DIPLOMA IN CIVIL ENGINEERING (DCLE(G) / DIPLOMA IN MECHANICAL ENGINEERING (DME) / DCLEVI/ DMEVI / DELVI / DECVI / DCSVI

Term-End Examination, 2019

BET-024 : E/M ENGINEERING

Time : 2 Hours]   [Maximum Marks : 70

Note : **All Question** are **compulsory**. Use of scientific calculator is permitted. Missing data if any may be suitably assumed.

1. Select the correct answer from the given **four** alternatives for the following multiple choice objective type questions :   [7x2=14]

    (a) The efficiency of engine using air as the working medium is known as :

        (i)   Brake thermal efficiency

        (ii) Indicated thermal efficiency

        (iii) Fuel efficiency

        (iv) Air standard efficiency

(b)   The thermal efficiency of otto cycle is given by :

(i) $\eta = 1 - \dfrac{1}{(r)^{r+1}}$

(ii) $\eta = 1 - \dfrac{1}{(r)^{r-1}}$

(iii) $\eta = 1 + \dfrac{1}{(r)^{r+1}}$

(iv) $\eta = 1 - \dfrac{1}{r\,(r)^{r-1}}\left[\dfrac{\rho^r - 1}{\rho - 1}\right]$

where r = compression ratio, $z = C\rho / Cv$

(c)   When a gas is to be stored, the type of compression that would be ideal is :

(i)   isothermal

(ii)   adiabatic

(iii) polytropic

(iv)   isochoric

(d)   A material for good magnetic memory should have :

(i)   low hysteresis loss

(ii)   · low retentivity

(iii)   high permeability

. (iv) high retentivity

(e)   Which method of braking is generally used in elevators ?

(i)   Regenarative braking

(ii)   Plugging

(iii)   Rheostatic braking

(iv)   None of the above

(f)   The equation of state of an ideal gas is a relationship between the variables :

(i)   Pressure and volume

(ii)   Pressure and temperature

(iii)   Pressure, volume and temperature

(iv)   Temperature and volume

(g)   Power factor for purely resistive circuit is :

(i)   Zero

(ii)   One

(iii)   Two

(iv)   None of the above

2. Attempt **any two** of the following :   [2x7=14]

(a) Explain the valve timing diagram for a 2-stroke
    and 4-stroke engine respectively, with neat
    sketches.

(b) Explain the following terms as applied to a vapour
    compression refrigeration system :

    (i)   Refrigeration effect

    (ii)   Expansion Valve

    (iii)   Subcooling

    (iv)   Superheating

    (v)   Coefficient of performance (C.O.P.)

    (vi)   Latent heat of vaporisation

    (vii)   Refrigerant

(c) Describe the principle and working of a vapour
    absorption system with a neat diagram.

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3. Attempt **any two** of the following : [2x7=14]

(a) Discuss briefly the comparision between Four Stroke and Two Stroke Engine.

(b) Describe an elevator. Classify it and describe any one in brief.

(c) A reversible heat pump is used to maintain a temperature of $0^\circ C$ in a refrigerator when it rejects the heat to the surroundings at $25^\circ C$. If the heat removal rate from the refrigerator is 1440 KJ/min, determine the C.O.P. of the machine and work input required.

4. Attempt **any two** of the following : [2x7=14]

(a) Compare between a 3-Phase System and Single Phase System.

(b) Derive EMF equation of DC generator.

(c) A single phase transformer is connected to a 230 V, 50 Hz supply. The net cross-sectional area of the core is 60 cm^2. The number of turns in the primary is 500 and in the secondary 100. Determine :

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(i)   Transformation ratio

(ii)   E.M.F. induced in secondary winding

(iii)   Maximum value of flux density in the core

5.   Attempt **any two** of the following :   [2x7=14]

(a)   Distinguish between overhead and underground system.

(b)   Write the function of following :

     (i)   Earth wire

     (ii)   Phase wire

     (iii)   Street light wire

     (iv)   Neutral wire

(c)   A D.C. series motor of resistance 1.5Ω runs at 750 r.p.m. at 220 V with a current of 20A. Find the speed at which it will run when connected is series with a 4.5Ω resistance and taking the same current.

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