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Total Number of Pages: 03

B.Tech
PBC1B102

1st Semester Regular/Back Examination 2017-18

Basics of Civil Engineering

BRANCH: AEIE, AUTO, BIOTECH, CHEM, CIVIL,
CSE, ECE, EEE, EIE, ELECTRICAL, ETC, IEE, IT, MECH, METTA, MINERAL, MINING,
MME, PE, TEXTILE

Time: 3 Hours

Max Marks: 100

Q.CODE: B901

Answer Question No.1 and 2 which are compulsory and any four from the rest.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: *multiple type or dash fill up type* (2 x 10)

- a) The geometrical centre of the body is.....
i)centroid ii)centre of gravity iii)centre of mass iv) all of the above
- b) The total momentum of a system _____, if no external impressed force acts on it.
i)increases ii) decreases iii) remains constant iv)none of the above
- c) The centre of gravity of a semi-circle lies at a distance of ---- from its base measured along the vertical radius. (i) $3r/8$ (ii) $3r/4\pi$ (iii) $8r/3$ (iv) $4r/3\pi$
- d) Harmful constituent of a good brick earth is ---- .
i) silica ii) alumina iii) lime iv) alkali
- e) Whenever a force acts on a body and the body undergoes a displacement, then
i) work is done ii) power is being transmitted iii) body has kinetic energy of translation iv) body develops potential energy
- f) Number of bricks required for one cubic metre of brick masonry is ----- .
i) 500 ii) 550 iii) 400 iv) 450
- g) A good building stone should not absorb water more than ----- .
i) 5% ii) 10% iii) 15% iv) 20%
- h) A bus travels with a speed of 15 m/s when accelerated at 0.10 m/s^2 from its rest position. What is the distance travelled ?
i) 1125 m ii) 1000 m iii) 2250 m iv) None of the above
- i) Which axial force is determined while analyzing a truss?
i) compressive force ii) tensile force iii) both (i) & (ii) iv) none of the above
- j) Le Chatelier's device is used for determining the ----- of cement.
i) setting time ii) soundness iii) Tensile strength iv) compressive strength

Q2 Answer the following questions briefly. (2 x 10)

- a) State parallel axis theorem.
- b) Differentiate between a particle and a rigid body.
- c) Differentiate between collinear and concurrent forces.
- d) State Varignon's theorem.
- e) Write the equations of equilibrium of a rigid body.
- f) What are the reactions at the fixed support of a plane beam?
- g) In which situation, pile foundation is provided?
- h) Name any four important stones used in the building construction.
- i) Define the term 'mortar'. How is it classified?
- j) Explain the term; *dressing of stones*

- Q3 a)** A force of magnitude 10 kN is applied at point C shown in figure. Determine the angle α for which the larger of the string tension is as small as possible and the corresponding values of tension in the strings. (Fig A) **(9)**

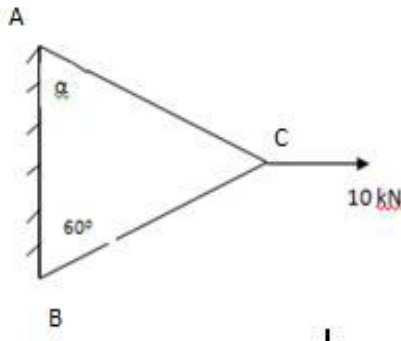


Fig. A

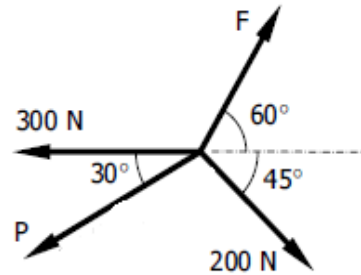
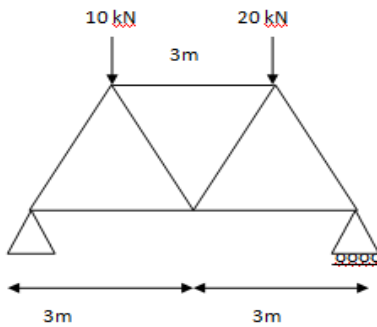


Fig. B

- b)** Determine the magnitude of P and F necessary to keep the concurrent force system in equilibrium. (Fig B) **(6)**

- Q4** The girder consists of 7 members each of 3m length supported at its end points. Find the forces in all the members and their nature. **(15)**



- Q5 a)** Determine the moment of inertia of a T-section 150x100x6 mm with respect to its centroidal X- axis. **(10)**

- b)** Locate the centroid of the shaded portion obtained by cutting a semicircle of diameter 'a' from the quadrant of a circle of radius 'a'. **(5)**

- Q6** Mention the stations which are affected by local attraction and determine the corrected bearings. **(15)**

Line	FB	BB
AB	$45^{\circ} 45'$	$226^{\circ} 10'$
BC	$96^{\circ} 55'$	$277^{\circ} 5'$
CD	$29^{\circ} 45'$	$209^{\circ} 10'$
DE	$324^{\circ} 48'$	$144^{\circ} 48'$

