FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I-Semester (Supplementary) Examination, May / June 2017

Subject: Water Resources Engineering – II

Time : 3 hours   Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. Define the terms bank storage and valley storage.
2. Define the term retarding basin.
3. State the objectives of galleries in gravity dams.
4. Distinguish between theoretical and practical profile of a gravity dam.
5. Write a brief on hydraulic fill type of earth dams.
6. State the consequences of earth quake failure in earthen dams.
7. List the functions of emergency spillways.
8. State the circumstances under which ogee spillway is to be used.
9. Define utilization factor and plant factor.
10. List the function of flow duration curves.

PART – B (50 Marks)

11. Determine the capacity of the reservoir for the varying demand values given below.

Inflows (cumec)	15	70	200	250	220	180	140	90	70	50	35	25	16	13
Demands (cumec)	15	17	45	140	190	205	180	150	125	100	60	40	25	16

12. a) Design a practical profile of a concrete gravity dam for the following data :
    RL of base of the dam is 1350.0 m, RL of HFL is 1400.0 m specific gravity of concrete is 2.4, safe compressive stress of concrete is 3000 kN/sq.m., and height of wave is 1.0 m.
    b) List the forces acting on a gravity dam.

13. a) Explain the criteria for the safe design of embankments.
    b) State the function of down stream drainage system.

14. a) Write a brief note on siphon spillways.
    b) Describe with neat sketches the energy dissipation arrangements when the TWC lies below post jump depth curve.

15. Explain the modes of failure of gravity dams.

16. a) Mention the causes of over topping of earth dams.
    b) List the seepage control measures through embankments and foundations of earth dams. Further, explain any one of them under each category.

17. a) List the different types of surge tanks.
    b) Explain the salient features of penstocks.

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FACULTY OF ENGINEERING

B.E. 4/4 (Inst.) I-Semester (Supplementary) Examination, May / June 2017

Subject : Opto-Electronics Instrumentation

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Write classification of Laser.	3
2	In a two energy level system transition of higher to lower energy levels emit wave length of 550 nm. Calculate the ratio of the population of the two energy levels at 27^0C where gain $g_1 = g_2$.	3
3	Write equation for lasing threshold.	2
4	Define line shape function.	2
5	Mention advantages of optical fibre communication.	2
6	List different losses in optical fibre communication.	3
7	Mention characteristics useful in the optical fibre sensor design.	3
8	Write the classification of fibre optic sensors.	2
9	Calculate the efficiency of a PIN diode if the responsivity is 0.58 A/W at 800 nm.	3
10	List different types of optical couplers.	2

PART – B (50 Marks)

11 For a 3 level system, explain the attainment of population inversion and derive equation for Einsteins coefficents. 10

12 With necessary diagram explain laser welding and laser machining. 10

13 Explain electro optic and mechano optic modulation techniques of optical fibre. 10

14 With necessary diagrams explain measurement of voltage and fluid level using optical fibre sensors. 10

15 Explain the operation of a phototransistor and plasma display as an optoelectronic device. 10

16 a) Explain construction of a dye laser. 6
   b) Explain briefly about laser strain guage. 4

17 a) Explain external CVD fibre fabrication technique. 5
   b) With a diagram explain operation of optical time domain reflectometre. 5

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FACULTY OF ENGINEERING
B.E. 4/4 (ECE) I - Semester (Suppl.) Examination, May / June 2017

Subject : Mobile Cellular Communication

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1   Define Grade of service.   (2)
2   If a total of 66 MHz of bandwidth is allocated to a cellular system which uses   two 50 KHz simplex channels compute the number of channels available per cell if a system uses four-cell and seven-cell reuse.   (3)
3   Explain three basic propagation mechanisms.   (3)
4   Write a short note on the indoor propagation models.   (3)
5   Differentiate between TDMA and FDMA.   (2)
6   Write the features of GSM.   (2)
7   Briefly explain classifications of packet radio access.   (3)
8   Discuss the control channels in GSM.   (2)
9   Compare features of 3G and 4G.   (2)
10 Write a short note on wireless local area networks.   (3)

PART – B (50 Marks)

11 (a) Briefly explain various channel assignment strategies in a cellular system.   (5)
   (b) Explain umbrella cell approach.   (5)

12 (a) Discuss briefly Durkin's model for outdoor propagation model.   (5)
   (b) Explain types of small-scale fading.   (5)

13 (a) Differentiate between pure ALOHA and slotted ALOHA. Determine the maximum value of throughput for each ALOHA.   (6)
   (b) Compare SSMA and FHMA.   (4)

14 (a) Explain how the signal is processed in GSM with a neat sketch.   (5)
   (b) Write various services offered by GSM.   (5)

15 (a) Explain the concepts of cell splitting and cell sectoring.   (6)
   (b) Briefly discuss reservation protocols.   (4)

16 (a) How a cellular telephone call is made? Discuss.   (5)
   (b) Explain CDMA 2000.   (5)

17 Write a short notes on the following:
   (a) CSMA   (5)
   (a) GSM Architecture with a neat diagram.   (5)

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FACULTY OF ENGINEERING

B.E. 4/4 (M / P) I – Semester (Suppl.) Examination, May / June 2017

Subject: Finite Element Analysis

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 Discuss briefly about the importance of convergence requirements in FEM.   2

2 Derive shape functions for four node quadrilateral element.   4

3 If the shape functions of a linear triangular element are given by $N_i = \dfrac{20 - 7x - 3y}{20}$,

   $N_j = \dfrac{8x - 3y}{20}$ find the N_k. If the model temperature are $\emptyset_t = 40^oC$, $\emptyset_j = 30^oC$, and

   $\emptyset_k = 60^oC$. Find the temperature at the point x=4 and y=2.   4

4 Derive material matrix for plane strain condition.   4

5 Derive steady state temperature gradient matrix for triangular element.   3

6 If the x component velocity in a 2-D flow is given by $u = x^2 + 2x - y^2$, find the y-component of velocity that satisfies the continuity equation.   3

7 Explain geometric isotropy.   2

8 Write the steps involved in FEM software's.   3

PART – B (50 Marks)

9 Two bars made of different materials are connected as shown in Fig. 1 the properties of the two bars are given by

$$A^{(1)} = 600mm^2, E^{(1)} = 125GPa, a^{(1)} = 20x10^{-6} / \,^oC$$
$$A^{(2)} = 1200mm^2, E^{(1)} = 200GPa, a^{(2)} = 15x10^{-6} / \,^oC$$

If the temperature of the two bar system is raised by 40^oC. Determine the displacements and element stresses developed in the two bars.
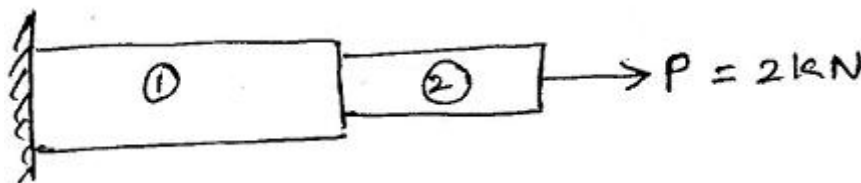

Fig. 1

10 a) Distinguish between essential and natural boundary conditions with reference to a cantilever beam.   3

b) For a two-bar truss shown in Fig. 2. Determine the displacements and stresses in all elements E = 70GPa, A = 200 mm^2.
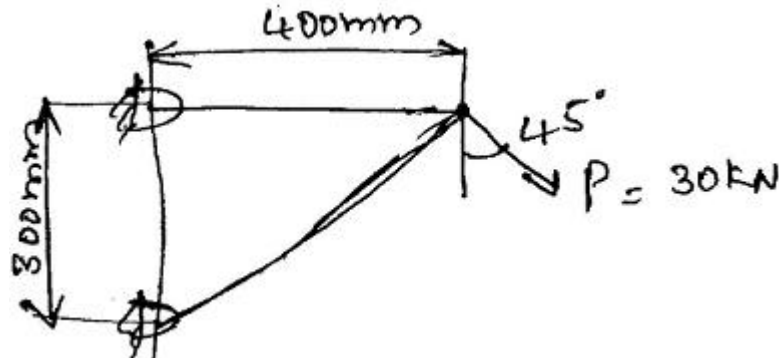

Fig. 2

11 A composite wall made up of three different materials as shown in Fig. 3 is used in the enclosure of a furnace. The inner surface of the wall is exposed to the furnace temperature of $\varnothing_\infty$ = 400°C and convection heat transfer occurs on the inner surface of the wall. The outer surface of the wall is maintained at the atmospheric temperature of 20°C. Determine the temperature distribution in the wall for the following data: w_1 = 0.4 m, w_2 = 0.2 m, w_3 = 0.1 m, K_1 = 10 W/m^{o}C, K_2 = 25 W/m^{o}C, K_3 = 60 W/m^{o}C, h = 50W/m^2 ^{o}C.
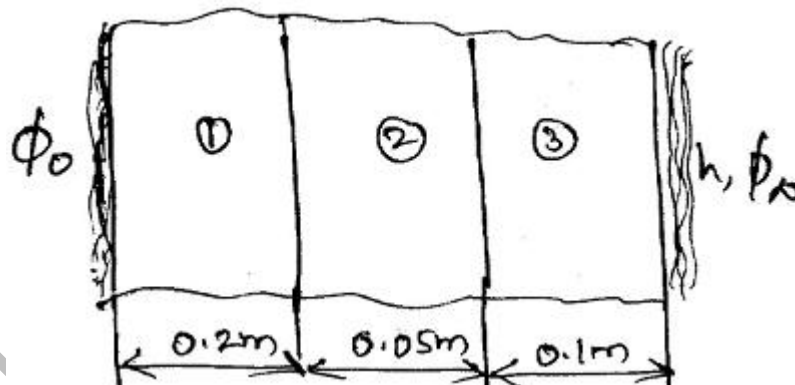

Fig. 3

12 Calculate [J], [B], and [D] matrix for an axisymmetric element shown in Fig. 4. E = 200 GPA, μ = 0.3

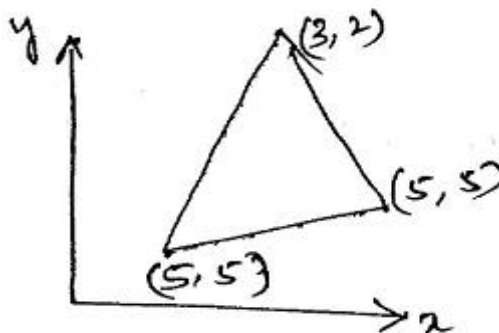**Fig. 4**

13 Find the Eigen values and Eigen vectors for the stepped bar shown in Fig. 5 in axial vibrations. E = 100GPA, … = 7500 Kg/m^3.
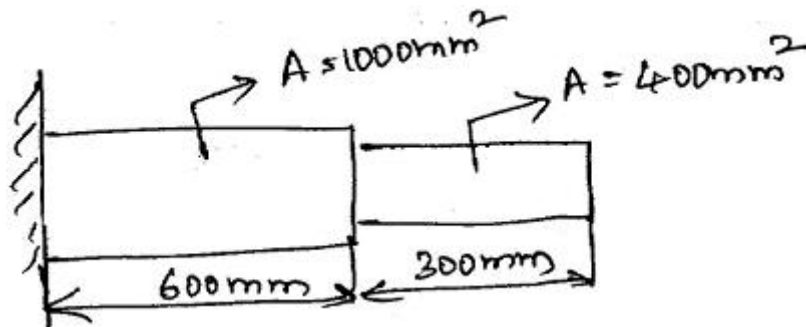

Fig. 5

14 a) Explain the finite element formulation for the irrotational flow of an inviscid fluid around a stationary circular cylinder placed between two horizontal walls.
   b) Derive material [D] matrix for 3-D formulation.

15 Derive the element equation for a beam element by potential energy approach.

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FACULTY OF ENGINEERING
B.E. 4/4 (AE) I – Semester (Suppl.) Examination, May / June 2017
Subject: Vehicle Maintenance

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 Explain different maintenance practices followed in garages / service stations.

2 Explain general safety precautions and procedure to be followed in service stations.

3 What is cylinder-head gasket? Where it is installed and why?

4 Define engine tune up, draw sequential block diagram of engine tune up procedure.

5 If a vehicle body as well as steering vibrates while breaking, what may be the reason and how it can be solved?

6 If a engine is overheating, list out the possible problems and their solution.

7 Explain the maintenance procedure and the vehicle lead acid battery and write the various tests to be conducted on the battery.

8 Explain any four problems experienced in starter motor with their causes and remedies.

9 Why a thermostat is required in a vehicle cooling system?

10 What is the purpose of anti-freezing solutions? Name some of the anti-freezing solutions.

PART – B (5x10 = 50 Marks)

11 a) Clearly demarcate overhauling and reconditioning.

    b) Name and explain different record forms used in maintenance.

12 a) List out the special tools to be used in the maintenance of an engine.

    b) What should be the sequence of piston rings from piston skirt? Write the function of each ring.

13 a) Define clutch drag and clutch slip.

    b) Describe the overhauling of clutch and gear box of a car.

14 a) Explain maintenance of alternator and head light alignment.

    b) Describe ignition system maintenance.

15 a) What is vapour lock in fuel system? How it is caused.

    b) Give a brief account of servicing of oil and fuel filter.

16 a) Explain tuning of carburetor for optimum fuel supply.

    b) List out various parts of a car which require periodic lubrication either by lubricating oil or grease.

17 Write short notes on:
    a) Computerized alignment and wheel balancing
    b) Fault diagnosis and maintenance of modern electronic controls.

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FACULTY OF ENGINEERING & INFORMATICS
B.E. 4/4 (CSE/IT) I - Semester (Suppl.) Examination, May / June 2017

Subject : Information Security

Time : 3 Hours   **Max. Marks: 75**

Note: Answer all questions from Part-A and answer any five questionsfrom Part-B.
PART – A (25 Marks)

1 Define security and specify the different keys of security implemented by any
   organization.   (2)
2 What is the most common form of violation of Intellectual property right? How does
   an organization protect from it?   (3)
3 Which Law amended the computer fraud and abuse act of 1986, and what did it
   change?   (2)
4 What is cost Benefit analysis? Given an example.   (3)
5 Specify the five elements of a business impact analysis.   (3)
6 Differentiate between static and dynamic packet filtering.   (2)
7 In an IDPS, how does true attack stimulus and false attack stimulus differ? (2)
8 Define PKI and specify its role in cryptography.   (3)
9 Illustrate Bulls eye model used in implementing information security.   (3)
10 List the steps involved in configuration management.   (2)

PART – B (50 Marks)

11 List the various stages of secure systems development lifecycle and compare
   the unique steps of it from a software development lifecycle.   (10)

12 (a) List and explain the relevant US laws for preserving privacy of customer
       information.   (4)
   (b) If the information asset B has a value score of 100 and has two vulnerabilities,
       calculate the risk for the two cases.   (6)
       (i) Given, vulnerability X has a likelihood of 0.7 with a current control that
            addresses 40% of its risk. Assumptions and data are 70% accurate.
       (ii) Given, vulnerability Y has a likelihood of 0.3 with no current control.
       Assumption and data one 50% accurate.

13 (a) List and describe six continuity strategies adopted when planning for Business
       continuity.   (5)
   (b) IPsec is achieved in 2 modes, which is dominant protocol used in VPN.
       Describe.   (5)

14 (a) List and explain the types of intrusion detection and prevention systems. (6)
   (b) Demonstrate asymmetric encryption using RSA algorithm taking an
       example.   (4)

15 Describe the process employed for performing Digital forensics.   (10)

16 (a) Explain risk analysis by elaborating the relation between threats, attack
       and vulnerabilities.   (5)
   (b) Elaborate EISP, ISSP and SYSSP documents and their key components. (5)

17 Write short notes on the following: (10)
   (a) Security Education, Training and Awareness (b) Cipher methods
       (c) Employee policies and practices

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