# FACULTY OF ENGINEERING

B.E. (Civil) V – Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject: Hydropower Engineering (Elective – I)

Time: 3 Hours   Max. Marks: 70

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

PART – A (10x2 = 20 Marks)

1   Differentiate between storage and pondage.

2   Define firm or primary power and secondary or surplus power.

3   What is an intake?

4   How are the approximate dimensions of a power house fixed?

5   What is meant by economical diameter of a penstock? How can it be found?

6   List the different types of joints used in cast iron pipes.

7   What is water hammer in pipes?

8   What is a surge tank?

9   List the different types of anchor blocks.

10 What is governing of a turbine?

PART – B (5x10 = 50 Marks)

11 a) What is a flow duration or power duration curve? Explain with a sketch. Discuss its uses.   5M

b) For a hydropower plant, the design capacity is 1.23×10^5 KW. If the generated power is 10×10^4 KW, determine: 5M

   i)   Efficiency of the plant.

   ii) Plant capacity if the peak discharge is 1.6 times the normal discharge.

   iii) Plant factor.

   iv) Total energy produced in a year.

12 a) Discuss about the dam intake and runoff river intake.   5M

b) Explain the general arrangement of a power house with a sketch.   5M

13 a) Write the design criteria for a penstock.   5M

b) Calculate the head losses and the corrected flows in the various pipes of a distribution network shown in the figure, using Hardy Cross method with Hazen William's formula. Compute the corrected flows after one correction. (Assume suitably any data missing).   5M
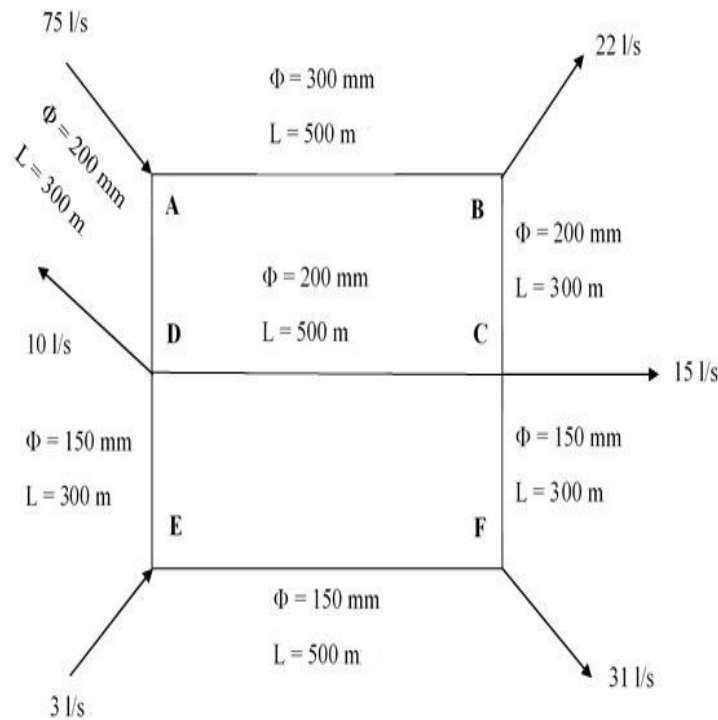
14 a) Explain the Joukowsky's method of solution for water hammer in pipes. 5M

b) A penstock pipe 750m long with cross sectional area 3.46 m^2 takes off from a reservoir and feeds water to a turbine, the level of which is 220m below the reservoir level. The steady state discharge is 9 m^3/s. If the turbine gates are closed in a period of 4.5 seconds completely at a uniform rate, what would be the water hammer pressure developed? Use Z^2=1.32 from Allievi's chart and wave velocity to be 1000 m/s. Neglect friction effects.(Assume suitably any data missing). 5M

15 a) Write about the simple surge tank of special design and differential surge tank. 5M

b) What are unit quantities? Derive the expression for unit speed. A turbine develops 9000 KW, when running at 10 rpm under a head of 30m. Determine the speed and power developed under a head of 18m. 5M

16 a) Explain in detail the forces acting on the anchor blocks with sketches. 5M

b) Discuss the specifications in laying and jointing of pipes. 5M

17 Write short notes on: 10M

i) Methods of characteristics for water hammer.

ii) Newton Raphson's method of analysis of pipes.

iii) Functions of intakes.

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FACULTY OF ENGINEERING

B. E. (Civil) (CBCS) V – Semester (Main & Backlog) Examination, December 2019

Subject: Infrastructure Engineering (Elective – I)

Time: 3 hours   **Max. Marks: 70**

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

PART – A (20 Marks)

1. Explain the significance of Infrastructure. (2)
2. Enumerate the organizations and players in the field of infrastructure. (2)
3. List out the problems with infrastructure privatization. (2)
4. Describe about the role of Water supply in Infrastructure. (2)
5. What do you mean by Core Economic risk? (2)
6. What are the risks associated with infrastructure projects? (2)
7. What are BOT and BOOT Projects? (2)
8. What are PPP Projects? (2)
9. Mention the social impact of Project Cycle. (2)
10. What are the strategies for successful implementation of infrastructure projects? (2)

PART – B (50 Marks)

11. (a) Describe the infrastructural needs of road and rail transportation. (5)

    (b) Present an overview of Infrastructure projects in Power sector. (5)

12. What are the benefits of privatization of infrastructure projects related to roads? (10)

13. (a) Explain about Mapping and Facing the landscape of risks in Infrastructure projects. (5)

    (b) Discuss about Demand risks and political risks in infrastructure planning. (5)

14. (a) Mention the attributes and parameters for Environmental Impact Assessment of Infrastructure projects. (5)

    (b) Describe the consideration involved in Land and Water interrelationships. (5)

15. What do you understand bout infrastructure engineering related to Civil Engineering Projects? (10)

16. (a) Enumerate the risk management framework for infrastructure projects. (5)

    (b) Discuss rural infrastructure projects. (5)

17. Write a short note on: (10)

    (a) Concept of Life Cycle.

    (b) Environmental regulations.

    (c) Contractual issues in infrastructure projects.

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FACULTY OF ENGINEERING

B.E (Civil) V-Semester (CBCS) (Main & Backlog) Examination, Dec 2019

Subject: Soft Computing skills in CE (Elective-I)

Time: 3 Hours   **Max. Marks: 70**

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

PART – A (20 Marks)

1. State briefly L.P. primal problem and Dual problem with an example.   [3]

2. A L.P. Model has the following formulation. Convert it into a Standard form and also state different variables of the problem.   [3]

$$Min \quad Z = 2X_1 + X_2$$
$$\text{Sub to} \quad 3X_1 + X_2 = 3$$
$$4X_1 + 3X_2 \geq 6$$
$$X_1 + 2X_2 \leq 4$$
$$X_1 + X_2 \geq 0$$

3. State the Bellman's principle of Optimality   [2]

4. Define a Neural Network model with a sketch.   [3]

5. Define membership form is Fuzzy logic.   [3]

6. Two fuzzy sets are given below compute Union, Intersection and Complement.   [4]

$$\tilde{A} = \left\{ \frac{0.1}{3}, \frac{0.3}{6}, \frac{0.7}{8}, \frac{0.9}{10} \right\} \qquad \tilde{B} = \left\{ \frac{0.2}{3}, \frac{0.3}{6}, \frac{0.5}{8}, \frac{0.8}{10} \right\}.$$

7. Write binary coding for 3 and 5.   [2]

PART – B (5 x 10 = 50 Marks)

8. a) Explain Revised Simplex Algorithm and various steps involved to solve L.P. Problem.[7]
   b) Differentiate the method of solving L.P. problem using Big M method and Two Phase method.   [3]

9. Solve the following L.P. problem.   [10]

$$Min \quad Z = X_1 + X_2 + 2X_3$$
$$Sub \ to \quad X_1 + X_3 \leq 15$$
$$X_1 - X_2 + 5X_3 \geq 10$$
$$2X_1 + 2X_2 - X_3 \geq 10$$
$$X_1, X_2, X_3 \geq 0$$

10. Allocation of water has to be done to three different irrigated regions for water supply from a canal system. Formulate a Dynamic programming Model for the problem. Also solve the problem using the benefits of these allocations to the users given below. Make allocation of the available resources of 40 units in steps of 10 units.   [10]

Quantity units	Irrigated Region 1	Irrigated Region 2	Irrigated Region 3
0	0	0	-1
10	03	02	04
20	05	06	06
30	07	08	09
40	10	11	10

11. Using Bank Propagation Network concept, compute the weights for the given network in Figure-1. The input pattern is [0,1]. The target output is 1. Assume learning rate as 0.30. Use Binary Sigmoidal function. The weights are given in the network. Perform minimum of two iterations for the entire Network. [10]

Figure – 1
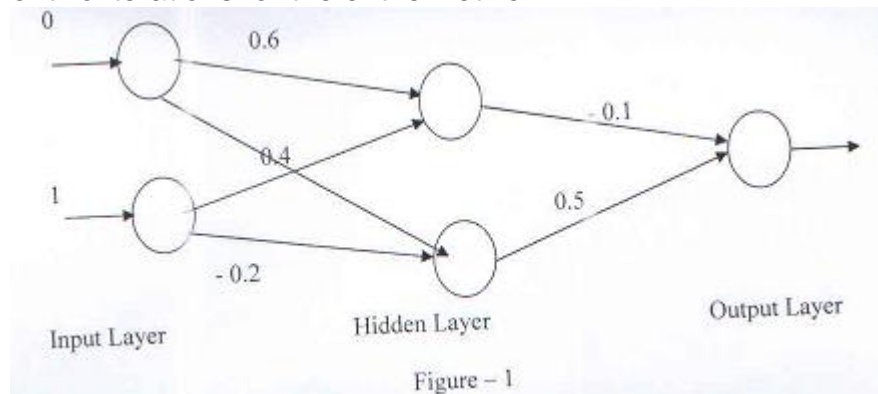
12. a) Consider two fuzzy sets given below. Compute Algebraic Sum, Algebraic Product, Bounded Sum and Bounded Differences. [5]

$$\tilde{A} = \left\{ \frac{0.1}{1}, \frac{0.5}{3}, \frac{0.7}{5}, \frac{1.0}{7} \right\} \qquad \tilde{B} = \left\{ \frac{0.3}{1}, \frac{0.4}{3}, \frac{0.5}{5}, \frac{0.9}{7} \right\}.$$

b) With the aid of neat sketches and relevant expressions, explain three important membership functions adopted generally in Fuzzy Logic models. [5]

13. a) With the help of flow chart explain various steps of Genetic Algorithm. [5]
    b) Explain the selection operator methods adopted in Genetic Algorithms. [5]

14. Write short notes on the following:
    (a) De-fuzzification methods in Fuzzy Logic models. [3]
    (b) Capacity Expansion application using D.P. model [3]
    (c) Neural Network Architecture [4]

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FACULTY OF ENGINEERING

B.E. (EEE) V – Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject: Programmable Logic Controllers (Elective – I)

Time: 3 Hours   **Max.Marks: 70**

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

PART – A (10x2 = 20 Marks)

1. List a few disadvantages of using PLC.
2. Name 4 analog devices which are connected to the input of PLC.
3. Convert following word description in to PLC ladder diagram.
   Switch 7 and switch 9, plus either switch 12 or switch 14, must be on for output 35 to be on.
4. Discuss the peculiarity of normally closed contact.
5. Convert following octal numbers to decimal number
   54 and 213.
6. List the symbols used for different arithmetic operations.
7. Differentiate between input register and input group register.
8. What is meant by non-retentive timer?
9. What are the different comparison functions available in PLC?
10. What is TABLE to TABLE function?

PART – B (5x10 = 50 Marks)

11. a) Discuss the evolution of relay and the computer evolution into the PLC.   5

     b) List the rules for constructing ladder diagrams.   5

12. Design a ladder diagram and flow chart for a fundamental industrial control problem: spray process system.   10

13. a) When a switch is turned on, output C goes on immediately and D goes on 9 seconds later. Opening the switch turns both C and D off. Write a ladder program for timer.   5

     b) An indicating light is to go on when a count reaches 23. The light is then go off when a count of 31 is reached. Write a ladder program for counter.   5

14. a) Discuss PLC addition function with an example.   5

     b) Discuss one application of PLC digital bit function.   5

15. a) Differentiate between SKIP and MASTER CONTROL RELAY.   5

     b) Discuss PLC data move systems.   5

16. Discuss the PLC sequencer function with the example of a dishwasher.   10

17. a) There are three machines with its own start stop buttons. Only one may run at a time. Construct a ladder diagram with appropriate interlocking.   5

     b) What is PLC repetitive clock? Where does it require?   5

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FACULTY OF ENGINEERING

B.E. (EEE) V – Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject: Electronic Instrumentation (Elective – I)

Time: 3 Hours   Max. Marks: 70

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

PART – A (10x2 = 20 Marks)

1   What are the uses of piezo- electric material and transducers?   2 M

2   Brief the operation of photo multiplier.   2 M

3   List out the advantages of a charge amplifier.   2 M

4   Define common mode rejection ratio.   2 M

5   Draw the ideal characteristics of band stop and high pass filter.   2 M

6   An analog transducer with a 0-10 V input is able to distinguish a change of 10 mV in its input signal. Calculate its resolution and the number of bits of an A/D converter to that the digital output has almost the same resolution as the transducer. The A/D converter uses a binary code.   2 M

7   Draw the timing diagram of ramp DVM and brief.   2 M

8   Differentiate between the differential transformer recorder and X-Y recorder.   2 M

9   The gap of a tape recorder is 6.25 micro-m. Determine the speed of the tape so has to have a satisfactory response at 50,000 Hz. Assume that recorded wavelength must be greater than 2.5 times the gap of the recorder.   2 M

10 Brief about the magnetic material used for tape.   2 M

PART – B (5x10 = 50 Marks)

11 With necessary diagrams explain in detail about ionized and modified ionized transducer working principle.   10 M

12 a) From fundamentals obtain the expression for closed loop gain of an operational amplifier.   5 M
   b) With neat diagram explain the working principle of chopper type dc amplifier.   5 M

13 a) Discuss about band rejection filter operation with neat diagrams.   5 M

   b) A simple equal arm voltage sensitive bridge is initially in balance (null). Three of the arms consist of ordinary resistors, while the fourth is a thermistor. Each arm has a nominal resistance of 10,000 ohms and bridge is energized with a 6 V dc source. A) if the temperature change causes a +5% change in thermistor resistance, what output voltage will be indicated from the bridge? B) if a -5% change in resistance is caused, what will be the bridge output?   5 M

14 a) What is digital frequency meter? Explain its principle of operation, construction and working.   6 M

b) With neat diagram explain in detail about operating principle to strip char recorder.   4 M

15 Draw the block Schematic of CRT and explain its working. What are the possibilities and limitations of improving Deflection Sensitivity of CRT?   10 M

16 a) Explain about Delay lines in CROs.   5 M

b) An electrostatically deflected cathode ray tube has plane parallel deflecting plates which are 2.5cm along and 0.5 cm apart, and the distance from their centre to the screen is 20 cm. The electron beam is accelerated by a potential difference of 2500 V and is projected centrally between the plates. Calculate the deflecting voltage required to cause the beam to strike a deflecting voltage and find the corresponding deflection of the screen.   5 M

17 a) Discuss in detail about automatic zeroing RMS detector used in DMM.   5 M

b) Write short notes on successive approximation method.   5 M

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FACULTY OF ENGINEERING

B.E V-Semester (CBCS) (EEE) (Main & Backlog) Examination, December 2019

Subject : FACTS DEVICES (Elective –I)

TIME: 3 Hrs   Max. Marks: 70

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

Part – A (20 Marks)

1 What are the basic applications of FACTS-devices?   (2)

2 List important controllable parameters that are considered for power flow control.   (2)

3 Explain basic principle of current source converter.   (3)

4 Explain basic principle of STATCOM.   (3)

5 List Functions of TSC –TCR type VAR generator.   (3)

6 Explain usefulness of UPFC in power industry.   (2)

7 Explain basic idea behind series capacitive compensation.   (3)

8 How to prevent voltage instability in FACTS.   (2)

PART – B (50 Marks)

9. (a) Distinguish between shunt connected controllers with series connected
   controllers   (5)
   (b) What are FACTS controllers and explain different categories of FACTS
   controllers   (5)

10. (a) Explain FC-TCR Configuration of Static shunt compensator   (5)
    (b) Explain different control techniques of TCR   (5)

11. Explain operating principle and different control techniques of STATCOM   (10)

12. Explain capability of UPFC to control real and reactive power flow in transmission
    line   (10)

13. Explain improvement methods of system stability using FACTS controllers   (10)

14. (a) Explain the method of voltage control by SVC   (5)
    (b) Discuss the role of TCSC in enhancement of system damping   (5)

15. (a) What are the methods for protection against Over Voltage?   (10)
    (b) Discuss SSSC
    (c) Discuss VAR rating

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FACULTY OF ENGINEERING

BE V Semester (CBCS)(Inst.) (Main & Backlog) Examination, December 2019
Subject: Advanced Sensors

Time: 3 Hours   **Max Marks:70**

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

PART – A (20 Marks)

1. Write any two limitations of capacitive measurement.   (2)
2. Why it is not recommended to rely only on sensor system characteristic alone? (2)
3. Discuss biosensor using its block diagram   (2)
4. Describe the term MEMS.   (2)
5. What are the fundamental requirements of smart sensors?   (2)
6   Give a detail working of an application of smart sensor.   (2)
7. Give the working of semiconductor gas detector.   (2)
8. What is H_2O turbidity?   (2)
9. What is robotics vision? Give an example.   (2)
10 Write a few characteristics of robotics sensors.   (2)

PART – B (50 Marks)

11 Explain a few guidelines for selecting and installing measurement/sensor.   (10)
12. What is bio receptor molecule? Explain any three.   (10)
13. (a) Explain the task involved in the development of biosensors.   (5)
    (b) Why nano-sensors? Write the salient features of CNTs.   (5)
14. (a) Explain the Law which governs the electromagnetism in sensing.   (5)
    (b) Explain the inductive proximity sensor using a suitable block diagram.   (5)
15 Differentiate between Touch and Tactile sensor. Suggest each with their
    working.   (10)
16 Write short note on:
    a) Applications of biosensors   (10)
    b) Types of proximity sensors
    c) Pollution sensors
17. a) Discuss a few mass sensors.   (5)

    b) Explain the working and construction of fiberoptics pressure sensor.

                                                                                  (5)

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FACULTY OF ENGINEERING

B.E. V – Semester (CBCS) (CSE) (Main & Backlog) Examination, December 2019
Subject: Artificial Intelligence (Elective-I)

Time: 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part A. Answer any five questions from Part B.
PART – A (10X2=20 Marks)

1 Define heuristic function and search in a state space.   2

2 Write the first order logic of the sentence "*Marcus tried to assassinate Ceaser*".   2

3 What is a semantic network and how it is used to represent knowledge?   2

4 What is meant by recursive descent parsing?   2

5 Prove the following theorem using natural deduction system A∧B *infer* A∧(B∨C) 2

6 Write the characteristics of an expert system.   2

7 What is an artificial neuron?   2

8 What are the applications of support vector machine?   2

9 Differentiate between supervised and unsupervised learning   2

10 Draw the parse tree for the sentence *"Colorless green ideas sleep furiously"*   2

PART – B (5x10 = 50 Marks)

11 Use resolution refutation to prove that a gray rabbit likes a pink rabbit;   10
   that is, prove $(\exists x, y)[Gray(x) \wedge Pink(y) \wedge Likes(x, y)]$

   From the following facts about them:

   1. Sunny, Tommy, and Puppy are rabbits.

   2. Sunny is pink.

   3. Tommy is gray and likes Puppy.

   4. Puppy is either pink or gray (but not both) and likes Sunny.

12. What are the different methods that are available in proving the validity of the   formula
    and construct a semantic table for the formula (A∧~B) ∧(~B->C)   10

13. Explain Back propagation algorithm with example.   10

14. Draw the architecture of expert system and explain how truth maintenance system is
    used in expert systems   10

15. How is support vector machine is used for linear and non-linear classification of data?10

16. Explain the various phases in Natural Language Processing.   10

17. What is semantic web? Explain how Resource Description Framework is used to build
    semantic web.   10

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FACULTY OF ENGINEERING

B.E. (IT) V-Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject : Artificial Intelligence (Elective-I)

Time : 3 hours   **Max. Marks : 70**

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

PART – A (10 x 2 = 20 Marks)

1 List the advantages of DFS.
2 Define Turing test.
3 Define a Neural network. Explain the different types of layers.
4 Write short notes on semantic networks.
5 Define ANN.
6 Explain an expert system.
7 Write the expression for sigmoid function.
8 State and explain logical entailment in predicate calculus.
9 Why is A* admissible?
10 State plausibility.

PART – B (5 x 10 = 50 Marks)

11 a) Describe A* algorithm. Support your answer with an example.   6
   b) Give four criteria for evaluation of search strategies and explain each strategy
      briefly.   4

12 a) Obtain the resolution proof for the proposition "Angle B is equal to Angle C'
      from the following axioms :   5
      i)   If a triangle is equilateral then it is isosceles
      ii) If a triangle is isosceles then two sides AB & AC are equal
      iii) If AB & AC are equal then angle B and angle C are equal
      iv) ABC is an equilateral triangle
   b) Write short notes on Hill climbing.   5

13 a) Write the steps to convert the formula in proportional logic into CNF. Convert the
      formula $(\neg A \rightarrow B) \wedge (C \wedge \neg A)$ into its equivalent CNF representation.   4+3
   b) Write the following predicate statement to clause form.   3
      $\forall x$ [Roman(x) $\rightarrow$ LoyalTo (x, Caesar) v Hate(x, Caesar)]

14 a) Explain Dempster – Shafer theory.   5
   b) Define perceptron and design a perceptron for the Boolean function OR.   5

15 Explain multilayer feed forward networks and how these networks are trained to
   learn a concept.   10

16 Draw and explain the architecture of expert system.   10

17 Write short notes on :   5+5
   a) Bayesian belief networks
   b) Knowledge representation using Frames

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FACULTY OF ENGINEERING

BE (IT) V Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject: Multimedia Technologies (Elective-I)

Time: 3 Hours　　　　　　　　　　　　　　　　　　　　　　**Max Marks:70**

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

PART – A (20 Marks)

1. List the components of multimedia. (2)

2. What is the purpose of Multimedia Authoring Tools? Give any two Multimedia Authoring Tools. (2)

3. Differentiate between bitmap images and vector drawn images. (2)

4. What color is outdoor light? Around what wavelength would you guess the peak power is for a red sunset? (2)

5. What is the purpose of chroma subsampling used in digital video? (2)

6 Give an example (in English, not hex) of a MIDI voice message. (2)

7. Calculate the entropy of a "checkerboard" image in which half of the pixels are BLACK and half of them are WHITE. (2)

8. How many principal modes does JPEG have? What are their names? (2)

9. What is the key difference between IPv6 and IPv4? (2)

10 How useful would you say the textual data is as a cue for identifying image contents while searching for several web site image captions? (2)

PART – B (50 Marks)

11 (a) What are the popular file formats? Explain in brief. (5)

　　(b) Describe the good desirable features of image-editing tools with examples (5)

12. Discuss the following transformations.
　　(a) XYZ to RGB Transformation. (5)
　　(b) XYZ to RGB Transformation with gamma correction. (5)

13. (a) Write about various digital video recording formats. (5)
　　(b) Discuss MIDI-to-WAV conversion? (5)

14. Briefly discuss about Audio compression techniques. (10)

15 (a) Describe the functionalities of each layer in the OSI model and their relations to multimedia communications. (5)

　　(b) Discuss key technologies in the current CBIR systems in brief. (5)

16 (a) Explain how you can create an animated scene with an example. (5)

　　(b) Explain different graphics and image data representations and their data types (5)

17. Write short notes on the following
　　a) ITU-R Standards for Digital Video (4)
　　b) H.263 (3)
　　c) Visual concept search (3)

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