

B.TECH. DEGREE EXAMINATION, MAY 2018

I B.Tech. II Semester**ENGINEERING MATHEMATICS - I**

(Common to All Branches)

Time : 3Hrs

Max. Marks : 60

*Answer ONE question from each section**All questions carry equal marks.*

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SECTION - I

1. Find the values of λ for which the equations $(\lambda - 1)x + (3\lambda + 1)y + 2\lambda z = 0$, $(\lambda - 1)x + (4\lambda - 2)y + (\lambda + 3)z = 0$, $2x + (3\lambda + 1)y + 3(\lambda - 1)z = 0$ are consistent, and find the ratios of $x : y : z$ when λ has smallest of these values. What happens when λ has the greatest of these values.

2. (a) Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$.

- (b) Prove that any square matrix A and its transpose A' have the same Eigen values.

SECTION - II

3. (a) Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 8(x^2 + e^{2x} + \sin 2x)$.

- (b) Solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = xe^x \sin x$.

4. Solve $\frac{d^4y}{dx^4} + 2\frac{d^2y}{dx^2} + y = x^2 \cos x$.

SECTION - III

5. Find the volume of the greatest rectangular parallelepiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.

6. Find the dimensions of the rectangular box, open at the top, of maximum capacity whose surface area is 432 sq. cm.

SECTION - IV

7 Change the order of integration in $I = \int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2+y^2}} dx dy$ and hence evaluate it.

8 Find the volume of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.

SECTION - V

9 (a) Find the directional derivative of $f = x^2 - y^2 + 2z^2$ at the point $P(1,2,3)$ in the direction of \overline{PQ} where Q is the point $(5,0,4)$. Also calculate the magnitude of the maximum directional derivative.

(b) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$.

10 (a) Prove that $\text{div}(\text{grad } r^n) = n(n+1)r^{n-2}$.

(b) Prove that $\nabla \cdot (f \vec{G}) = \nabla f \cdot \vec{G} + f(\nabla \cdot \vec{G})$.

SECTION - VI

11 Verify Greens theorem for $\oint_C (xy + y^2) dx + x^2 dy$ where C is the boundary of the region bounded by $y = x$ and $y = x^2$.

12 Verify Divergence theorem for $\vec{F} = (x^2 - yz)\vec{i} + (y^2 - zx)\vec{j} + (z^2 - xy)\vec{k}$ taken over the rectangular parallelepiped $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, MAY 2018

I B.Tech.**ENGINEERING MATHEMATICS – I**
(Common to All Branches)

Time : 3Hrs

Max. Marks : 60

Answer **FIVE** Questions, Choosing **ONE** Question from each section
All Questions carry equal marks

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SECTION - I

- 1 (a) Determine whether the following equations will have a nontrivial solution, if so solve them.

$$4x + 2y + z + 3w = 0, \quad 6x + 3y + 4z + 7w = 0, \quad 2x + y + w = 0$$

- (b) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$, verify Cayley – Hamilton theorem. Hence find A^{-1} .

- 2 Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form by using the orthogonal transformation and hence find its rank, index, signature & nature.

SECTION - II

- 3 (a) Verify Lagrange's Mean value Theorem for the function $f(x) = (x-1)(x-2)(x-3)$ in the interval $[0, 4]$

(b) Show that $\frac{\sin^{-1}x}{\sqrt{1-x^2}} = x + \frac{4x^3}{3!} + \dots$

- 4 (a) Find c of Cauchy's mean value theorem on $[a, b]$ for $f(x) = e^x$ and $g(x) = e^{-x}$ ($a, b > 0$)
- (b) A rectangular box open at the top has a capacity of 32 cubic feet. Find the dimensions of the box requiring least material for its construction

SECTION - III

- 5 (a) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x^5}} dx$ in terms of β function
- (b) Show that the evolute of the cycloid $x = a(\theta - \sin \theta)$; $y = a(1 - \cos \theta)$ is another cycloid
- 6 Trace the curve $r = a(1 + \cos \theta)$

SECTION - IV

- 7 (a) Evaluate the following integral by transforming into polar coordinates

$$\int_0^a \int_0^{\sqrt{a^2-x^2}} y \sqrt{x^2 + y^2} dx dy$$

- (b) Evaluate $\int_{y=0}^1 \int_{x=y}^1 \int_{z=0}^{1-x} x dx dy dz$

- 8 (a) Change the order of integration and evaluate $\int_0^1 \int_{x^2}^{2-x} xy dx dy$

- (b) Find the volume bounded by the cylinder $x^2 + y^2 = 4$, and the planes $y + z = 4$ and $z = 0$.

SECTION - V

- 9 (a) Find the directional derivative of $\phi(x, y, z) = x^2 yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the normal to the surface $f(x, y, z) = x \log z - y^2$ at $(-1, 2, 1)$

- (b) Find the constants a, b, c such that the vector

$$\vec{A} = (x + 2y + az)\vec{i} + (bx - 3y - z)\vec{j} + (4x + cy + 2z)\vec{k}$$

is irrotational. Also find ϕ such that $\vec{A} = \nabla \phi$.

- 10 Verify Stokes theorem for $\vec{F} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$ bounded by the Projection on the xy -plane

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B.TECH. DEGREE EXAMINATION, MAY 2018
I B.Tech. II Semester

PROFESSIONAL ENGLISH
(Common to All Branches)

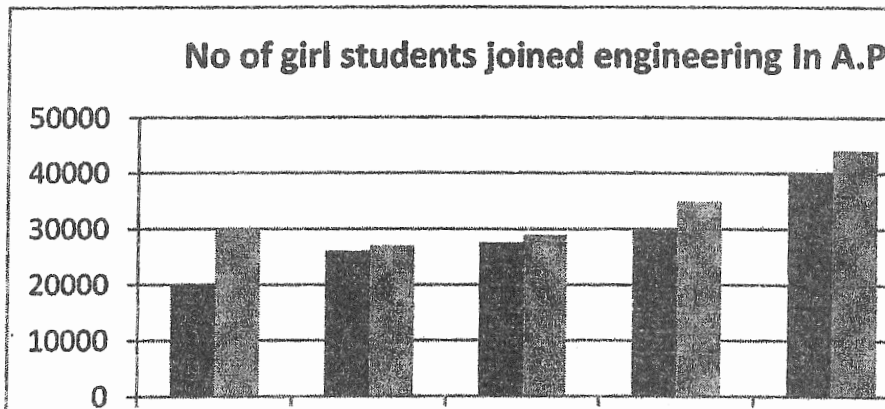
Time : 3Hrs

Max. Marks : 60

Answer ONE Question from each section
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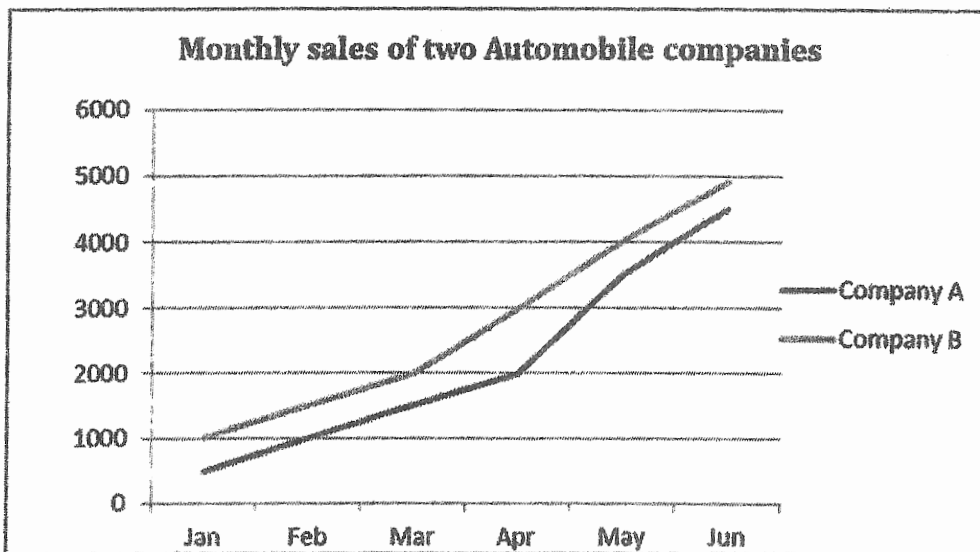
SECTION - I

1. (a) Interpret the following data in your own sentences in about 300 words.



- (b) 1. Grass : Soil :: (water : salty/seaweed : silver/fish : pond/ocean : boat)
- 2. Lion : Animal :: (mango : free/flower : rose/ plant : root/ grass : stem)
- 3. Aeroplane : Sky :: (Ship: load/rocket:water/train:track/car:space)

2. (a) Compare and contrast the following line diagram.



- (b) Write the meanings and make sentences by using the following homonyms:
1. Hear, here
 2. Root, route
 3. Fair, fare.

SECTION - II

3. (a) What are the guidelines for writing an effective e-mail.
- (b) Write the meanings of the following idioms and use them in your own sentences
1. In a nut shell.
 2. Greek and Latin
 3. Born with silver spoon
4. (a) What is an e-mail? What are the various advantages of an e-mail?
- (b) Write the meanings of the following one word substitutes.
1. Democracy
 2. Geology
 3. Autobiography

SECTION - III

5. (a) Analyze the following issue.
"Internet has made the world a global village".
- (b) Write the right words by using the following prefixes
1. Inter-
 2. Bio-
 3. Auto-
6. (a) Analyze the following argument.
India's major companies will have to take quick action to include more number of women directors in their boards for effective administration. At present their number is very low.
- (b) Write the right words by using the following suffixes
1. -logy
 2. -ing
 3. -less

SECTION - IV

7. (a) What is a project proposal? What is the significance of writing a project proposal ?
- (b) Write synonyms.
- i. Adequate
 - ii. Sophisticated
 - iii. Abuse
8. (a) What are the steps involved in taking notes during a lecture on a non- technical topic?
- (b) Write antonyms
- i. Joy
 - ii. Debit
 - iii. Benevolent

SECTION - V

- 9 (a) What strategies do you follow in making notes from a technical text.
- (b) Write any six words of your choice which are often confused.
- 10 (a) You are planning to organize a cultural festival on your campus. Prepare a proposal including various factors for conducting the festival to submit it to the principal.
- (b) Write any six words of your choice which are often confused.

SECTION - VI

- 11 (a) Discuss the strategies involved in summarizing a text.
- (b) Fill in the missing words of the following passage with the options given below.
The _____ sources like biomass, animal _____ wind and water will serve as _____ to commercial _____ like coal, _____ and electricity. They are non-polluting and also help to preserve the _____.
(fuels, alternatives, wastes, oil, renewable, environment)
- 12 (a) Write a review of any book which you have read recently.
- (b) i. Rahul went to Niagara falls and it was _____ (memory).
ii. After reaching exam center, Jyothi realized that she had forgot to bring a hall-ticket. the examiner said she is _____ (neglect).
iii. It was a _____ (strain) job.

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B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, MAY 2018

I B.Tech.**ENGLISH**
(Common to All Branches)

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*Answer FIVE Questions, Choosing ONE Question from each section
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* * *

SECTION - I

1. (a) What are the main causes for soil erosion? What measures can be taken to check soil erosion.
- (b) Write briefly about young Washington's life at Mrs Ruffner's house.
2. (a) "Mission mode program helps to solve this problem". Explain briefly the plans of Kalam to solve the problem at Bokaro Steel Plant ?
- (b) Homi Jehangir Bhabha is known as a versatile genius . Describe his contribution to the development of our nation ?

SECTION - II

3. (a) Write a letter to the Manager of a bank in your city applying for a student loan of Rs 3 lakhs for your sister, who has admitted to an undergraduate law program. Ask what the bank interest rate on student loan, what documents are require and how long process will take.
- (b) Imagine the following situation and write a dialogue. Your teacher asked you to complete the project and bring it to the class . You haven't completed it because you had severe headache the previous night. You express your apologies to the teacher.
- 4 (a) Write a letter to the Editor of a newspaper complaining about the vulgar movie posters near schools and college.
- (b) Write a paragraph not exceeding 75 words about
"The Examination System needs a change"

SECTION - III

5. (a) Write a report of the TV channels viewed by different age groups
- (b) Write with a/an or the in the blanks

I have _____ house and _____ flat _____ house is in Rajamundry and
_____ flat in Vizag.

6. (a) Write a speech about ' **Unemployment in India**'.
- (b) Fill in the blanks with prepositions.
1. The Student complained _____ the hostel facilities.
 2. I discussed the project _____ Peter.
 3. He is not responsible _____ this
 4. All teachers are proud _____ of him.

SECTION - IV

7. **Correct the errors and rewrite any twelve of the following sentences**
- a. Why you are roaming on the roads.
 - b. Neither the supervisor nor the staff members was able to calm the distressed client.
 - c. The doctor advised us drinking low –fat – milk.
 - d. I, you and she have been commended for the success of the project.
 - e. Her information are biased.
 - f. She seldom sees her parents in the village , is she?
 - g. Games not only harden the children even enable them to endure the weather
 - h. The agreement is between her and we
 - i. Janaki is my cousin sister.
 - j. I stood among Hari and Rama.
 - k. He has lived here since three years.
 - l. The film is worth to watch.
 - m. Ramu goes to the school everday.
 - n. Jasmine smells sweetly.
 - o. Twenty miles are not a long sistance.
 - p. I am fit enough to join the expedition , am I

SECTION - V

8. (a) **Read the Passage and answer the Questions**

With the help of technological advancement , beginning with X-Ray and progressing to ECG, EEG, Ultra Sound NMR imaging, and of course in computer technology, new methods of investigations and diagnosis have begun to dominate medical practice. As far as theory is concerned, the biggest break thorough since the advent of the germ theory has been in genetic medicine. Medical genetics refer to the application of the knowledge to medical care. This has special relevance to the causes and correctiveness for genetic disorders. Following the success of the Human Genome Project , Scientists are speculating about the possibility of being able to predict the susceptibility of individuals to specific disorders, like the propensity to heart disease, or to cancer or to mental disorders, etc. Nor , surprising, there is wide uneasiness also that this would be like opening a Pandora's Box, because of the very high possibility that such information will be misused, invariably to the disadvantage of the weaker and helpless sections of the people . At another level, there is talk of human cloning , designer babies, and the science fiction like possibility of growing spare organs through advances in stem cell research.

It may be claimed that with the advances in microbiology, the development of vaccines for all the major infections and communicable diseases and the UN assisted mass immunization programs, the first frontier of medicine was successfully crossed. Of course it has to be mentioned that the challenges of implementation, including the political and economic agenda of poverty eradication remain to be addressed.

(P.T.O)

1. What are the new methods of investigations and diagnosis that have begun to dominate medical practice?
2. Would you agree that medical genetics is the biggest breakthrough human have had in the area of medicine? Why?
3. How do you think this breakthrough in medical genetics may be misused?
4. Which aspects of our socioeconomic , political and cultural background may pose a challenge to the successful implementation of the latest medical program.

(b) **Fill in the blanks with the correct verb forms**

- a. The train _____ at 10 p.m. on Friday (leave)
- b. I have _____ Shazia and Manit for a long time (know)
- c. Their flight _____ at three in the morning (arrive)
- d. The girls are _____ in the backyard.(play)

