## BTAS -002 [ENGINEERING PHYSICS-I]

1. What are inertial and non-inertial frames of reference?
2. A meson has a speed 0.6 c with respect to ground and its time of flight with respect to in the rest frame is $2 \times 10-8 \mathrm{~s} 2 \times 10-8$ then what is the time of flight observed with respect to itself.?
3. In a photoelectric effect experiment the threshold wavelength of light is 380 nm . If the wavelength of incident light is 260 nm ,then what is the maximum kinetic energy of emitted electrons $E($ in eV$)=[1237 / \lambda($ in nm$)]$.?
4. The work function of a substance is 4.0 eV .then what is the longest wavelength of light that can cause photoelectron emission from this substance .?
5. (i) The refractive index of glass is 1.5 . What is the speed of light in glass? The speed of light in a vacuum is ( $3.0 \times 10^{8} \mathrm{~m} \mathrm{~s}^{-1}$ )
(ii) Is the speed of light in glass independent of the colour of light? If not, which of the two colours, red and violet, travels slower in a glass prism? PART-B
6. In Young's double-slit experiment, the slits are separated by 0.28 mm , and the screen is placed 1.4 m away. 1.2 cm is the distance between the central bright fringe and the fourth bright fringe. Determine the wavelength of light used in the experiment.?
7. A beam of light consisting of two wavelengths, 650 nm and 520 nm , is used to obtain interference fringes in Young's double-slit experiment.
(a) Find the distance of the third bright fringe on the screen from the central maximum for wavelength 650 nm .
(b) What is the least distance from the central maximum where the bright fringes due to both wavelengths coincide?

## BTAS-12

## Engg. Mechanics

## PART-A

Q1-State Varignon's theorem.
Q2-A force of 210 N inclined at $60^{\circ}$ to the horizontal is applied to a block weighing 450 N which is put on 'a plane. Determine whether the block would move due to application of the force. The coefficient of friction between the block and the plane is 0-5.

Q3-State law of conservation of momentum.
Q4- A wheel is rotating with a constant acceleration of 1 radian $/ \mathrm{s}^{2}$ about its axis. If the initial and final angular velocities are 5.2 radian $/ \mathrm{s}$ and 10.5 radian $/ \mathrm{s}$ respectively, determine the total angle turned through during the time interval this change of angular velocity took place.

Q5- State law of polygon of forces in brief.

## PART-B

Q1-When a motorcyclist is riding west at $40 \mathrm{~km} / \mathrm{h}$, he finds the rain meeting him at an angle of $45^{\circ}$ with the vertical. When he rides at $24 \mathrm{~km} / \mathrm{h}$, he finds the rain at an angle of $30^{\circ}$ with the vertical. What is the actual velocity (magnitude and direction) of the rain ?

Q2-A body of 100 kg has its velocity changed from $6 \mathrm{~m} / \mathrm{s}$ to $10 \mathrm{~m} / \mathrm{s}$ in the same direction in 40 seconds. Find
(a) the change in momentum, and
(b) the force responsible for this change.

## BTCS-11

## COMPUTER SYSTEM AND PROGRAMMING IN

## PART-A

1.Explain different types loops in C language.
2. Explain Array with an example?
3.Define Pointers with an example.
4.Difine structure with an example?
5.Write a program for Fibonacci series in c without recursion?

PART-B
1.Write a program to read the data from a file.
2. Write a program to add elements of an array.

## B.Tech1 st Semester

(Common to all Branches)

## BTAS-14 ENVIRONMENT AND ECOLOGY

## PART-A

1. What is the introduction of environmental science?
2. What is the concept of ecosystem and its components?
3. What do you understand by the term biodiversity explain biodiversity at national and local level of India?
4. What are natural resources renewable \& non-renewable resources?
5. What is the impact of migration on population?

## PART-B

1. What is the biodiversity at global level and at Indian level?
2. How do industrial growth and transportation influence our environment?

# BTAS-12 <br> ENGG. MATHS-1 

## PART-A

1.Find Eigen values of the matrix

| 2 | -3 | 1 |
| :---: | :---: | :---: |
| 3 | 1 | 3 |
| -5 | 2 | -4 |

2.Test the consistency of following system of linear equations and hence find the solution $4 x-y=12,-x+5 y-2 z=0,-2 y+4 z=-8$
3. Find the $n^{\text {th }}$ derivative of $\frac{x^{2}}{(x+2)(2 x+3)}$
4.If $\mathrm{y}=(1-x)^{-\alpha} e^{-\alpha x}$, prove that
$(1-\mathrm{x}) y_{n+1}-(\mathrm{n}+\mathrm{ax}) y_{n}-n \alpha y_{n-1}=0$
5.Find rank and nullity of $\begin{array}{rrr}1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9\end{array}$

## PART-B

1.If $\frac{x^{2}}{a^{2}+u}+\frac{y^{2}}{b^{2}+u}+\frac{z^{2}}{c^{2}+u}=1$,

Show that

$$
\left(_{\partial x}^{\partial u_{2}}\right)^{2}+\left(\frac{\partial u_{2}}{\partial y}\right)^{2}+\left(\left(_{\partial z}\right)^{\partial u_{2}}=2\left(x \frac{\partial u}{\partial x}+y \frac{\partial u}{\partial y}+z \frac{\partial u}{\partial z}\right)\right.
$$

2.Expand the following in powers of $x$
i) $\sqrt{(1+\sin x)}$
ii) $e^{x} \cos x$
iii) $\cos ^{-1} \frac{x^{2}-1}{x^{2}+}$

BTAS-11

## COMMUNICATION SKILLS

PART-A

Q1- What is "communication." Write a short note on the distinction between general and technical communication.
Q2 -What are levels of communication? Give its advantages and disadvantages.
Q3- What is active listening and passive listening?
Q4- Describe audio-visual aids with appropriate examples.
Q5- Write a critical appreciation on the essay "The Language of Literature and Science" by A. Huxley.
PART-B
Q1- What are the principles of effective communications?
Q-2 Define verb and its classification.

