Registration No: | | | | | | | | | | |

Total Number of Pages: 3 **B.TECH**

PBC1B102

1st Semester Regular Examination 2016-17
BASICS OF CIVIL ENGINEERING
BRANCH(S): ALL
Time: 3 Hours
Max Marks: 100
Q.CODE: Y619

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 Answer the following questions with choosing the right answer: (2 x 10)

a) What the reactive component (s) of a roller support on a horizontal plane;
(i) Only vertical force (ii) only horizontal force (iii) both horizontal and vertical force (iv) a moment

b) Bending is _____ in the members of a truss.
(i) allowed (ii) not allowed (iii) selectively allowed (iv) all of these

c) The unit of coefficient of friction is -------- .
(i) mm (ii) steradian (iii) pure number (iv) second

d) Constant acceleration implies;
(i) linear displacement diagram (ii) linear velocity diagram (iii) parabolic velocity diagram (iv) none of these

e) Initial and final setting time of ordinary portland cement are -------- and ------ .
(i)30 minutes and 10 hours, (ii) 1 hour and 10 hours , (iii) 30 minutes and 3 hours , (iv) 1 hour and 3 hours

f) Standard size of brick recommended by BIS is -------- and ------ respectively. (i) 20cmx20cmx20cm, (ii) 18cmx18cmx18cm, (iii) 19cmx19cmx19cm , (iv) 15cmx15cmx15cm

g) The moment of inertia of a triangle of base width *b* and height *h* wrt its base is ---------- . (i) $bh^3/8$, (ii) $bh^3/12$, (iii) $bh^3/24$, (iv) $bh^3/36$

h) The volume of cement contained in a standard cement bag is ------ .
(i) 30 kg , (ii) 40 kg , (iii) 50 kg, (iv) 60 kg

i) The length of each link of an Engineer's chain is ------ .
(i) 1m (ii) 1 ft (iii) 1 cm , (iv) 1 inch

j) Compared to OPC, rapid hardening cement has ---------- . (i) higher tri-calcium silicate , (ii) lower tri-calcium silicate, (iii) same amount of tri-calcium silicate, (iv) no tri-calcium silicate at all.

Q2 Answer the following questions: (2 x 10)

a) Discuss the principle of *transmissibility.*

b) State *Pappus Theorem*.

c) A ball is thrown vertically upward at 20 m/sec from a window 50 m above the ground. Determine the maximum rise.

d) In which situation, pile foundation is recommended ?

e) Which two apparatus are used for finding the setting time and soundness of cement respectively?

f) State the reason of providing *frog* in bricks.

g) Which constituent of brick earth imparts *plasticity* of the brick?

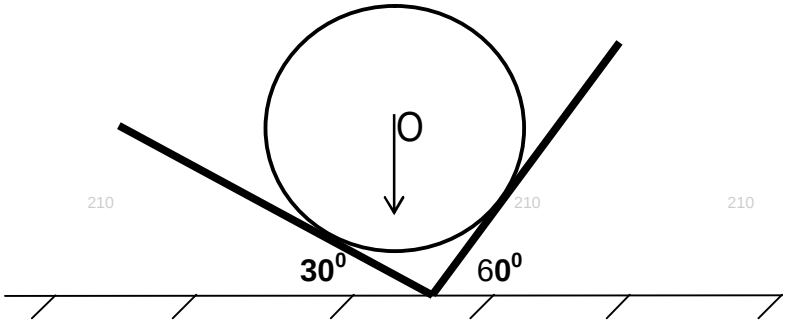
h) If the *fore bearing* of a line is $320^0\,30'$, find the *back bearing*.

i) What effect prevents the compass needle from pointing to the magnetic north?

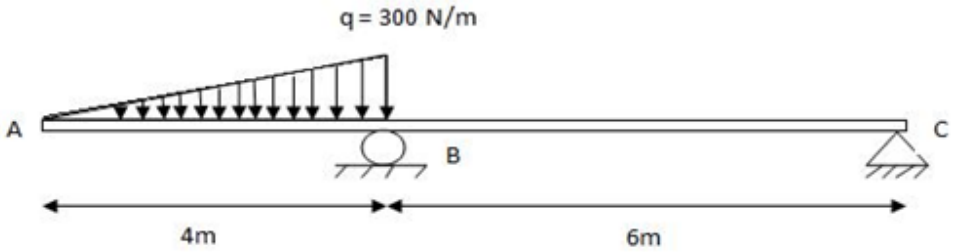
j) State various types of roofs.

Part – B (Answer any four questions)

Q3 a) A smooth circular cylinder of radius 0.5 m is lying in a triangular groove, one side of which makes 30^0 angle and the other 60^0 angle with the horizontal. Find the reactions at the surfaces of contact, if there is no friction and the cylinder weighs 400 kN. **(10)**



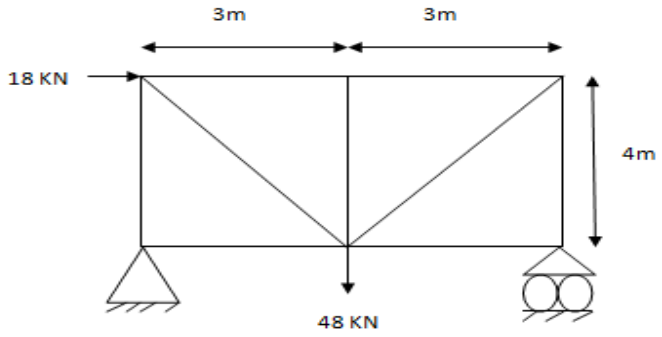
b) Compute the reaction at the supports B and C of the beam loaded as shown below. **(5)**



Q4 a) A man wishing to slide a stone block of weight 1 kN over a horizontal concrete floor, ties a rope to the block and pulls it in a direction inclined upward at an angle 30^0 to the horizontal. Calculate the minimum pull necessary to slide the block if the coefficient of friction $\mu = 0.5$. Calculate also the pull required if the inclination of the rope with the horizontal is equal to the angle of friction and prove that this is the least force required to slide the block. **(10)**

b) Determine the centroid of the area bounded between the intersecting curves $y = 3x$ and $y = x^{1/2}$. **(5)**

Q5 **a)** Analyse the truss shown in the figure given below. **(10)**



b) Determine the moment of inertia of a T-section (flange 20 cm X 2 cm) and web (2 cm X 24 cm) about its centroidal x-axis. **(5)**

Q6 **a)** Water drips from a tap at uniform rate on to the floor which is 2 m below. The first drop strikes the floor at the instant the sixth drop is on the verge of falling from the tap. What would be the location of the different drops when the first drop hits the floor? **(10)**

b) A ball impinges directly on a similar ball at rest. Due to impact, the first ball comes to rest and looses half of its kinetic energy. Make calculations for the coefficient of restitution. **(5)**

Q7 The following bearings were observed in running a closed traverse. **(15)**

Line	Fore bearing	Back bearing
AB	75^0 5’	254^0 20’
BC	115^0 20’	296^0 35’
CD	165^0 35’	345^0 35’
DE	224^0 50’	44^0 5’
EA	304^0 50’	125^0 5’

At what stations do you suspect the local attraction? Determine the correct magnetic bearings.

Q8 **a)** Briefly explain any one processes involved in manufacturing of cement. **(10)**

b) State various properties of a good stone. **(5)**

Q9 **a)** What do you mean by workability of concrete? Explain the factors affecting workability. **(10)**

b) Explain about *soundness* and *consistency* of cement. **(5)**