Code No.2511/CBCS/BL

FACULTY OF ENGINEERING

B. E. II- semester (CBCS)(Backlog) Examination, November 2020

Subject: Engineering Mechanics-II

Time: 2 Hours **Max. Marks: 70**

Note: Answer any five questions from PART-A & any four questions from PART-B

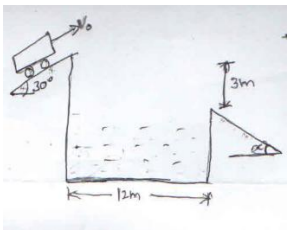
PART- A (5x2=10 Marks)

1. State principle of virtual work.
2. Find the mass moment of inertia of a rod of mass 5kgand length 40cm about its base axis.
3. Show that the path of a projectile is a parabola.
4. A rectilinear motion of a particle is given by $S=4t^3 + 3t^2 - 6t + 8$.Find the acceleration of the particle when t = 2seconds.
5. A lift of weight 70kNis moving with an acceleration of $2m/sec^2$. Find the D 'Alemberts force.
6. Write the plain motion equations for D' Alemberts principle.
7. A body of mass 3kg moving with a velocity of $3m/sec^2$. Find the kinetic energy of the body.
8. Sate work energy principle in translation.
9. State principle of conservation of momentum.
10. Define coefficient of restitution.

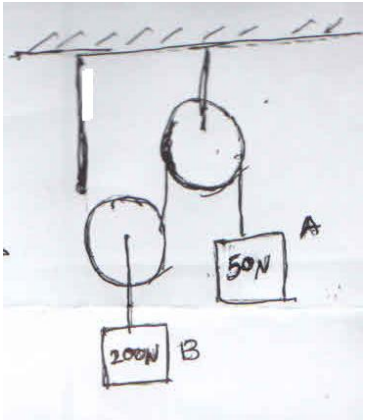
PART – B (4x15=60 Marks)

11. a) A simply supported beam of span 6m carries two point loads60kN and 40kN at a distance of 1m and 4m from left support. Using virtual work method determine support reactions.
    b) Calculate the moment of inertia and radius of gyration of a cylinder about its centroidal axis parallel to the base. Given mass 0.1kg, radius 0.5m and height 0.4m.

12. A stuntman is to drive an auto across the water-filled gap as shown in following Figure (1). Determine the auto's minimum take off velocity and the angle 'α' of the landing ramp.



13. A system of frictionless pulleys carries two weights hung by chord as shown in following Figure (2). Find the tension in chords and acceleration of the system.



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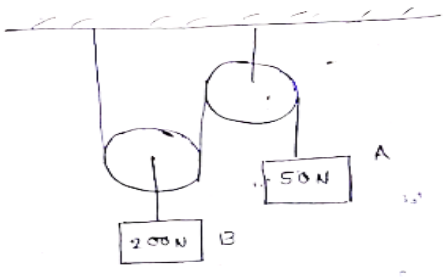

Fig. (2)

14. Find the velocities of blocks if block 'B' as shown in following Figure (3) falls vertically at a distance of 2m. W_A=200N, W_B=100N μ_k=0.2.

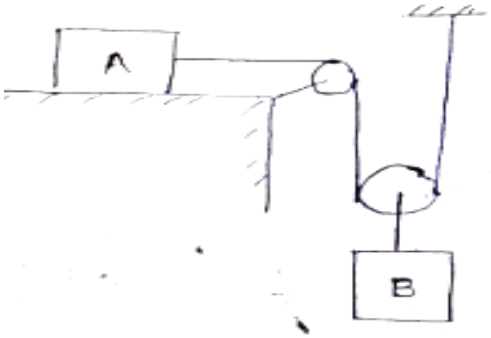

Fig. (3)

15 A bullet weighting 0.5N and moving at 700m/s penetrates 75N body as shown in following Figure (4) and emerges with a velocity of 200m/s. how far and how long does the body then move.

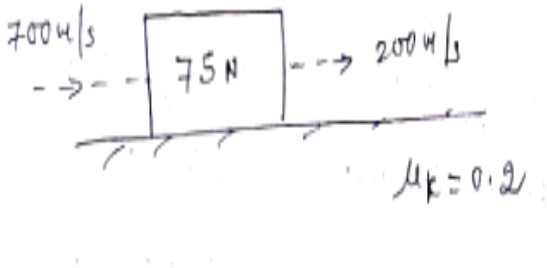

Fig. (4)

16. The equation of motion of a moving body along a straight line is given by $S = 4t^3 - 8t + 20$, where 'S' is in meters and 't' is in seconds find
    a) time taken by body to reach a velocity of 120m/s
    b) acceleration of body when velocity is 60m/s
    c) distance travelled by body in 4 seconds.

17. Determine the mass moment of inertia of a solid sphere of mass 'M' and radius 'R' about its centroidal axis.

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Code No.2512/CBCS/BL

FACULTY OF ENGINEERING

B.E. II-Semester (CBCS) (Backlog) Examination, November 2020

Subject : Elements of Mechanical Engineering

Time : 2 hours **Max. Marks:70**

Note: Answer any five questions from Part-A, & Any four questions from Part-B.

PART – A (5x2=10 Marks)

1 List out the deficiencies of first law of thermodynamics?
2 What is Clasius inequality?
3 Compare S.I and C.I engine.
4 Define adiabatic efficiency of compressor
5 State lambert's Cosine law.
6 Define black body and listout it's properties.
7 Explain the effect of slip and velocity ratio in belt drivers.
8 Give the classification of gears.
9 Differentiate between cold working and hot working process.
10 List different parts of a lathe machine.

PART – B (4x15=60 Marks)

11 a) Explain macroscopic and microscopic approach of thermodynamics.
b) Air enters a compressor at 1 bar and 25^0 c having a volume of 1.8 m^3/kg and is compressed to 5 bar isothermally. Determine work done, change in internal energy and heat transferred.

12 a) Explain with neat sketches working of four-stroke diesel engine.
b) Air is compressed in a single-stage reciprocating compressor from 1.013 bar and 15^0 c to 7 bar. Calculate the indicated power required for air delivery of 0.3 m^3/min. When the compression process is isentropic.

13 a) Explain absorptivity, reflectivity and transmittivity.
b) An exterior wall of a house may be approximated by a 0.1m layer of common brick (K=0.7 W/m^0c) followed by a 0.04m layer of gypsum plaster (K=0.48 W/m^0c). What is thickness of loosely packed rock wool insulation (K=0.065 W/m^0c) should be added to reduce the heat loss or gain through the wall by 80%.

14 a) Compare compound gear train and Reverted gear train.
b) Derive an expression for length of belt in cross belt drive.

15 a) Compare up milling and down milling.
b) Explain with a neat sketch the die casting process.

16 a) Explain the valve timing diagram of four stroke SI engine.
b) Describe the three types of flames used in gas welding and give their fields of application.

17 a) What is critical radius of insulation? Explain.
b) Define open, closed, isolated, homogenous and heterogeneous system.

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Code No : 2514/ CBCS/BL

FACULTY OF ENGINEERING

BE II Semester (CBCS)(ECE) (Backlog) Examination, November 2020

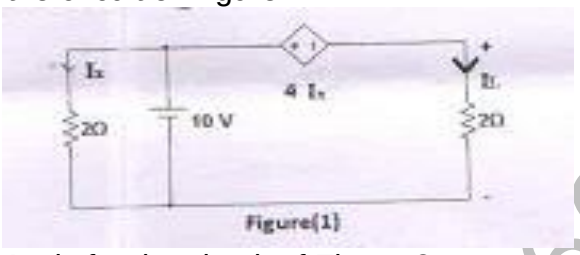
Subject: Basic Circuit Analysis

Time : 2 Hours **Max. Marks: 70**

Note: Answer any five questions from Part-A, & any four questions from Part-B.

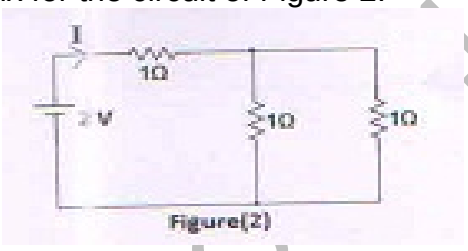
PART – A (5 x 2 = 10 Marks)

1. Find the current I_L in the circuit of Figure 1.



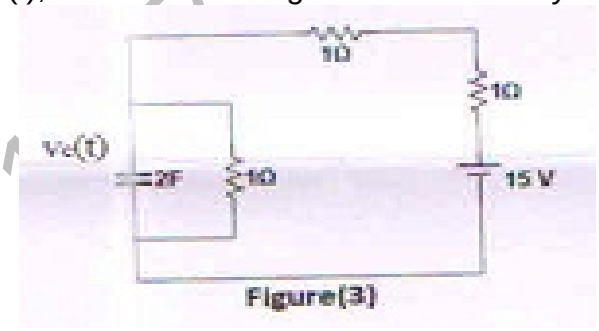
Figure(1)

2. Write the incidence Matrix for the circuit of Figure 2.



Figure(2)

3. Distinguish between zero-input response and zero state response.
4. Find the value of $V_c(t)$, in the circuit of figure 3 in the steady state.



Figure(3)

5. In a series AC circuit the applied voltage $20\angle 60^{o}V$ causes a current of $2\angle 30^{o}VA$.

   Find the average power and complex power supplier by the source voltage.

6. Explain the concept of coupling co-efficient in magnetically coupled circuits.

7. Write the parametric equations for
   a) h-parameter
   b) ABCD parameters for a Two-port network.

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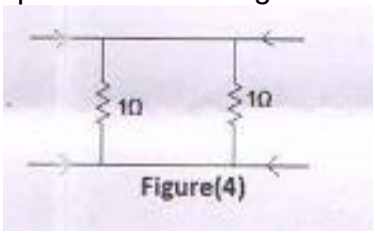
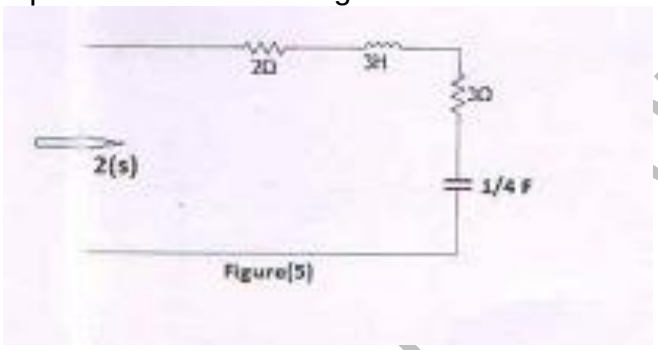
8. Find Z_{11} and Z_{12} for the two-part network of figure 4.



Figure(4)

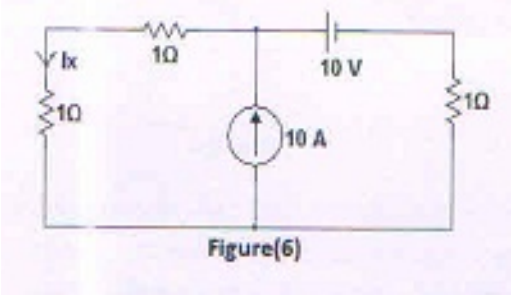
9. Derive the Q-factor of a series RLC circuit.
10. Draw the pole-zero plot for the circuit of figure 5.



Figure(5)

PART – B (4 x 15 = 60 Marks)

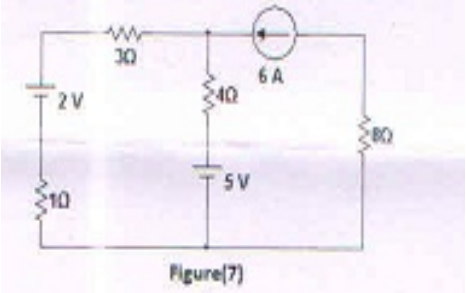
11. a) Find the current Ix in the circuit of Figure 6 using Superposition Theorem.



Figure(6)

b) Obtain the Tie set matrix for the circuit of Figure 6 above.

12. a) Draw the dual network doe the network of Figure 7.



Figure(7)

b) Explain how Thevenin's equivalent circuit can be found for circuits containing only dependent sources.

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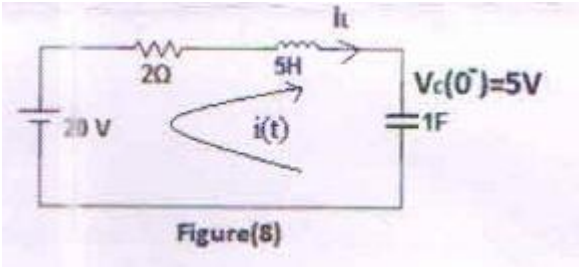
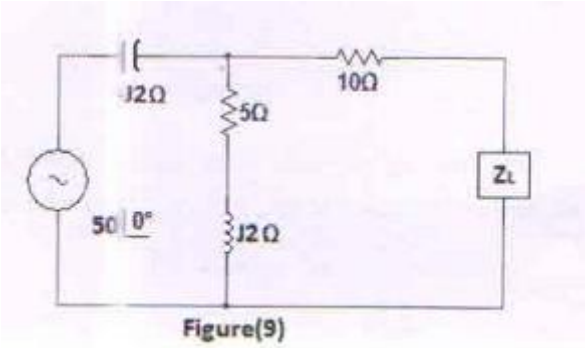
13. Find the transient response i(t) in the circuit of Figure(8) if $i_L(0^-) = 2A$ and $V_L(0^-) = 5V$



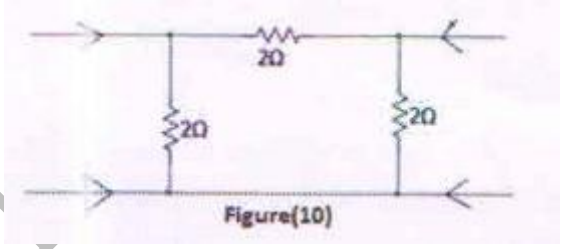
Figure(8)

14. In the circuit of Figure (9) find Z_L which draws maximum power. Find the Maximum power.



Figure(9)

15. a) Find the h-parameters of the two-port network of Figure(10).



Figure(10)

b) Derive expressions for the Z-parameters in terms of ABCD parameters.

16. a) Show that in a series resonant circuit $w_o^2 = w_1 w_2$ Where w_0, w_1 and w_2 are resonant frequency, lower 2dB frequency and upper 3dB frequency respectively.

b) Given $I(s) = \frac{5s}{(S^2 + 2S)}$ Find the time-domain response i(t) using the Pole-Zero plot of I(s).

17. Write short technical notes:
    a) Maximum Power transfer theorem.
    b) 3 types of damping in RLC transient circuit.
    c) Q-factor and Band width.

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Code No. 2516/CBCS/BL

FACULTY OF ENGINEERING

B.E. II-Semester (Backlog) Examination, November 2020

Subject : OOP Using C++

Time : 2 Hours **Max. Marks: 70**

Note: Answer any five questions from Part-A & any four questions from Part-B.

PART – A (5x2=10 Marks)

1 List the different data types supported in C++.

2 Define the terms :
(a) Inheritance (b) Polymorphism

3 List the different Testing and debugging functions.

4 Define a class and an object with example.

5 How is dynamic memory allocation done, give example?

6 When is the copy constructor called?

7 If there are 2 catch statements 1 for base, and 1 for derived class each which should come first?

8 What is the output of the following program?

```
Class C1
{
int a;
};
int main()
{
C1 ob;
ob.a=10;
cout<<ob.a;
return 0;
}
```

9 Write a function to insert an element in stack implemented as a linked list.

10 For the given elements: 10, 5, 4, 20, 16, 2 show the linked queue representation, element 10 is the first element.

PART – B (4x15=60 Marks)

11 (a) Differentiate procedural programming paradigm and object oriented programming paradigm.
(b) Discuss the applications of OOPS

12 (a) How is a function call done in C++, Discuss types with examples
(b) Write about unformatted I/O operations.

13 (a) Write down special characteristics of constructors and destructors.
(b) Explain different types of inheritance (with diagram).

14 (a) What are generic functions? Write a program to illustrate it.
(b) Write a program to implement binary operator overloading using friend function?

15 (a) Explain the operations of stack.
(b) Define linked list? How to insert a node at any position give example.

16 Write a program to sort names using dynamic arrays?

17 write short notes on following:
(a) Virtual base class
(b) Exception handling

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