No. of Printed Pages : **4 + Drawing Sheet**

BCE-024

DIPLOMA IN CIVIL ENGINEERING (DCLE(G)) DCLEVI/ACCLEVI

Term-End Examination

December, 2013

BCE-024 : CONSTRUCTION TECHNOLOGY-I

Time : 2 hours *Maximum Marks : 70*

*Note : Question number 1 is **compulsory**. Attempt **any four** more questions out of questions number 2 to 8. All questions **carry equal** marks.*

1. Choose the correct answer from the given four alternatives **7x2=14**

(a) Allowable bearing pressure for a foundation depends upon :

(i) Allowable settlement only

(ii) ultimate bearing capacity of soil only

(iii) both allowable settlement and ultimate bearing capacity

(iv) none of the above

(b) A combined footing is generally used when :

(i) number of columns is more than two and they are spaced far apart

(ii) number of columns is two and they are spaced close to each other.

(iii) number of columns is two and they are spaced far apart

(iv) there is only one column

(c) Thickness of joints in brickwork shall not exceed :

(i) 0. 1 cm
(ii) 0.5 cm
(iii) 1.0 cm
(iv) 1.5 cm
(v) None of the above

(d) Crushing strength of a first class brick should not be less than :

(i) 3.5 N/mm^2 (ii) 7.0 N/mm^2
(iii) 10.5 N/mm^2 (iv) 14.0 N/mm^2

(e) The lower most horizontal piece of a shutter in a door /window or ventilator is known as :-

(i) style (ii) transom
(iii) sill (iv) bottom rail

(f) The suitable door for entrance in an air conditioned building is a :

(i) revolving door
(ii) louvered door
(iii) collapsible door
(iv) swinging door

(g) Seasoning of timber is required to :

(i) soften the timber
(ii) harden the timber
(iii) straighten the timber
(iv) remove sap from the timber

2. (a) Describe the different methods to lower sub-soil water level for the purpose of excavation of foundation. 7

(b) Explain with neat sketch the application of undereamed piles. 7

(i) The Boyle's law is expressed as :

(i) $pV = \text{constant}$

(ii) $\frac{V}{T} = \text{constant}$

(iii) $\frac{V}{m} = \text{constant}$

(iv) $mT = \text{constant}$

(j) Lumen is the unit of :

(i) Luminous flux

(ii) Luminous intensity

(iii) Luminous capacity

(iv) Luminous velocity

(k) Practically _____ cycle is followed in petrol engine :

(i) Diesel (ii) Otto

(iii) Carnot (iv) Rankine

(l) HCV and LCV are related as under :

(i) $HCV + LCV = 2400\ (M + 9H_2)\ kJ/kg$

(ii) $HCV - LCV = 2400\ (M + 9H_2)\ kJ/kg$

(iii) $HCV + LCV = 2400\ (M - 9H_2)\ kJ/kg$

(iv) $HCV - LCV = 2400\ (M - 9H_2)\ kJ/kg$

(m) For high rise building, the acceptable lift speed is :

(i) 1 m/s (ii) 2 m/s

(iii) 5 m/s (iv) 9 m/s

(n) Which is **NOT** a part of reciprocating engine :

(i) Cylinder

(ii) Piston

(iii) Brake

(iv) Connecting rod

2. Answer *any two* of the following : **2x7=14**

(a) The resistance of two conductors is 25 ohms when connected in series and 6 ohms when joined in parallel.

(i) Calculate the resistance of each wire

(ii) What ratio of current will be shared when in parallel ?

(b) With the help of circuits, explain series and parallel connection of resistors. Deduce equation for a single equivalent resistance across voltage source for both the circuits.

(c) Calculate current flow through the 5Ω resistor when a 100 V battery is connected across it. Also calculate conductance of the resistor and the power dissipated by this resistor.

3. Answer *any two* of the following : 2x7=14

(a) (i) What is permittivity ?

(ii) Write down the Coulumb's law of Electrostatics.

(iii) What is a capacitor ? Draw circuits showing capacitors in series and parallel with the equations for C_s and C_p.

(b) (i) Define Transformer. Write working principle of transformer.

(ii) What is voltage transformation ratio and current ratio in respect of a transformer ?

(c) Two capacitors of 4μF and 8 μF are connected in parallel and this combination is connected in series with capacitor of 2uμF. Determine -

(i) Total capacitance

(ii) Total charge and

(iii) Charge on each capacitor

If applied voltage is 32 Volts.

4. Answer *any two* of the following : 2x7=14

(a) Distinguish between 3 phase generator and a single phase generator. Discuss merits and characteristics of a 3 phase system.

(b) Distinguish between Star and Delta connection. List out the importance characteristics of these configurations.

(c) An inventor claims to have developed a heat engine which produces 5 kW and consumes 400 kJ of heat per min. The engine operates between 1000 K and 300 K. Examine the claim and say if it is true.

5. Answer *any two* of the following : **2x7=14**

(a) A carnot cycle machine operates between $T_1 = 30°C$ and $T_2 = -15°C$. Determine COP when it operates as :

(i) a refergerating machine

(ii) a heat pump and

(iii) its efficiency, if it operates as a heat engine.

(b) Describe the various Air conditioning process. Show the processes on Psychometric Chart.

(c) Draw a P-V diagram for Rankine cycle. Describe the processes in the cycle. Derive the expression for the efficiency for Rankine cycle.