

JAMMU & KASHMIR BOARD OF TECHNICAL EDUCATION

MJ-22

Subject: Applied Mathematics-II
Scheme: New

Semester: 2nd
M. Marks: 100

Roll No. 16-07 R21-16 817
Branch: All
Time: 03 Hours

Instructions:

1. Attempt any Five Questions.
2. Figures to the right indicate marks.

Q1. (a) Evaluate the limit $\lim_{x \rightarrow 0} \frac{1 - \sqrt{1+x}}{x}$ 10

(b) Evaluate $\int \tan^{-1} x \, dx$ 10

Q2. (a) Differentiate from the first principle the function $\sin x$ w.r.t x . 10

(b) If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots \dots \dots \infty}}}$

Prove that $\frac{dy}{dx} (2y - 1) = \cos x$ 10

Q3. (a) Differentiate the function $\sin^{-1}(2x\sqrt{1-x^2})$ 10

(b) Find the point at which the curve $y = 10 + 2x - x^2$ has its slope equal to unity 10

Q4. (a) If $y = \tan^{-1} x$ prove that $(1+x^2) \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} = 0$ 10

(b) Evaluate $\int \sqrt{x}(ax^2 + bx + c) \, dx$ 10

Q5. (a) Evaluate $\int \sin 4x \cos 3x \, dx$ 10

(b) Evaluate the limit $\lim_{x \rightarrow 0} \frac{1 - \cos x}{\sin^2 x}$ 10

Q6. (a) Solve the differential equation $\frac{dy}{dx} + \frac{2}{x} y = 0$ 10

(b) Integrate $\int_0^{\frac{\pi}{2}} \sin^2 x \, dx$. 10

Q7. (a) Find the mean from the given data.

Class interval	0-7	7-14	14-21	21-28	28-35	35-42	42-49
frequency	19	25	36	72	51	43	28

(b) Find out the standard deviation for the following data 5, 8, 7, 11, 9, 10, 8, 2, 6, 7.

10

Q8. (a) Solve the differential equation $\frac{dy}{dx} - \frac{y}{x} = \tan \frac{y}{x}$.

10

(b) The arithmetic mean of 7, 9, 5, 2, 4, 8, x is given to be 7. Find x.

10

Q9. (a) Differentiate $e^{\sin^{-1} x}$.

10

(b) Evaluate $\int x e^{2x} dx$

10

Q10. (a) Find the maximum slope of the curve $y = -2x^3 + 6x^2 + 8x - 1$

10

(b) Differentiate $\sin^{-1}(2x\sqrt{1-x^2})$

10

$$\frac{dy}{dx} - \frac{y}{x} = \tan \frac{y}{x}$$

$$\frac{dy}{dx} = \frac{2}{x\sqrt{1-x^2}}$$

$$\frac{1 - \sin^2 \theta}{\cos \theta} = 1$$

$$\begin{array}{r} 127 \\ 384 \\ \hline 945 \\ 315 \end{array}$$

JAMMU & KASHMIR BOARD OF TECHNICAL EDUCATION

MJ-22

Subject: Basic Electrical Engg.

Branch: Eletx. & Comm. Engg. / Med. Eltx. /Computer Engg. /IT

Scheme: New

M. Marks: 100

Roll No.....

Semester: 2nd

Time: 03 Hours

Note: Attempt any five questions.

- Q.1. (a) Derive an expression for total resistance when resistances are connected in series. (10)
- (b) Explain Kirchhoff's current law and voltage law. (10)
- Q.2. State and Explain Thevenin's Theorem. (20)
- Q.3. (a) What do you mean by constant voltage source. Explain Ideal Voltage source. (20)
- Q.4. (a) Define Magnetic Circuit. Also give the comparison between magnetic circuit and electric circuit (20)
- Q.5. Define
- (i) Magneto motive force(mmf) (ii) Reluctance (5*4=20)
- (iii) Flux (iv) Relative Permeability
- Q.6. (a) Differentiate between primary and secondary cell. (10)
- (b) Explain Faraday's laws of Electromagnetic Induction (10)
- Q.7. Explain the construction details and working of Nickel Cadmium Battery. (20)
- Q.8. Explain the effect of AC applied to a pure capacitance. (20)
- Q.9. Draw a block diagram of Hydro-electric Power Station. Label its various parts and write briefly function of each part. (20)
- Q.10. (a) Write down the advantages and disadvantages of Thermal Power Station. (10)
- (b) Write short notes on:
- (i) impedance triangle (ii) phase angle (10)

JAMMU & KASHMIR BOARD OF TECHNICAL EDUCATION

M3-22

Subject: Applied Physics-II

Semester: 2nd

Roll No. 160 + 2242 - 1687

Scheme: New

M. Marks: 100

Branch: All

Time: 03 Hours

Instructions:

1. Attempt any Five Questions.
2. Figures to the right indicate marks.

- Q1. (a) Derive lens formula for convex lens . when real image is formed with suitable diagram. 10
(b) Define power of a lens . Write its unit . Find the power of a lens whose focal length is 2cm. 10
- Q2. (a) State and prove Coulombs law in Electrostatics. 10
(b) State and explain the experimental verification of Ohms law. 10
- Q3. (a) Find the equivalent resistance when three resistances are connected in parallel. 10
(b) Capacitors of 4, 5, and 6 microfarads are connected (1) in parallel and (2) in series. Compare the effective capacitances in the two cases. 10
- Q4. (a) Current of 20 A flows into Circuit consisting of 2, 4, 5, & 20 Ω resistance respectively in parallel. Determine the current in each branch. 10
(b) Explain with the suitable diagram construction and working of half wave rectifier. 10
- Q5. Explain the construction and working of moving coil galvanometer? 20
- Q6. (a) Differentiate between P-type and N- type Semiconductors. 10
(b) Explain the terms:
(1) Valence band (2) Conduction band
(3) Forbidden Energy gap 10
- Q7. (a) Plot and explain VI Characteristics of PN Junction diode. 10
(b) State Gauss's theorem .How Coulombs law can be derived from it. 10
- Q8. (a) A galvanometer of resistance 10 Ω gives full scale deflection for a current of 4mA. How can it be converted into ammeter of range 0 to 5 A. 10
(b) Write short note on Kirchhoff's laws and their applications. 10
- Q9. (a) Draw Course of rays through a compound microscope. Deduce an expression for its magnifying power. 10
(b) What are the applications of the X -rays in medicine. 10
- Q10. (a) What is an Optical fiber? Discuss various type of optical fiber. 10
(b) Give Construction and working of Slide Wire Bridge. 10

JAMMU & KASHMIR BOARD OF TECHNICAL EDUCATION

MJ-22

Branch: E&C/IT/Computer/Med.Eltx.

Time: 3hrs

Scheme: New

Attempt any five questions.

Roll No. 16-07 -R 21- 27 03

Subject: Basic Electronics

Maximum Marks: 100

Semester: 2nd

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- Q.1) a: Write down the differences between Active and Passive Components. (10)
b: Draw Energy Level diagram of Insulators, conductors and semiconductors. (10)
- Q.2) Define Co-valent bond. Draw and explain Atomic Structure of Germanium and Silicon (20)
- Q.3) Draw and explain the circuit diagram of Center tapped full wave rectifier with necessary waveforms. (20)
- Q.4) Explain full wave bridge rectifier with necessary waveforms and circuit diagram. (20)
- Q.5) Draw and explain the structure of an NPN transistor. Also explain the mechanism of current flow in it. (20)
- Q.6) Draw and explain Input and output characteristics of transistor in Common Emitter configuration. (20)
- Q.7) Draw and explain single stage amplifier circuit in common emitter configuration also explain phase reversal of the output voltage. (20)
- Q.8) Explain operation of a MOSFET(depletion or enhancement) with necessary diagrams. (20)
- Q.9) Compare JFET, MOSFET and BJT. What are advantages and applications of CMOS? (20)
- Q.10) a) Explain fixed bias configuration with the help of a circuit diagram. (10)
b) Explain H-parameters briefly. (10)
- 34x

JAMMU & KASHMIR BOARD OF TECHNICAL EDUCATION

U-22

Subject: Communication Skills-II
Scheme: New

Semester: 2nd
M. Marks: 100

Roll No. 1607-22M-2-1687
Branch: All
Time: 03 Hours

Instructions:

1. Attempt all Questions.
2. Figures to the right indicate marks.

1. Answer the following question briefly:
 - A. Describe the grandmother's routine in the village.
 - B. Describe how the grandmother celebrated the writers return from abroad.
 - C. Why were all the girls so fond of Isabel at school.
 - D. Why were the Burmells not satisfied with the school their children went to.
 - E. Why did the old farmer feed his grand-child and not himself with the copper coin.
 - E. Describe the manner in which the old man fed his grand-child. [4x2½=10]
2. What are the delights of walking tours? Or
Describe the life of Henry Dunant after his disappearance from the public view? [10]
3. Give the summary of Poem, "All the world's A stage"? Or
Give the summary of poem "Pipa's Song"? [10]
4. Precise the following paragraph to its one third and also give a suitable title:
But to read nothing but books of fiction is like eating nothing but cakes and sweetmeats. As we need plain, wholesome food for the body, so, we must have serious reading for the mind. And here we can choose according to our taste; There are many noble books on history, biography, philosophy, religion, travel and science which we ought to read and which will give us not only pleasure but an education. And, we can develop a taste for serious reading, so that in the end it will give us none solid pleasure than even novels and books of fiction. [10]
5. Write a letter to your friend describing your first day in the college.
Or
Write a letter to toy company to send its price list and catalogue. [10]
Write a report in the form of a memo on the Cricket tournament held in your institution?
Or
Draft a circular on informing the employees about change in office thing? [10]

- Q7. Translate the following words into Urdu or Hindi:
- | | | | | |
|-----------|----------|-----------|--------------|-------------|
| A. Acid | B. Alum | C. Ampere | D. Balance | E. Base |
| F. Bridge | G. Chain | H. Flask | I. Viscosity | J. Concrete |
- [10]

- Q8. What do you mean by written communication? What are its advantages?
Or [10]

- Q9. Explain horizontal and diagonal communication?
What do you mean by listening? Explain barriers to listening?
Or [10]
What do you mean by downward communication? What are its advantages?

- Q10. A. Change the voice (any five):

1. He threw the ball.
 2. Tom painted the wall.
 3. Inayat likes coffee.
 4. The doctor is examining the patient.
 5. She write a letter.
 6. The teacher drew figures.
 7. She is solving the sum.
- [05]

- B. Change the narration indirect speech (any five):

1. The child said, "Papa is busy now".
 2. He said to me, "Have you seen the Taj Mahal".
 3. I said to my friend, "Barking dogs seldom bite".
 4. She said, "Why are you late".
 5. He said, "Earth moves round the sun".
 6. He says, "I am leaving".
 7. Rita said, "I am going to Delhi".
- [05]