

Reg. No. : 9380519

JECRC UNIVERSITY, JAIPUR  
First-In Sem Examination 2019-20  
B.Tech. II- Semester  
Subject: Engineering Mathematics-II (BAS002C)

Time: 1: 15 hours

Marks: 50

Instructions:

1. Attempt all the questions.
2. Illustrate your answers with suitable examples and diagrams, wherever necessary.
3. Write relevant question numbers before writing the answer.

Section-A

Q.1 Answer the following questions.

(1x10=10 marks)

- A1 (CO1) A matrix is said to be symmetric if \_\_\_\_\_
- A2 (CO1) Non homogeneous system of equations have no solutions if  $\text{rank}(A)=\text{rank}(A:B)$ . (True/False)
- A3 (CO1) If  $\lambda$  is an eigen value of A then  $\lambda^m$  is an eigen value of  $A^m$  (m is any +ve integer). (True/False)
- A4 (CO1) Matrix and its transpose have same eigen value. (True/False)
- A5 (CO1) Product of the eigen values of a matrix is equal to its determinants. (True/False)
- A6 (CO2) The series  $\sum_{n=1}^{\infty} \frac{1}{n^p}$  is convergent if
- ~~pen~~
- (i)  $p < 1$       (ii)  $p > 1$       (iii)  $p = 1$       (iv) none
- A7. (CO2) The sequence  $\{u_n\} = \left\{ \frac{n^2 + n}{2n^2 - n} \right\}$  is
- (i) Convergent      (ii) Divergent      (iii) Oscillating      (iv) none
- A8. (CO2) The sequence  $\{u_n\} = \left\{ \frac{2n-1}{1-3n} \right\}$  is
- (i) Convergent      (ii) Divergent      (iii) Oscillating      (iv) none
- A9. (CO2) If  $S_n = \sum v_n$  tends to a finite limit as  $n \rightarrow \infty$  then series is said to be
- (i) Convergent      (ii) divergent      (iii) oscillating      (iv) none
- A10. (CO2) If two series  $\sum u_n$  and  $\sum v_n$  are convergent then  $\sum (u_n + v_n)$  is also convergent. (True/False)

Section-B

(2x4=8marks)

Q.2. Answer the following questions.

B1 (CO1) Define skew symmetric matrix with example.

B2 (CO1) Define rank of matrix.

B3 (CO2) Define sequence and series.

B4 (CO2) Test the convergence of the sequence  $\{1 + (-1)^n\}$ .

Section-C

(2x6=12marks)

Q.3 Answer the following questions.

C1(CO1) Show that the system of equations  $x-2y+z=a$ ;  $-2x+y+z=b$ ;  $x+y-2z=c$  have no solution unless  $a+b+c=0$  and if  $a+b+c=0$  then it have infinite solutions. Find solution if  $a=3$ ,  $b=-2$ ,  $c=-1$ .

C2(CO2) Test the convergence of the series  $\sum_{n=1}^{\infty} \frac{(2n^2 - 1)^{\frac{1}{3}}}{(3n^3 + 2n + 5)^{\frac{1}{4}}}$ .

Section-D

(2x10=20marks)

Q.4 Answer the following questions.

D1(CO1) Find characteristic equation of matrix  $A = \begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{bmatrix}$  and show that it satisfies its characteristic

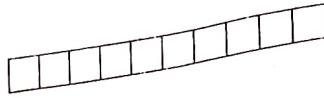
equation and hence find  $A^{-1}$ .

D2(CO1) Reduce the matrix A into normal form and hence find its rank.

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

~~Q - B + 10^-20~~  
~~Q - 1 b + 10^-20~~  
~~Q - 10^-20~~

Registration No. \_\_\_\_\_



JECRC UNIVERSITY  
I<sup>st</sup> In-Sem Examination Feb-2020  
II Semester, B.Tech. (All Branches)  
Engineering Mechanics (BES007A)

**Instructions:**

1. All questions are compulsory.
2. In objective questions write down the complete answer along with option (a/b/c/d).
3. Draw neat and clean figures wherever necessary.
4. Do not write anything other than your Reg. No. on the question paper.

**Course Objectives:**

- CO1. Identify, formulate, and solve engineering problems.  
CO2. Apply knowledge of basic mathematics, science and engineering.

**Q.1. Objective type questions**

Section A

(1×10 = 10)

- I Which of the following statement is correct?  
(a) A force is an agent which produces or tends to produce motion.      (b) A force is an agent which stops or tends to stop motion  
(c) A force may balance a given number of forces      (d) both (a) and (b) acting on the body.
- II The forces which meet at one point but their lines of action do not lie in one plane, are called  
(a) Coplanar concurrent forces      (b) Coplanar non-concurrent forces  
(c) Non coplanar concurrent forces      (d) Non coplanar non-concurrent forces
- III A body acted upon by non-concurrent system of forces will be called in complete equilibrium if  
(a) Sum of all the components of forces is zero      (b) Sum of all the components of forces and moment of forces is zero  
(c) Sum of all the moment is zero      (d) All of these
- IV "There will not be any change of the effect of force if the force is applied anywhere on the line of action" is called  
(a) Principle of Transmissibility      (b) Principle of Moments  
(c) Principle of conservation of forces      (d) Lami's Theorem
- V The branch of science which deals with forces and their effect on deformable bodies is called  
(a) Engineering Mechanics      (b) Fluid Mechanics  
(c) Quantum Mechanics      (d) Solid Mechanics
- VI S.I. Unit of Force is  
(a) Kg.m/s      (b) Kg.m/s<sup>2</sup>  
(c) Kg.m<sup>2</sup>/s      (d) Joule/s
- VII Cosine Law is the mathematical expression of  
(a) Triangle Law      (b) Sine Law  
(c) Lami's Theorem      (d) Parallelogram Law
- VIII Which of the following is not correct?  
(a)  $\cos(-\theta) = \cos \theta$  ✓  
(c)  $\cos(180 + \theta) = -\cos \theta$  ✓  
(b)  $\cos(90 - \theta) = -\sin \theta$   
(d)  $\sin(90 - \theta) = \cos \theta$  ✓
- IX Varignon's theorem is also known as  
(e) Principle of Transmissibility  
(g) Principle of Moments  
(f) Principle of couples  
(h) Principle of forces
- X If the dot product of two vectors is zero, then we can conclude that  
(a) Vectors are parallel  
(c) Vectors are collinear  
(b) Vectors are perpendicular  
(d) None of these

### Section B

Q 2. Answer the following questions.

(2 x 4 = 8)

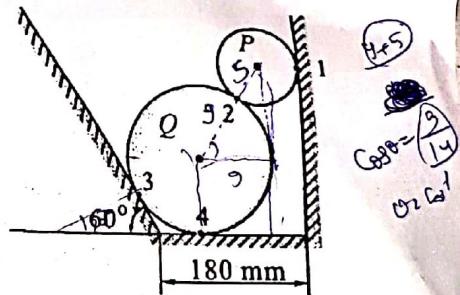
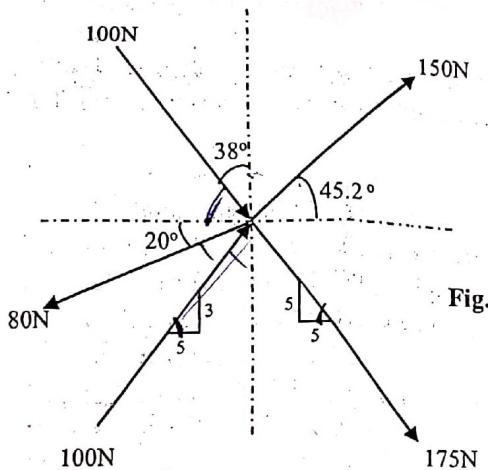
- I. What is a couple? Explain with suitable real-life example application of couple.
- II. State parallelogram of forces.
- III. What is a force? List out various systems of forces.
- IV. What is the difference between a scalar and vector quantity?

### Section C

Q 3. Answer the following questions.

(6x2 = 12)

- I. Two cylinders P and Q in a channel as shown in the Fig. 1. The P has a diameter of 100mm and weight 200N and Q has 180mm and 500 N. Determine the reaction at all the contact surfaces.
- II. A body is acted upon by a system of coplanar forces (Fig. 2). Find resultant (R) and its angular position ( $\alpha$ ) with horizontal.

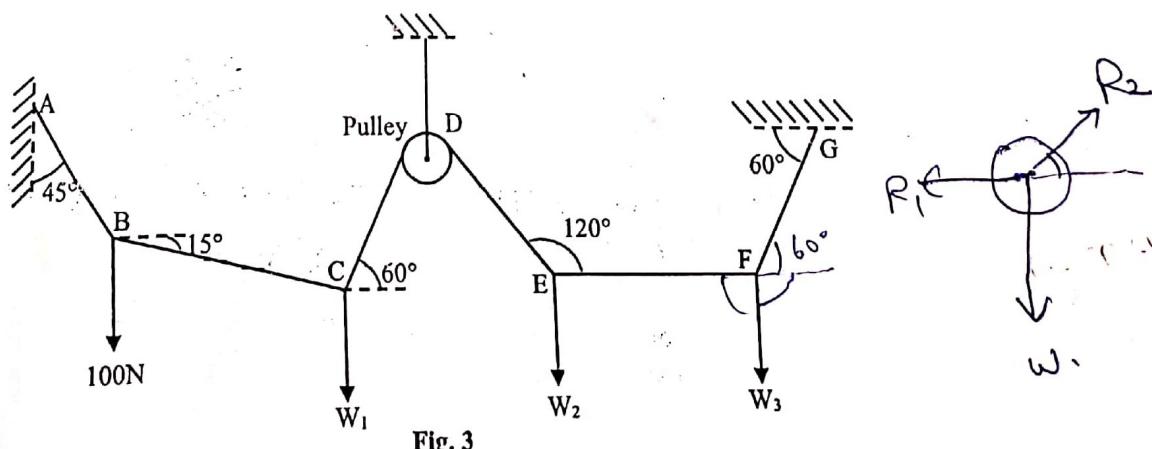


### Section D

Q. Answer the following questions.

(10x2 = 20)

- I. For (Fig. 3) find tensions in the strings and unknown weights to keep the system of forces in equilibrium condition. If the weight of the pulley and rope are considered negligible.



- II. What is varignon's theorem? Prove it with suitable example.



Student's Reg. No.....

JECRC UNIVERSITY, JAIPUR  
Session 2019-2020  
I-In Term (IIInd sem.) Examination  
Class- B.Tech.  
Paper: Environmental Studies (BMC061A)

Duration: 1.15 hours

Maximum Marks: 50

Instructions: All questions are compulsory.

**CO1:** Recognize the history, structure, function, interactions and trends of key socio-environmental systems on personal, organizational and intellectual level regarding our surroundings through different media.

**CO4:** Examine and understand how and why the climate and pollution systems respond to natural changes and human impacts.

**PART-I**

Multiple choice questions

[10X1=10 marks]

Q.1 Name of present Chairman/Director of India's leading environmental NGO "Centre for Science & Environment"? **CO1**

- (a) Anil Kumar Agarwal (b) Sunita Narain (c) G. D. Aggarwal (d) None

Q.2 Ecomark of our country is? **CO1**

- (a) Earthen mug (b) earthen pitcher (c) earthen saucer (d) earthen lamp

Q.3 Sept. 16-23 is observed as? **CO1**

- (a) Ozoné week (b) wild life week (c) biodiversity week (d) disaster reduction week

Q.4 Eutrophication in water means ..... ? **CO4**

- (a) Enrichment of nutrients (b) deficiency of nutrients  
(c) Reduced dissolved oxygen (d) a and c

Q.5 AQI is? **CO4**

- (a) Air quality index (b) Air quantity index (c) Air quality impact (d) a and c both

Q.6 Marsh gas released from decay of vegetables which is responsible for air pollution ..? **CO4**

- (a) methane (b) ethane (c) butane (d) None

Q.7 Radio waves are reflected from thermosphere.....true/false? **CO-1**

Q.8 The scientist turned saint, who has been fighting for protection of river Ganga is....? **CO-1**

Q.9 Environment friendly products are given ISO.....Certification? **CO4**

Q.10 Environment in urban areas has high energy demands and dense population..True/False? **CO4**

**PART-II**

Very short answer questions:

[4X2=8 marks]

Q.1 Define environment and its components? **CO1**

Q.2 Write the name of five layers of atmosphere, which one is related to Ozone depletion? **CO1**

Q.3 Write down the full forms of terms concerned with environment? **CO4**

- (i) CPCB (ii) CSE (III) NO<sub>x</sub> and SO<sub>x</sub>

Q.4 What is Pollution Under Control Certificate, which is mandatory for all vehicles? **CO4**

**PART-III**

Short answer questions:

[2X6=12 marks]

Q.1 What do you understand with the terms given? **CO1**

- (i) Green media (ii) Green marketing

Q.2 What control measures have taken by government to control air pollution, any three? **CO4**

**PART-IV**

[2 X10=20 marks]

Descriptive questions:

Q. 1 How environmental study is multi-disciplinary in nature, explain its various scope? **CO1**

Q.2 What are the causes for water pollution and what can be the control measures for it? **CO4**

Reg.No.: .....

JECRC University  
1 st In Sem Examination 2019-2020  
2<sup>nd</sup> Semester B.Tech  
Subject: Eng. Chemistry  
Paper code -BAS011C

Time: 1.15hrs

Maximum Marks: 50

Instructions:

1. Attempt all questions.
2. Illustrate your answer with suitable examples and diagrams, wherever necessary.
3. Write relevant question number before writing the answer.

Q.1. Objective type 1x10=10

True/False

- i. CO1 The water which does not produce lather with soap solution is called hard water (T/F)
  - ii. CO1 The concentration of hardness producing ions are expressed in terms of equivalent of  $\text{CaCO}_3$  (T/F)
  - iii. CO1 Degree Clarke ( $^{\circ}\text{Cl}$ ) is the parts of  $\text{CaCO}_3$  equivalent hardness per  $10^6$  parts of water (T/F)
  - iv. CO1 If the precipitation takes place in the form of loose and slimy precipitate it is called scale. (T/F)
  - v. CO1 Boiler corrosion is the decay of boiler material by a chemical or electrochemical attack by its environment.
- Fill up the blanks
- vi. CO1. Caustic embrittlement is a type of boiler corrosion, caused by using highly \_\_\_\_\_ water in the boiler.
  - vii. CO1. In Chlorination ,chlorine produces \_\_\_\_\_ acid, which is a powerful germicide.
  - viii. CO1. The Chemical name of EDTA is \_\_\_\_\_.
  - ix. CO1. The indicator \_\_\_\_\_ is used for complexometric titration between hard water and EDTA.
  - x. CO1. \_\_\_\_\_ is the production of persistent foam or bubbles in boiler,which do not break easily

Q.2. Very short answer  $2 \times 4 = 8$

- i. CO1. Define hardness of Water and its types.
- ii. CO1. What is priming and foaming?
- iii. CO1. Write the structure of EDTA and EBT.
- iv. CO1. Define the unit of hardness in degree French ( $\text{Fr}^0$ ) and  $^{\circ}\text{Cl}$ .

Q.3 Short answer  $6 \times 2 = 12$

- i CO1. Write a note on Caustic Embrittlement
- ii CO1. Calculate the total hardness of water in  $\text{Fr}^0$  and  $^{\circ}\text{Cl}$  from the following analysis of water sample. $\text{Mg}(\text{HCO}_3)_2 = 20.8\text{mg/L}$ ;  $\text{Mg}(\text{NO}_3)_2 = 28.8\text{mg/L}$ ;  $\text{MgCl}_2 = 21.0\text{mg/L}$ ;  $\text{MgSO}_4 = 20.0\text{mg/L}$ ;  $\text{CaCO}_3 = 21.2\text{mg/L}$ ;  $\text{KCl} = 73.2\text{mg/L}$ .

Q.4 Long answer  $10 \times 2 = 20$

- i) CO1. Discuss determination of Hardness by complexometric EDTA method in detail.
- ii) CO1. Write short notes on
  - a) CO1. Break point chlorination
  - b) CO1. Boiler corrosion

Reg. No.....

JECRC UNIVERSITY

1<sup>st</sup> In-Sem of B.Tech I year II Semester Examination, February 2020

Sub: Basic Electrical Engineering Subject Code: BES005C

Time: 1hr 15mins

Maximum marks: 50

Instructions:

1. Attempt all the questions.
2. Illustrate your answers with suitable examples and diagrams, wherever necessary.
3. Write relevant question numbers before writing the answer.

Course Outcome (CO):

CO1) To understand, analyze and solve DC electrical circuits.

CO2) To understand, analyze and solve single phase electrical circuits for different loads and configurations.

CO3) To understand, analyze and solve three phase electrical circuits for different loads and configurations.

CO4) To understand working and applications of transformers.

CO5) To understand working and applications of different AC and DC rotating machines.

Section A: Objective type questions

(10X1 = 10 marks)

1. The circuit whose properties are same in either direction is known as .....  
a) Unilateral circuit b) Bilateral circuit c) Irreversible circuit d) Reversible circuit
2. Ohm's law is related with .....  
a) Current b) Voltage c) Both a & b d) None of these
3. Kirchhoff's current law is applicable to only .....  
a) Junction in a network. b) Closed loops c) Electric circuits d) None of these
4. The nodal method of circuit analysis is based on  
(a) KVL and ohm's law (b) KCL and ohm's law (c) KVL and KCL (d) both (a) and (b)
5. Star to Delta transformation eliminates the .....  
(a) Mesh (b) Node c) Internal resistance d) None of these
6. Superposition theorem is applicable for two or more voltage sources. True/False.
7. While calculating the Thevenin's resistance the given voltage source is .....  
(a) Open Circuited (b) Short (c) Thevenin's Voltage d) None of these
8. Maximum power is transferred when the load resistance is .....  
(a) Equal to network resistance (b) equal to half of the source resistance  
(c) equal to zero (d) none of these
9. While calculating the Norton's resistance the given current source is .....  
(a) Open Circuited (b) Short (c) Equivalent current source (d) None
10. To neglect a voltage source, the terminals across source are  
(a) open circuited (b) short circuited  
(c) replaced by some resistance (d) replaced by some inductor

Section B: Very Short answer type questions

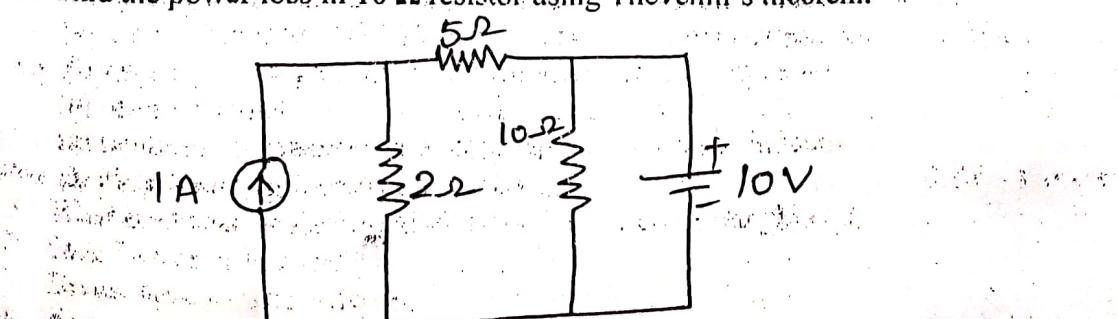
(2X4 = 8 marks)

1. What are linear and bilateral elements? Give one example each.
2. State Norton's Theorem.
3. Define open circuit voltage.
4. What are the steps involved in solving the nodal method of analysis for DC circuits?

Section C: Short answer type questions

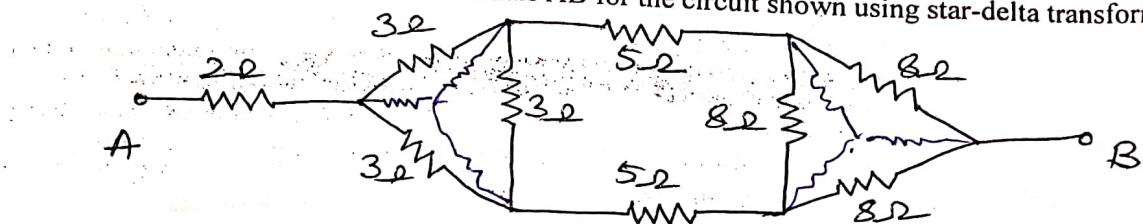
(6X2 = 12 marks)

1. State and prove the maximum power transfer theorem.
2. Find the power loss in  $10\Omega$  resistor using Thevenin's theorem.

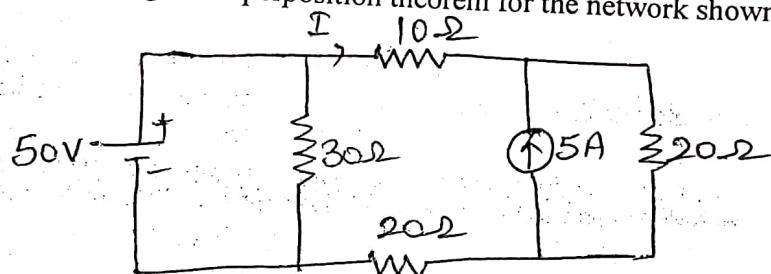


**Section D: Long answer type questions**

1. Find the resistance across terminals AB for the circuit shown using star-delta transformation.  $(10 \times 2 = 20 \text{ marks})$



2. Obtain I using the superposition theorem for the network shown



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**Registration No.....19BC6N380.....**

**JECRC UNIVERSITY**  
**Ist In term Examination February 2019**  
**II Semester B.Tech.**  
**Subject: Computer Programming-II(BES01)**

**Time: 1.15 hrs.**

**Maximum marks: 50**

#### **Instructions:**

1. Attempt all the questions.
  2. Illustrate your answers with suitable examples and diagrams, wherever necessary.
  3. Write relevant question numbers before writing the answer.

**Q1. Answer the following multiple choice questions.**

**(1×10 = 10 Marks)**

1. [CO1] Compiler compiles program :

- a. line by line b. whole program c. word processing d. none of the above

2.[CO1]Which of the following is an example of a single user single task operating system?

- a. lynx      b. Palm os      c. windows xp

d. windows 8

### c. windows xp

### 3. [CO<sub>2</sub>] What?

5. [EZ] What will be the output of the following C code?

```
#include <stdio.h>
```

```
void main()
```

1

```
int a[2][3] = {{1, 2, 3}, {4, 5}};
```

```
int i = 0, j = 0;
```

```
for (i = 0; i < 2; i++)
```

```
for (j = 0; j < 3; j++)
```

1

a)  $\{1, 2, 3, 4, 5, 0\}$

a) 1 2 3 4 5 0  
b) 1 2 3 4 5 junk

a) 1 2 3 4 5 6

d) Run time error

4 [CO2] If the two strings are identical, then strcmp() function returns

- a)-1                    b)1                    c)0                    d)yes

5.[CO2] Which of the following function is more appropriate for reading in a multi-word string?  
A).printf();      B).scanf();      C).gets();      D).puts()

6. [CO2] What will be the output of the program ?

```
#include<stdio.h>
#include<string.h>
int main()
{
    char str1[20] = "Hello", str2[20] = " World";
    printf("%s\n", strcpy(str2, strcat(str1, str2)));
    return 0;
}
```

- A.Hello
- B.World
- C.Hello World
- D.WorldHello

7.[CO1] Antivirus is a \_\_\_\_\_ software.

8.[CO1] BIOS stands for \_\_\_\_\_.

9.[CO1] GUI stands for \_\_\_\_\_.

10.[CO2] An *array* is a collection of same data type elements in C(T/F)

**Q2. Answer the following questions.**

(2×4 = 8 Marks)

1.[CO1] What do you understand by Utility software.

2. [CO2] Discuss strlwr function.

3.[CO2] Wap to insert and print elements of 2d array.

4.[CO1] Discuss functions of BIOS.

**Q3. Answer the following questions**

(6×2 = 12 Marks)

1.[CO2] Write a program to pass an linear array as an arguement in a function.

2.[CO1] State differences between linker and loader.

**Q4. Answer the following questions**

(10×2= 20 Marks)

1.[CO1] Explain the types of Operating system.

2.[CO2] a) Differentiate 1D and 2D array with memory representation.

b) Write a program to add two[2\*2] matrices.?