b. List the types of paints. Describe the procedure of painting on steel surfaces.  
(08 Marks)  
(08 Marks)

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**CBCS SCHEME**

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17CIV13/23

**First/Second Semester B.E. Degree Examination, June/July 2018**  
**Elements of Civil Engineering and Mechanics**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing one full question from each module.****Module-1**

- 1 a. Briefly explain the role of civil engineer in the infrastructural development. (08 Marks)  
 b. Define Couple and Mention its characteristics. (06 Marks)  
 c. Find the moment of 500N force about point A, B, C and D as shown in fig. Q1(c). (06 Marks)

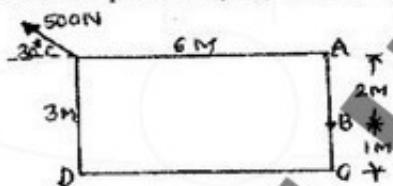
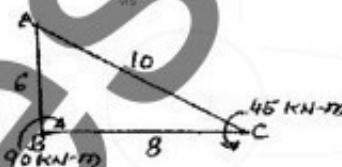


Fig.Q1(c)

**OR**

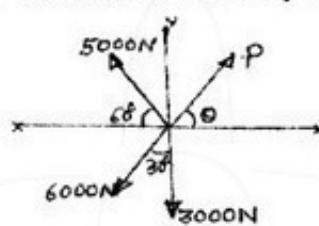
- 2 a. State and explain basic idealization in mechanics. (08 Marks)  
 b. Explain the following bridges with neat sketches :  
     i) Suspension bridge    ii) Arch bridge. (06 Marks)  
 c. In the triangle ABC, a force at 'A' produces a clockwise moment of 90kN-m at B and an anticlockwise moment of 45kN-m at C. Find the magnitude and direction of the force as shown in fig.Q2(c). (06 Marks)

Fig.Q2(c)

**Module-2**

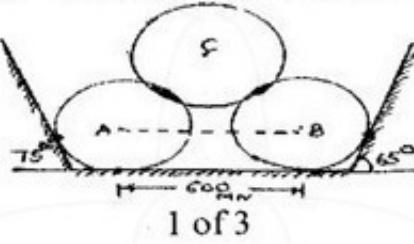
- 3 a. State and prove Lami's theorem. Also write the significance of the law. (10 Marks)  
 b. Four forces acting on the gusset plate of a joint in a bridge truss are shown in fig. Q3(b). Determine the value of 'P' and 'theta' to maintain the equilibrium of the joint. (10 Marks)

Fig.Q3(b)

**OR**

- 4 a. State the laws of Static friction. (04 Marks)  
 b. Define i) Angle of friction    ii) Coefficient of friction    iii) Cone of friction. (06 Marks)  
 c. Determine the reactions at contact points for spheres A, B and C as shown in fig.Q4(c). It is given that  $W_A = W_B = 4\text{kN}$ ,  $W_C = 6\text{kN}$ ,  $d_A = d_B = 500\text{mm}$ ,  $d_C = 800\text{mm}$ . (10 Marks)

Fig.Q4(c)



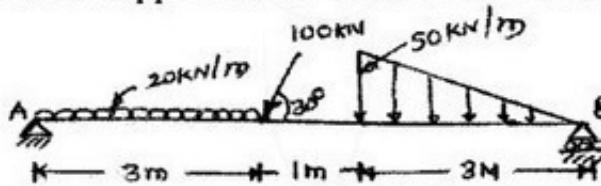
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(10 Marks)  
(10 Marks)

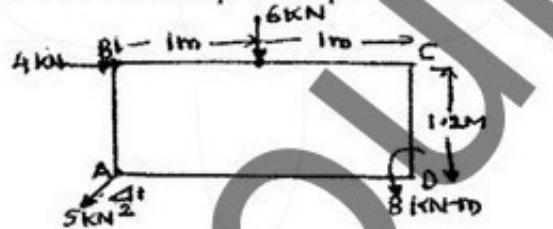
- Module-3**
- 5 a. State and prove Varignon's theorem of moment.  
b. Determine the reactions at the support for the beam as shown in fig. Q5(b).

Fig.Q5(b)

**OR**

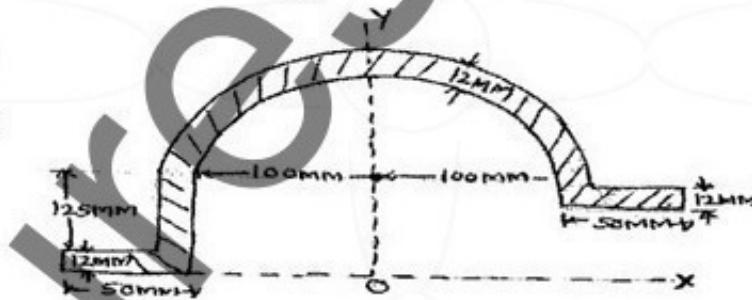
- 6 a. Explain briefly with neat sketch :  
i) Types of load ii) Types of support iii) Types of beams.  
b. Determine the resultant of the force system acting on a body as shown in fig. Q6(b). Also locate the position of the resultant with respect to point 'D'. (10 Marks)

Fig.Q6(b)

**Module-4**

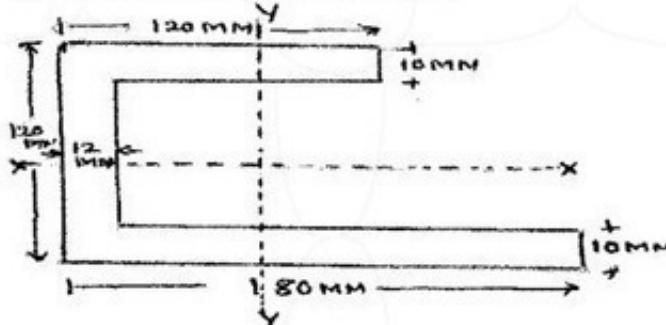
- 7 a. State and prove Parallel Axis theorem.  
b. With reference to the co-ordinate axis X and Y, locate the centroid of an area as shown in fig. Q7(b). (08 Marks)

Fig.Q7(b)

**OR**

- 8 a. Determine the centroid of a triangular lamina about its base by method of integration.  
b. Determine the moment of inertia of the section shown in fig. Q8(b) about its centroidal axis. Calculate the least radius of gyration for the section. (12 Marks)

Fig.Q8(b)



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**Module-5**

- 9 a. Determine the position at which the ball is thrown up the plane will strike the inclined plane as shown in fig. Q9(a). The initial velocity is 30m/sec and the angle of projection is  $\tan^{-1}\left(\frac{4}{3}\right)$ . (10 Marks)

Fig.Q9(a)



- b. A Burglar's car starts at an acceleration of  $2\text{m/sec}^2$ . A police vigilant party came after 5 seconds and continued to chase the Burglar's car with a uniform velocity of  $20\text{m/sec}$ . Find the time taken in which the police van will overtake the car. (10 Marks)

**OR**

- 10 a. What is a Projectile? Define the following terms briefly : (10 Marks)  
i) Angle of projection ii) Horizontal range iii) Vertical height iv) Time of flight.  
b. A stone is dropped from the top of the tower 50m high. At the same time another stone is thrown up from the foot of the tower with a velocity of  $25\text{m/sec}$ . At what distance from the top and after how much time the stones cross each other. (10 Marks)

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# CBCS Scheme

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17CIV13

**First Semester B.E. Degree Examination, Dec.2017/Jan.2018****Elements of Civil Engineering & Mechanics**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer FIVE full questions, choosing one full question from each module.****Module-1**

- 1 a. Briefly give the scope of different fields in Civil Engineering. (10 Marks)  
 b. List and briefly explain the types of force systems with example. (10 Marks)

**OR**

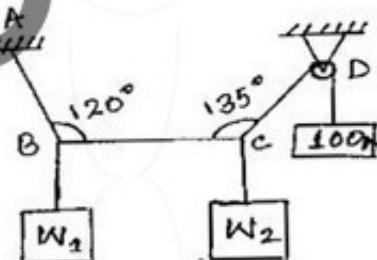
- 2 a. Write the classification of roads and comparison of flexible and rigid pavements. (10 Marks)  
 b. The moment of certain force 'F' is 180 kN-m clockwise about 'O' and 90kN-m counter clockwise about 'B'. If its moment about 'A' is zero, determine the force 'F'. Refer fig.Q2(b). (10 Marks)

Fig.Q2(b)

**Module-2**

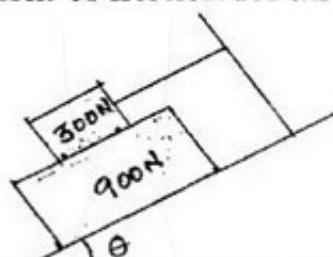
- 3 a. State and prove Parallelogram law of forces and also write the significance of the law. (10 Marks)  
 b. In the fig. Q3(b) the portion BC of the string is horizontal and pulley is frictionless. Determine tensions in different segments of the string. Also find W1 and W2. Use Lami's theorem. (10 Marks)

Fig.Q3(b)

**OR**

- 4 a. Define the terms : i) Angle of friction ii) Cone of friction. (04 Marks)  
 b. What should be the value of theta if fig. Q4(b) which will make the motion of 900N block down the plane to impend? The coefficient of friction for all contact surfaces is 1/3. (06 Marks)

Fig.Q4(b)



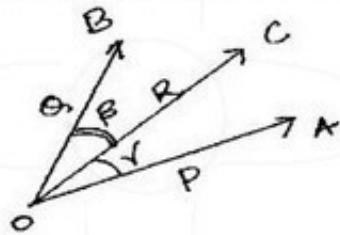
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 Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg.  $42+8 = 50$ , will be treated as malpractice.

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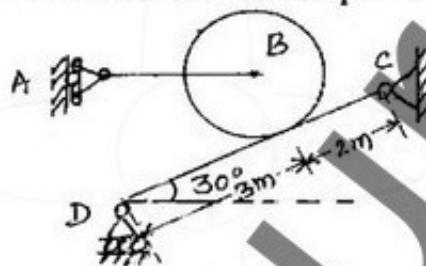
- c. Two forces P & Q are acting at point 'O' as shown in fig. Q4(c). the resultant force is 400N, angles  $\beta$  and  $\gamma$  are  $35^\circ$  and  $25^\circ$  respectively. Find the two forces P and Q. (10 Marks)

Fig.Q4(c)

**Module-3**

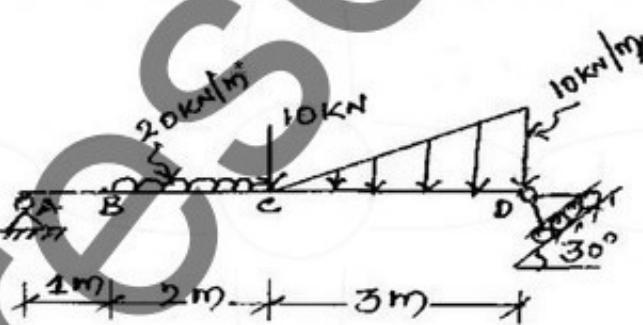
- 5 a. Explain i) Types of loads ii) Types of support. (10 Marks)  
 b. A roller weighing 2000N rests on an inclined bar, which is 5m long and weighing 800N as shown in fig. Q5(b). Determine the reactions developed at supports C and D. (10 Marks)

Fig.Q5(b)



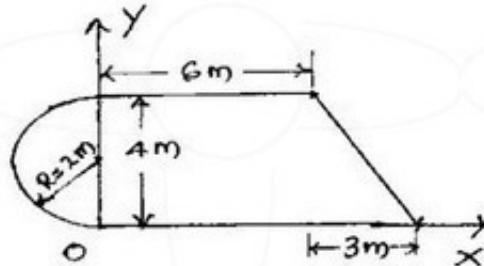
- 6 a. State and prove 'Principle of Moments' (10 Marks)  
 b. Determine the reactions at the supports for the beam loaded as shown in fig. Q6(b). (10 Marks)

Fig.Q6(b)

**Module-4**

- 7 a. Determine the centroid of a right angle triangle of base 'b' and height 'h' from first principle. (08 Marks)  
 b. Determine the centroid of the area shown in fig. Q7(b) with respect to the axes shown. (12 Marks)

Fig.Q7(b)

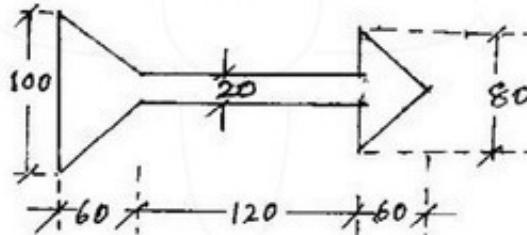
**OR**

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- 8 a. Determine the moment of Inertia of a circle about its diametral axis by the method of integration. (06 Marks)  
 b. Determine the moment of inertia of the section shown in fig. Q8(b) about the Vertical Centroidal axis. All dimensions are in mm. (14 Marks)

Fig.Q8(b)

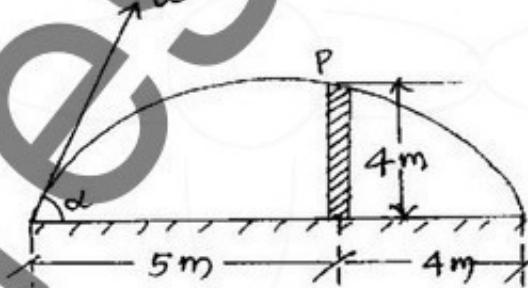
**Module-5**

- 9 a. State and explain Newton's laws of motion. (10 Marks)  
 b. On a straight road, a smuggler's car passes a police station with uniform velocity of 10m/sec. After 10 secs, a police van follows in pursuit with a uniform acceleration of 1m/sec<sup>2</sup>. Find the time necessary for the police van to catch up with the smuggler's car. (10 Marks)

**OR**

- 10 a. What is Projectile? Define the terms i) Angle of projection ii) Horizontal range. (06 Marks)  
 b. Define : i) Centrifugal force ii) Super elevation. (04 Marks)  
 c. Find the least initial velocity with which a projectile is to be projected so that it clears a wall of 4m height located at a distance of 5m, and strikes the ground at a distance 4m beyond the wall as shown in fig. Q10(c). The point of projection is at the same level as the foot of the wall. (10 Marks)

Fig.Q10(c)



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