ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B.Tech — Semester: II
Stream: CSE
Paper Title : Electrical and Electronics Technology — Paper Code: EEE41102
Maximum Marks : 40 — Time duration: 3 hours
Total No of questions: 08 — Total No of Pages: 02

Instruction for the Candidate:

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups

GROUP-A

Answer ***all*** the questions of the following **5×1 = 5**

1. a) Draw the symbol of p channel enhancement type MOSFET and NPN transistor.

b) Define Fermi level for T > 0K temperature.

c) Define Power Factor.

d) What is susceptance?

e) "Current is not a vector"-Justify.

GROUP –B

(Short Answer Type Questions)

Answer ***any three*** of the following **3×5 = 15**

2. a) Explain how does a transistor act as a switch.

b) Draw and explain the common base transistor circuit and output characteristics. [2+3=5]

3. Explain forward & reverse bias characteristics of a PN junction diode. [5]

4. (i) Derive the expression of resonant frequency of a series R-L-C circuit.

(ii) Why series resonant circuit is called 'Acceptor Circuit'? [3+2]

5. (i) Explain with the help of a diagram how alternating current is generated.
(ii) "Average Power is more convenient to measure than Instantaneous Power"- Justify [3+2]

GROUP –C
(**Long Answer Type Questions**)

Answer *any two* of the following **2×10 = 20**

6. a) What are the differences between BJT & FET?

b) Explain the following terms:

i) Zener Breakdown

ii) Drain characteristics of FET

c) The Transistor has a base current I_B=150μA, I_{CO}= 10 μA and α =0.98. Calculate the collector current I_C and emitter current I_E [2+4+4=10]

7. a) Write the expression for the Einstein relationship between diffusion and mobility phenomena. Calculate the 'volt-equivalent temperature' at 37□.

b) What is selectivity?

c) Define the following with suitable example:

i) Unilateral Element.

ii) Bilateral Element. [(2+3)+2+(1.5+1.5)=10]

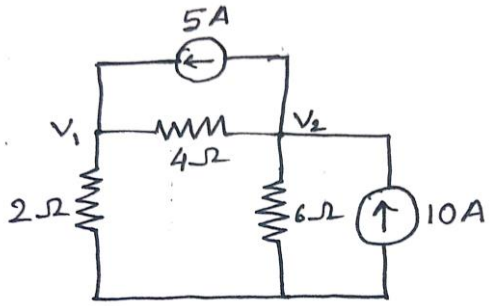
8. a) Define the following:

i) Active Power.

ii) Reactive Power.

b) State Norton's Theorem.

c) Find the node voltages V_1 and V_2 in the circuit



[(1.5+1.5)+2+5=10]

ADAMAS UNIVERSITY
PURSUE EXCELLENCE

Name of the Program: B.Tech Semester: II Stream: ME/CE/CSE/EE/ECE/Biotechnology
PAPER TITLE: **Engineering Mechanics** PAPER CODE: EME41102
Maximum Marks: 40 Time duration: 3 Hours
Total No of questions: 09 Total No of Pages: 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
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Group– A *(Question no. 1* is compulsory.)

1. **Answer all the Five Questions** $(\mathbf{5 \times 1\ Marks\ =\ 5\ Marks})$

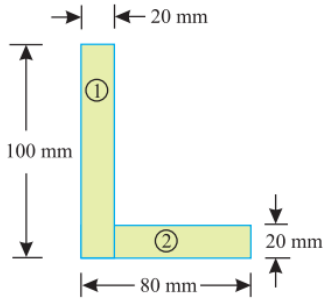
(i) Find out the moment of inertia of rectangular section 3 cm wide and 4 cm deep about X-X axis.
(ii) If the resultant of two equal forces has the same magnitude as either of the forces, then what is the angle between the two forces?
(iii) State Lami's Theorem.
(iv) What is the expression of the moment of inertia of a triangular section of base (*b*) and height (*h*) about an axis through its CG.
(v) What is angle of repose?

Group– B

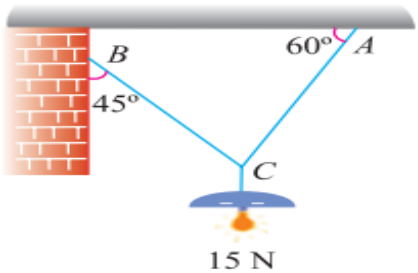
Answer any *three* questions $(\mathbf{3 \times 5\ Marks\ =\ 15\ Marks})$

2. Explain:
(a) Varignon's principle of moments (2.5X2)
(b) Polygon law of forces

3. Determine the centroidal position of triangular section whose base is 'B' and height is 'H'. (5)
4. Find the centroid of an unequal angle section 100 mm × 80 mm × 20 mm. (5)



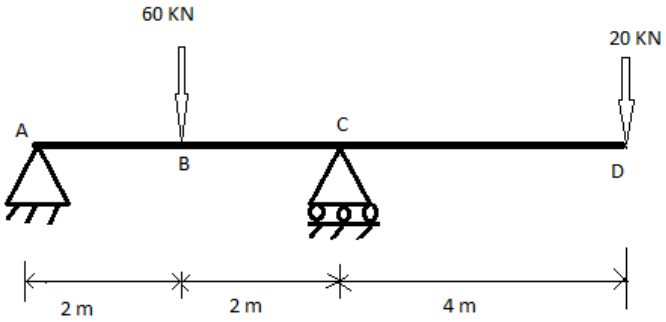
5. An electric light fixture weighting 15 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in Figure. Using Lami's theorem, determine the forces in the string's AC and BC. (5)



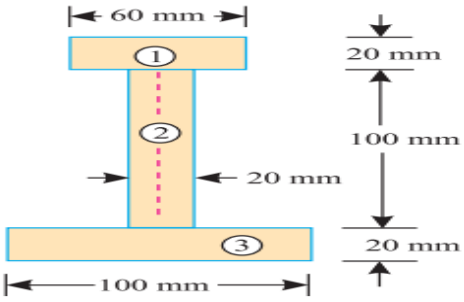
Group– C

Answer any *two* questions $(2 \times 10\ Marks = 20\ Marks)$

7. (a) Explain principle of transmissibility? (3)
(b)Find out the reaction forces at support as shown in figure below using principle of virtual work.(7)



8. (a) Derive perpendicular axis theorem of moment of inertia. (3)
(b) An I-section is made up of three rectangles as shown in Figure below. Find themoment of inertia of the section about the horizontal axis. (7)



9. (a)Explain Laws of Coulomb's friction? (3)
(b) An effort of 200 N is required just to move a certain body up an inclined plane of angle 15° the force acting parallel to the plane. If the angle of inclination of the plane is made 20° the effort required, again applied parallel to the plane, is found to be 230 N. Find the weight of the body and the coefficient of friction. (7)

ADAMAS UNIVERSITY
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END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B.Tech
Stream: CSE
PAPER TITLE: Life Science
Maximum Marks: 40
Total No of questions: 08

Semester: II
PAPER CODE: SBT41108
Time duration: 3 hours
Total No of Pages: 01

Instruction for the Candidate:

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Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1. **a)** What is the function of microfilaments in eukaryotic cells?
b) Which structure mediates the process of cytokinesis in animal cells?
c) Define the term 'oncogene.
d) What is hormone?
e) Define paracrine signaling.

GROUP –B
(Short Answer Type Questions)

Answer *any three* of the following $3 \times 5 = 15$

2. Describe the action of tumor suppressor gene with an example.
3. Write a short note on the transport of materials through cell membrane.
4. Describe Darwin's theory of natural selection.
5. Write a note on the microtubule organizing center with diagram.

GROUP –C
(Long Answer Type Questions)

Answer *any two* of the following $2 \times 10 = 20$

6. Define the term 'sarcoma'. Write a short note on metastasis. Mention some of the risk factors associated with cancer. (2 + 5 + 3 = 10)
7. What is cell division? Discuss the process of cell division in somatic cells. (1 + 9 = 10)
8. Discuss the structures and functions of the different components of a typical eukaryotic cell with diagram.

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END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech Semester: II
Stream: CSE
PAPER TITLE: Engineering Chemistry PAPER CODE: SCY41106
Maximum Marks: 40 Time duration: 3 hours
Total No of questions:08 Total No of Pages: 02

Instruction for the Candidate:

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Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1.a) What do you mean by molecularity of reaction?

b) Write Nernst equation.

c) What is unleaded petrol ?

d) H2SO4 decomposes at higher temperature than Me2SO4-why?

e) Find out the extensive properties from the following, specific heat, density, heat capacity.

GROUP –B

(Short Answer Type Questions)

Answer *any three* of the following $3 \times 5 = 15$

2. i) State and Explain the first law of thermodynamics.

ii) Calculate the amount of work done when 5 moles of an ideal gas expands isothermally and reversibly at 27^0Cfrom 5 litres to 50 litres 2+3

3. i) 'Formic acid is more acidic than acetic acid and acetic acid is more acidic than phenol'-

Explain

ii) Write the conditions of resonance. 3+2

4 .i) Find out the fraction of volume occupied by the ions for a face centered cubic closed packed system

ii) What do you mean by coordination isomerism? Give example 3+2

5. i) What are the characteristics of ideal fuel ?

ii) What is gutta percha ? 4+1

GROUP –C
(**Long Answer Type Questions**)

Answer *any two* of the following $\mathbf{2 \times 10 = 20}$

6.i) For which of the following complexes are optically isomers possible? Give reason for your answer

a. $[Fe(CN)_6]^{3-}$, b. $[Co(en)_2(NH_3)_2]^{3+}$, c. $[Cr(ox)_3]^{3-}$

ii) What do you mean by CFSE? Calculate the CFSE for d^2, d^3, d^4 and d^7 ions 5+5

7. i) Discuss SN_1 and SN_2 reactions with examples

ii) Calculate the maximum percentage of sulphur that can be present in vulcanized rubber

iii) Write short notes on 'Biodegradable polymer' 2+5+3

8.i) Can $CuSO_4$ solution be stored in zinc container? The standard reduction potential of Zn is -0.76V and that of Cu is +0.34 V

ii) Classify the polymer on the basis of tacticity.

iii) A first order reaction takes 60 minutes for 75% completion .Determine its half –life.

iv) What is octane number? 2+4+2+2

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END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech
Stream: CSE/ECE/EE/ME/CE/Biotech
PAPER TITLE: Engineering Mathematics-II
Maximum Marks: 40
Total No of questions: 08

Semester: II
PAPER CODE: SMA41102
Time duration: 3 hours
Total No of Pages: 02

Instruction for the Candidate:

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Answer all the Groups

Group A

Answer all the questions of the following $\mathbf{5 \times 1 = 5}$

1. **a)** Calculate the inverse z-transform of the function $F(z) = \frac{1}{z-2}$.
b) Find the polar form of $-1 + i$.
c) What is the Laplace transform of $f(t) = t^2 e^{-at}$?
d) Write down the Fourier series representation for an odd function $f(x)$ in the interval $-\pi \le x \le \pi$.
e) If $A = \begin{pmatrix} 0 & 2 \\ 0 & 4 \end{pmatrix}$, write A as a sum of a symmetric and skew symmetric matrices.

GROUP –B
(Short Answer Type Questions)

Answer *any three* of the following $\mathbf{3 \times 5 = 15}$

2. Verify Cayley-Hamilton theorem for $A = \begin{pmatrix} 0 & 0 & 1 \\ 3 & 1 & 0 \\ -2 & 1 & 4 \end{pmatrix}$.

3. Express $f(x) = \begin{cases} 1 & for\ 0 \le x \le \pi \\ 0 & for\ \ x > \pi \end{cases}$ as a Fourier sine integral and hence evaluate $\int_0^\infty \frac{1-\cos \pi\lambda}{\lambda} \sin \lambda x \, d\lambda$.

4. Define Harmonic function. Prove that $H(x, y) = e^{-y} Sin\, x$ is a harmonic function. [2+3]

5. Find the inverse Z-transform of $F(z) = \frac{(3z^2 - z)}{(z-2)(z-3)(z-4)}$, using partial fraction method.

GROUP –C
(Long Answer Type Questions)

Answer *any two* of the following $\mathbf{2 \times 10 = 20}$

6. (i) Determine the analytic function $f(z) = u + iv$, if $u = e^x(x\, Cosy - y \sin y)$.
(ii) Evaluate the line integral $\int_i^{2-i} (3xy + iy^2) dz$ along the line $x + y = 1$ [5+5]

7. (i) Evaluate the integration using Residue theorem $\int_c \frac{dz}{(z-1)(z-2)(z-3)}$ where c: $|z| = \frac{5}{2}$

(ii) Compute the Laplace transform of the following function $f(t) = \frac{e^{-at} - cosbt}{t}$ [5+5]

8. (i) Find Fourier cosine and Fourier sine transforms of the following function: [6+4]

$$f(x) = \begin{cases} x, & 0 < x < a \\ 0, & otherwise \end{cases}, \quad a\ is\ constant$$

(ii) Construct the Fourier cosine series expansion of the function

$$f(x) = \begin{cases} 1, & 0 \leq x < 1 \\ -1, & 1 < x < 2 \\ 0, & otherwise \end{cases}$$
