

KATHMANDU UNIVERSITY
End Semester Examination [C]
April, 2022

Marks Scored:

Level : B.E.

Course : ENGG 111

Year : I

Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration no.:

Date :

SECTION "A"
[20Q. × 1 = 20 marks]

Choose the most appropriate answer and **mark [X]**.

- The resultant of two forces P and Q (such that $P > Q$) acting along the same straight line, but in opposite direction is given by _____.
 P + Q P - Q P/Q Q/P
- Before reaching terminal velocity, for a skydiver upward force is _____ downward force.
 equal to greater than less than not equal to
- Static friction is always _____ dynamic friction.
 equal to greater than less than twice more than
- Which of the following is a proper sequence?
 proportional limit, elastic limit, yielding, failure
 elastic limit, proportional limit, yielding, failure
 yielding, proportional limit, elastic limit, failure
 proportional limit, yielding, elastic limit, failure
- Bricks to be adopted for the construction of subgrade of road are _____.
 1st class bricks 2nd class bricks 3rd class bricks 4th class bricks
- Which type of foundation is suitable for the construction of bridge in River?
 Mat foundation Raft foundation
 Pile foundation Isolated foundation
- For the Narrow V Shaped George with strong abutment, which type of Dam is preferred?
 Arch dam Rigid dam
 Gravity dam Detention dam
- For the M25 Concrete, 25 represents _____.
 Concrete cube should be tested in 25 days
 Concrete cube should be tested in 28 days and its characteristic strength should be 25 MPa
 Number of concrete cubes to be tested should be at least 25
 Size of concrete cubes to be tested should be 25 cm by 25 cm by 25 cm
- Which of the following scale is the largest one?
 1 cm = 10 km 1:5000 1 cm = 10 m 1:10000
- Trunnion Axis is also known as _____.
 Line of sight Line of collimation
 Vertical axis Horizontal axis

11. If back bearing of line is $N30^{\circ}W$, its fore bearing is _____.
 $S30^{\circ}W$ $S30^{\circ}E$ $N30^{\circ}E$ $N30^{\circ}W$
12. Which of the following is a Global Satellite System?
 GLONASS BEIDOU QZSS IRNSS
13. Which of the following is the extensive property of a thermodynamic system?
 pressure volume temperature density
14. Kelvin-Planck's law deals with
 conservation of work conservation of heat
 conversion of heat into work conversion of work into heat
15. The absolute zero pressure will be _____.
 when molecular momentum of the system becomes zero
 at sea level
 at absolute zero temperature
 at the center of the earth
16. Heat energy stored in the gas and used for raising the temperature of the gas is called _____.
 external energy internal energy kinetic energy molecular energy
17. The property of a liquid which resists the movement of one layer of liquid over another adjacent layer of liquid is called _____.
 surface tension compressibility capillarity viscosity
18. When a liquid is flowing through a pipe, the velocity of liquid is _____.
 maximum at the center and minimum near the walls
 minimum at the center and maximum near the walls
 zero at the center and maximum near the walls
 maximum at the center and zero near the walls
19. A flow in which the quantity of liquid flowing per second is constant, is called _____ flow.
 steady streamline turbulent unsteady
20. A Pelton wheel is
 tangential flow impulse turbine inward flow impulse turbine
 outward flow impulse turbine inward flow reaction turbine

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April, 2022

Level : B.E.
Year : I
Time : 2 hrs. 30 mins.

Course : ENGG 111
Semester : I
F.M. : 55

Attempt **ALL** questions. Assume if data is necessary. Use separate answer book for Section "B", Section "C" and Section "D".

SECTION "B"
[3Q × 11 = 33 marks]

1. (a) Find the centroid of the composite area (Figure 1). All dimensions are in centimeter. [3]

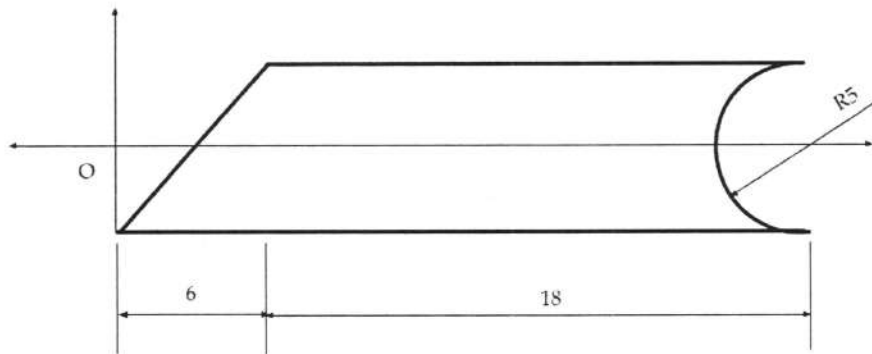


Figure 1.

- (b) Find the reactions at the supports (Figure 2). All dimensions are in meter. [5]

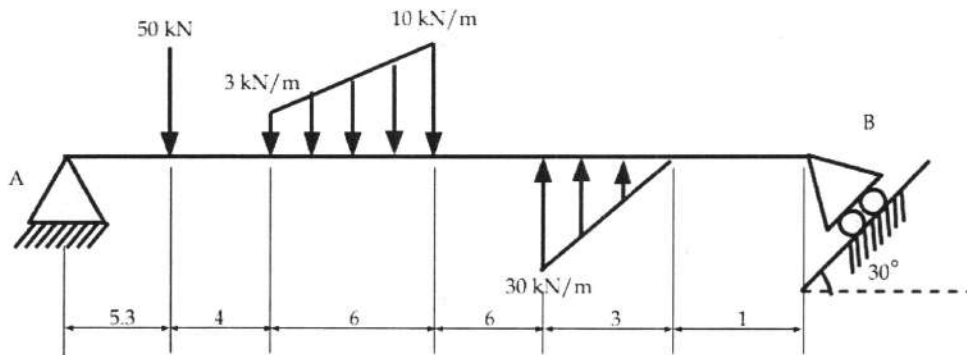


Figure 2.

- (c) Briefly describe different types of loads with practical examples. [3]
2. (a) What are the similarities and differences between refrigerators and heat pumps? Explain with the help of appropriate schematic diagrams. [4]
- (b) Draw PV and TS diagrams of Carnot, Otto, Diesel and Brayton cycles with appropriate names of processes and indices. [4]
- (c) What are the assumptions of an air standard analysis for thermodynamic cycles? [3]

3. (a) A hose lying on the ground has water coming out of it at a speed of 5.4 m/s. You lift the nozzle of the hose to a height of 1.3 m above the ground. At what speed does the water now come out of the hose? Assume $P_{\text{atm}} = 101 \text{ kPa}$ and $g = 9.8 \text{ m/s}^2$. [3]
- (b) Differentiate between the following with examples: [6]
- Newtonian and non-Newtonian fluids
 - Laminar and turbulent flows
 - Streamlines and streaklines
- (c) Write significances of Mach number and Reynolds number. [2]

SECTION "C"
[1Q × 11 = 11 marks]

4. (a) Define Building materials? List out different properties of the materials and explain briefly the mechanical properties? In which case fourth class bricks are adopted in civil Engineering construction works. [1 + 2 + 1]
- (b) Why foundation is provided in the Civil Structures? With the help of neat figure explain in which case you will recommend isolated foundation to be adopted in the construction of Civil Structure. What are the ideal requirements of bridges to be constructed in Hilly and plain region of Nepal? [1 + 2 + 1]
- (c) Explain shortly with the help of neat sketch about English Brick Bonds, furthermore write its suitability? What are the factors to be considered while supervising Stone masonry works? [2 + 1]

SECTION "D"
[1Q × 11 = 11 marks]

5. (a) What is Surveying? Write down the principles of surveying with brief explanation about each of them. [1 + 2]
- (b) Briefly write about the different types of tapes used in Surveying. Mention the suitable conditions for chain surveying. [2 + 2]
- (c) Convert the following WCBs to QBs or vice-versa [2]
- WCB of AB = $243^{\circ}42'$
 - QB of CD = $S39^{\circ}35'E$
 - WCB of EF = $353^{\circ}47'$
 - QB of GH = $N45^{\circ}16'W$
- (d) Write short notes on: [1 + 1]
- Components of GIS
 - Types of remote sensing