Marks scored:

KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Level : B.E. /B.Sc. /B.Tech.
Year : I

Course : ENGG 111
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date FEB 2 2 2019

SECTION "A"
[20Q. × 1 = 20 marks]

Choose the most appropriate answer and mark [X].

1. The working principle of GPS is based on .....
[ ] Reflection [ ] Refraction [ ] Triangulation [ ] Resection

2. Passive remote sensing is when .....
[ ] the remote sensing is done from the ground
[ ] the remote sensing is done from an aircraft
[ ] satellites are used for remote sensing
[ ] external energy source is used for remote sensing

3. A theodolite can measure .....
[ ] horizontal distance accurately
[ ] horizontal and vertical distance and angles
[ ] horizontal and vertical angles
[ ] horizontal and vertical distance

4. The observations and measurements taken during chain surveying are recorded in a .....
[ ] survey book [ ] field book [ ] field note [ ] survey note

5. GIS stands for
[ ] Geographical Information System [ ] Geographic Information Science
[ ] Geographic Information System [ ] Geographic Information Sharing

6. The property of building materials to resist against wear and tear is termed as.....
[ ] Stiffness [ ] Hardness [ ] Toughness [ ] Tenacity

7. ..... footing is highly preferred where the SBC of the soil is very poor.
[ ] Combined [ ] Continuous [ ] Raft [ ] Arch

8. Which of the following is not an advantage of Concrete?
[ ] High Tensile Strength [ ] Fire Resistance
[ ] High Compressive Strength [ ] Resistance to water

9. Portion of dam in contact with ground at downstream side is……..
[ ] crest [ ] toe [ ] heel [ ] foot

10. For cement concrete flooring, what should be the ratio of concrete mix?
[ ] 1:8:16 [ ] 1:4:8 [ ] 1:2:8 [ ] 1:2:4

11. For an adiabatic process,
[ ] ΔE_{int}= 0 [ ] ΔE_{int}= -W [ ] ΔE_{int}= Q [ ] ΔE_{int}= Q-W

12. Calculate the Carnot efficiency foran engine operating between the temperature difference of 700◦Cand 7000◦C respectively.
[ ] 90.37 % [ ] 86.62 % [ ] 10.00 % [ ] 50.02%

13. Please tick the correct relation,
[ ] $COP_{HP} = COP_R + 1$ [ ] $COP_{HP} = COP_R - 1$
[ ] $COP_{HP} = 1 - COP_R$ [ ] $COP_{HP} = 1 + COP_R$

14. What is the dimension for weight density?
[ ] $ML^{-2}T^{-2}$ [ ] $M^{-1}L^2T^2$ [ ] L^3M^{-1} [ ] M^1L^{-3}

15. For a uniform flow,
[ ] $\left(\frac{\partial v}{\partial s}\right)_{t=constant} \neq 0$ [ ] $\left(\frac{\partial v}{\partial s}\right)_{t=constant} = 0$

[ ] $\left(\frac{\partial P}{\partial t}\right)_{x_0y_0z_0} \neq 0$ [ ] $\left(\frac{\partial P}{\partial t}\right)_{x_0y_0z_0} = 0$

16. One end of a cylindrical pipe has a radius of 1.5 cm. Water (density = 1.0 $\times 10^3$ kg/m^3) streams steadily out at 7.0 m/s. The rate at which mass is leaving the pipe is:
[ ] 4.9 kg/s [ ] 11.3 kg/s [ ] 0.011 kg/s [ ] 8 kg/s

17. If a number of forces act simultaneously on a particle, it is possible
[ ] to replace them by a single force
[ ] to replace them by a single force acting through CG
[ ] to replace them by a couple
[ ] to replace them by a couple and a force

18. If two equal forces of magnitude P act at an angle 11°, their resultant will be
[ ] P/2Cos(11/2) [ ] PSin(11/2) [ ] PCos(11/2) [ ] 2PTan(11/2)

19. The centre of gravity of a quarter lies at a distance of ……from its base measured along the vertical radius.
[ ] 2R/3π [ ] 4R/3π [ ] 8R/3π [ ] R/3π

20. Which of the following statement is incorrect?
[ ] The stress is force per unit area
[ ] Hooke's law holds good up to the breaking point
[ ] Stress is directly proportional to strain with in elastic limit
[ ] The ratio of linear stress to linear strain is called Young's modulus

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Time : 2 hrs. 30 mins.

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

SECTION "B"

[3Q. × 11 = 33 marks]

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

1.

a. What is free body diagram? [1]
b. Explain stress strain curve diagram of a ductile material. [2]
c. Calculate the centroid Y component of the geometry with respect to its base. [4]
As shown in Figure 1.

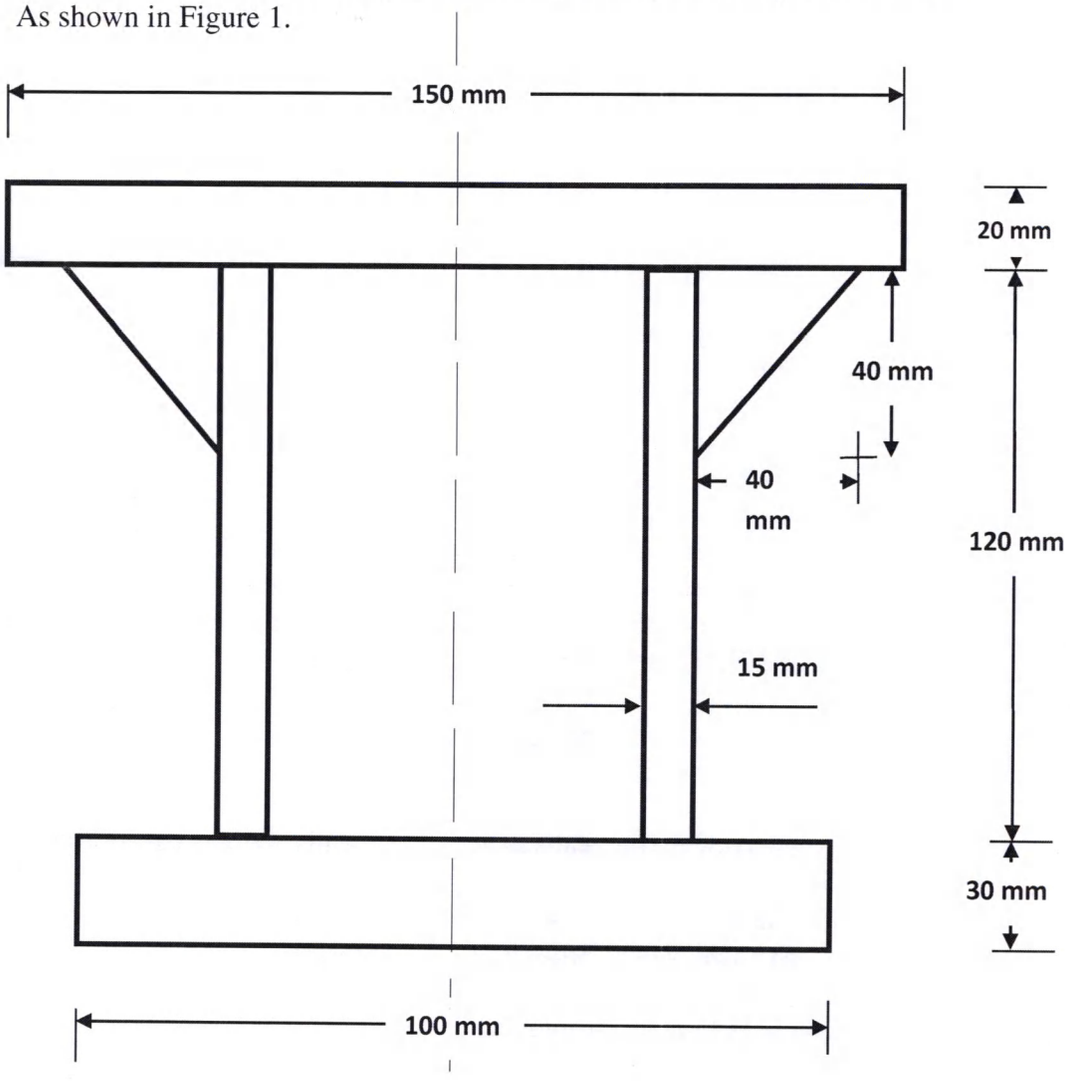

Figure 1

d. A car of mass 1.2 tonnes is travelling along a straight horizontal road at a speed of 20 ms^{-1} when it brakes sharply then skids. Friction brings the car to rest. If the coefficient of friction between the tyres and road is 0.8, calculate: [4]
   i. the deceleration
   ii. the distance travelled by the car before it comes to rest.

2.
a. Explain the second law of thermodynamics. [3]
b. Write short notes on: [1.5+1.5]
   i. Thermal equilibrium
   ii. Intensive Properties
c. Explain the ideal cycle for vapor power cycles using suitable diagram. [5]

3.
a. Differentiate between solid and fluids with example. [3]
b. Write short notes on: [1.5+1.5]
   i. Turbulent flow
   ii. Non-positive displacement pump
c. A tapered pipe 5 m in length is inclined to horizontal by 15° and carries water through 10 cm diameter and discharged out through 25 cm diameter. The inlet velocity of water is 1 m/s. Find out the flow rate of water and the pressure difference between the inlet and exit in Pa. *(assume data if necessary)* [5]

SECTION "C"

[1Q. × 11 = 11 marks]

4.
a. List any two basic principles of surveying. Differentiate between WCB and QB. [1+2]
b. List and explain the components of GIS. What are the segments of GPS? [2+2]
c. A traverse ABCDA is made in the form of a square in counter clockwise order. If the bearing of AB is 210°30', find the bearing of the other sides. [4]

SECTION "D"

[1Q. × 11 = 11 marks]

5.
a. Differentiate between load bearing walls and partition walls. Why is cast iron preferred over wrought iron? [2+2]
b. What are the requirements of a good foundation? Which footing type would you recommend in order to achieve uniform settlement and why? [2+2]
c. Define Seismic Load. What are the disadvantages of having flat roofs and explain how pitched roofs overcome those disadvantages. [1+2]